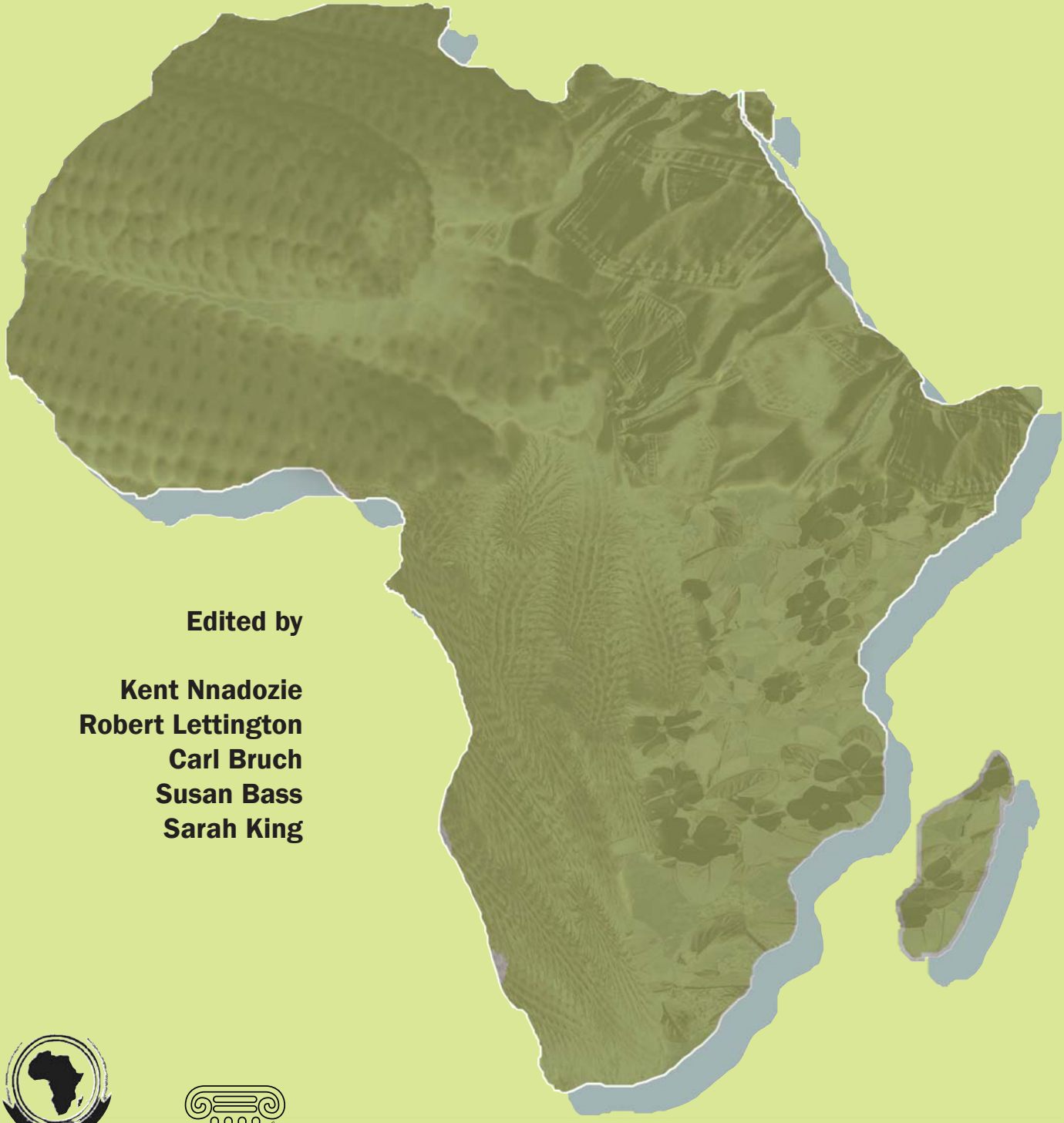
AFRICAN PERSPECTIVES ON GENETIC RESOURCES

AFRICAN PERSPECTIVES ON GENETIC RESOURCES

A HANDBOOK ON LAWS, POLICIES, AND INSTITUTIONS



Edited by

Kent Nnadozie
Robert Lettington
Carl Bruch
Susan Bass
Sarah King

AFRICAN UNION/UNION AFRICAINE
Scientific, Technical & Research Commission (STRC)
Commission Scientifique, Technique et de la Recherche (CSTR)

ENVIRONMENTAL LAW • INSTITUTE®

SEPRI
Southern Environmental and Agricultural Policy Research Institute

AFRICAN PERSPECTIVES ON GENETIC RESOURCES

A Handbook on Laws, Policies, and Institutions Governing Access and Benefit Sharing

African Perspectives on Genetic Resources:
A Handbook on Laws, Policies, and Institutions Governing Access and Benefit Sharing

ISBN# 1-58576-068-4, ELI project codes 001306, 020901

Dedicated to the life and spirit of Robert Mshana,
who helped launch this book

TABLE OF CONTENTS

ACRONYMNS

AABSML – African Access and Benefit Sharing Model Law
ABS – Access and benefit sharing
ADLI – Agricultural Development-Led Industrialization
ADMADE (Zambia) – Administrative Management Design for Wildlife Management
AGOA – U.S. African Growth and Opportunity Act
ANCAR (Senegal) – National Agency of Agricultural and Rural Advice
AMCEN – African Ministerial Conference on the Environment
ANAE (Madagascar) – National Association for Environmental Actions
ANADER (Ivory Coast) – National Agency for Rural Development
ANGAP (Madagascar) – National Association for the Management of Protected Areas
ARC – Agricultural Research Centre
ARIPO – African Regional Intellectual Property Organisation
ASALs – Arid and Semi-Arid Lands
ASARECA – Association for Strengthening Agricultural Research in Eastern and Southern Africa
ASRT – Academy of Scientific Research and Technology
AU – African Union
BDCP – Bioresources Development and Conservation Programme
BioEARN – Biotechnology East African Regional Network
BSP – Biodiversity Support Program
CBD – Convention on Biological Diversity
CBNRM – Community based natural resources management
CEMAC – Central African Economic and Monetary Community
CGIAR – Consultative Group on International Agricultural Research
CGRFA – (FAO's) Commission on Genetic Resources for Food and Agriculture
CHM – Clearing house mechanism
CI – Conservation International
CIDT – Ivorian Textile Development Company
CIMMYT – International Centre for the Improvement of Maize and Wheat
CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLIMA – Centre for Legumes in Mediterranean Agriculture
CNCSP (Senegal) – National Consultative Committee on Seeds and Plants
CNRA (Ivory Coast) – National Agricultural Research Centre
CONGAD (Sengal) – Council of NGOs for Development Support
CONSERE (Senegal) - Superior Counsel on Natural Resources and the Environment
COP - Conference of the parties
CORE (Madagascar) – Committee for the Orientation of Environmental Research
COREF/WECARD – West and Central African Council for Agricultural Research and Development
CRACV (Egypt) – Committee on Registration of Agricultural Crop Varieties
CRESERE – Circle for Reflection, Study and Support of Environmental Education
CRODET (Senegal) – Oceanographic Research Centre of Dakar-Thiaroye
CSIR (South Africa) – Council for Scientific and Industrial Research
DEAT (South Africa) – Department of Environmental Affairs and Tourism
DEF (Madagascar) – Directorate of Water and Forests
DNA – Deoxyribonucleic acid
DTC – Development through conservation
EAC – East African Community

ECZ (Zambia) – Environmental Council of Zambia
ECOWAS – Economic Community of West African States
EEAA (Egypt) – Egyptian Environmental Affairs Agency
EEZ – Exclusive economic zone
EIA – Environmental Impact Assessment
EMPS (Seychelles) – Environmental Management Plan for Seychelles
ENDA (Senegal) – Environment and Development Action
ENSA (Ivory Coast) – National School for Advanced Agronomy
EPA (Ethiopia) – Environmental Protection Authority
ESP (Zambia) – Environmental Support Programme
EU – European Union
EWCO (Ethiopia) – Ethiopian Wildlife Conservation Organization
FANR – (SADC Directorate) Food, Agriculture and Natural Resources
FAO – Food and Agriculture Organization of the United Nations
FDNR (Senegal) – National Fund for Rural Development
FEPA (Nigeria) – Federal Environmental Protection Agency
FMST (Nigeria) – Federal Ministry of Science and Technology
FNRAA (Senegal) – National Fund for Agricultural and Agri-food Research
FOFIFA (Madagascar) – Agricultural Research Center
FONGED (Ivory Coast) – Forum of Environmental and Development NGOs
FRU (Ivory Coast) – Biosciences Education and Research Unit
GDP – Gross domestic product
GEF – Global Environment Facility
GELOSE – Secured local management of natural resources
GM – Genetically modified, or genetic modification
GMAs – Game management areas
GMOs – Genetically modified organisms
GOPI (Madagascar) – Official Industrial Property Gazette
GNP – Gross national product
GRAIN – Genetic Resource Action International
GRBC (Malawi) – Genetic Resources and Biotechnology Committee
GPRI – Genetic Resource Policy Initiative
GRU – Genetic Resources Unit
GTZ – German Society for Technical Cooperation
GURTs – Genetic use restriction technologies
IARCs – International Agricultural Research Centres
IBCR (Ethiopia) – Institute of Biodiversity Conservation and Research
IBPGR – International Board on Plant Genetic Resources (now IPGRI, see below)
ICARDA – International Centre for Agricultural Research in Dry-land Areas
ICBG – International Cooperative Biodiversity Group
ICIPE – International Centre of Insect Physiology and Ecology
ICRAF – International Centre for Research in Agroforestry
ICRISAT – International Crops Research Institute for the Semi-Arid Tropics
IDC (Seychelles) – Island Development Company
IDEFOR (Ivory Coast) – Forests Institute
IDESSA (Ivory Coast) – Savannah Institute
IDRC – International Development Research Centre
IITA – International Institute for Tropical Agriculture
ILO – International Labour Organization
ILRI – International Livestock Research Institute
IMF – International Monetary Fund

IOC – Indian Ocean Commission
IPR – Intellectual property right
IRRI – International Rice Research Institute
IPGRI – International Plant Genetic Resources Institute
ISE (Senegal) – Environmental Sciences Institute
ISRA – Senegalese Institute of Agricultural Research
ITPGR – International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN – World Conservation Union
KARI – Kenya Agricultural Research Institute
KEFRI – Kenya Forestry Research Institute
KEMFRI – Kenya Marine and Fisheries Research Institute
KEMRI – Kenya Medical Research Institute
KENRIK – Kenya Resource Centre for Indigenous Knowledge
KEPHIS – Kenya Plant Health Inspectorate Service
KIPI – Kenya Industrial Property Institute
KWS – Kenya Wildlife Service
LUA (Nigeria) – Land Use Act
MACO (Zambia) – Ministry of Agriculture and Cooperatives
MEAs - Multilateral environmental agreements
MENR (Zambia) – Ministry of Environment and Natural Resources
MINEF (Cameroon) – Ministry of the Environment and Forestry
MoE (Madagascar) – Ministry of Environment
MOU – Memorandum of understanding
MLS – Multilateral system of access and benefit sharing
MPAs (Seychelles) – Marine protected areas
MTA – Material transfer agreement
NACGRAB (Nigeria) – National Centre for Genetic Resources and Biotechnology
NARO (Uganda) – National Agricultural Research Organization
NBI (South Africa) – National Botanical Institute
NBSAP – National Biodiversity Strategy and Action Plan
NBU (Egypt) – National Biodiversity Unit
NCA – National competent authority
NCF (Nigeria) – Nigeria Conservation Foundation
NCI – U.S. National Cancer Institute
NCST (Kenya) – National Council for Science and Technology
NEAP – National Environmental Action Plan
NEMA – (South Africa) National Environmental Management Act, or (Uganda), National Environmental Management Authority
NEPAD –New Partnership for Africa's Development
NESDA – Network for Environment and Sustainable Development in Africa
NEST (Nigeria) – Nigeria Environment Action/Study Team
NGO – Non-Governmental Organization
NIH – U.S. National Institutes of Health
NIPRD – National Institute for Pharmaceutical Research and Development
NISIR (Zambia) – National Institute for Scientific and Industrial Research
NMK (Kenya) – National Museums of Kenya
NPGRCs – National Plant Genetic Resources Centres
NPGRComms – National Plant Genetic Resources Committees
NPGRPs – National Palnt Genetic Resources Programmes
NPPGR (Egypt) – National Program for Plant Genetic Resources
NRCM – National Research Council of Malawi

NSAPBC (Egypt) – National Strategy and Action Plan for Biodiversity Conservation
NSCESRT (Egypt) – National Specialized Council on Education, Scientific Research and Technology
NSF – U.S. National Science Foundation
OAPI – African International Property Organization
OAU – Organization of African Unity (now AU, see above)
OIPR (Ivory Coast) – Ivorian Office of National Parks and Reserves
OMAPI (Madagascar) – Malagasy Industrial Property Office
ONADEF (Cameroon) – National Forestry Development Board
ONE (Madagascar) – National Office for the Environment
PBZT (Madagascar) – Botanical and Zoological Park of Tsimbazaza
PCGAP (Ivory Coast) – Framework Plan for the Management of Protected Areas
PE (Madagascar) – Environmental Program
PEF – Forest Exploitation Perimeter
PIC – Prior Informed Consent
PCT – Patent Cooperation Treaty
PGRC – Plant Genetic Resources Centre
PGRFA – Plant genetic resources for food and agriculture
PLT – Patent Law Treaty
PNAT (Senegal) – National Land Management Plan
PRONABIO – Association of Operators in Agro-business of Natural and Biological Products
PRSP – Poverty reduction strategy programme
PTC – French acronym for PCT (see above)
PVP – Plant variety protection
RAFI – Rural Advancement Foundation International (now ETC Group)
RBG-Kew – British Royal Botanic Gardens at Kew
SABDF – Southern Africa Biodiversity Forum
RVL – Restrictive variety legislation
SACCAR – Southern African Centre for Co-operation in Agricultural Research and Training
SADC – Southern African Development Community
SBS (Seychelles) – Seychelles Bureau of Standards
SBSTTA – Subsidiary Body for Scientific, Technical and Technological Advice
SCP – Standing Committee on the Law of Patents
SCCI (Zambia) – Seed Control and Certification Institute
SCCR – Standing Committee on Copyrights and Related Rights
SCIT – Standing Committee on Information Technologies
SCT – Standing Committee on Trademarks, Industrial Designs and Geographical Indications
SDC – Swiss Development Corporation
SHESTCO (Nigeria) – Sheda Science and Technology Complex
SIDA – Swedish International Development Agency
SNGF (Madagascar) – National Silo for Forest Grains
SNRAA (Senegal) – National System of Agricultural and Agri-food Research
SODEFOR (Ivory Coast) – Forests Development Society
SPGRC – SADC Plant and Genetic Resources Centre
SPLT – Substantive Patent Law Treaty
STRC – Scientific, Technical and Research Commission
SYPEAM (Madagascar) – Union of Professional Producers of Aromatic, Alimentary and Medicinal Extracts of Madagascar
TIFI – (SADC Directorate) Trade, Industry, Finance and Investment
TRIPs – Trade Related Aspects of Intellectual Property Rights Agreement
UN – United Nations
UNCED – United Nations Conference on Environment and Development (1992)
UNCST (Uganda) – Uganda National Council for Science and Technology

UNCTAD – United Nations Conference on Trade and Development
UNDP – United Nations Development Programme
UNESCO – United Nations Educational, Scientific and Cultural Organization
UNFCCC – United Nations Framework Convention on Climate Change
USAID – United States Agency for International Development
UPOV – International Union for the Protection of New Varieties of Plants
UWA (Uganda) – Uganda Wildlife Authority
WAEMU – West African Economic and Monetary Union
WARDA – West Africa Rice Development Association
WHO – World Health Organization
WIPO – World Intellectual Property Organization
WRAIR – Walter Reed Army Institute of Research
WSSD – World Summit on Sustainable Development
WTO – World Trade Organization
WWF – World Wildlife Fund for Nature
ZAWA (Zambia) – Zambia Wildlife Authority
ZFAP (Zambia) – Zambia Forest Action Plan
ZODAFARB – Areas of Tree Planting and Restoration, Zones of Action in Favour of Trees

ACKNOWLEDGEMENTS

Many individuals and institutions contributed to conceiving, developing, and producing this volume. The editors would like to express their appreciation to the International Centre for Insect Physiology and Ecology (ICIPE), the Environmental Law Institute (ELI), and the African Union (AU) for the support received throughout this process. Particular mention is merited for Erica Pencak, Gacambi Maina Mwangi, Peter Munyi, Jessica Troell, and Gwen Arnold for invaluable assistance in researching and editing. Nicole Nsabiteka, Bruce Ntatenza, Audrey Mugisha, and Angela Udoh translated the questionnaire and some of the chapters. Wendy Sandoz formatted, laid out, and proofread the volume; she also designed the cover. Lee Muench assisted in proofreading.

The Scientific, Technical and Research Commission (STRC) of the African Union has been a key partner throughout the process. Robert Mshana was an early supporter, lending his vision and energy to the endeavor. This project also benefited from the leadership of Kolawole Adeniji, who facilitated the review and publishing processes.

This project received generous support from the Rockefeller Foundation and the John D. and Catherine T. MacArthur Foundation. Abdoulaye Ndiaye and R. Michael Wright helped to launch the project; and Peter Matlon and Carolyn Deere were critical in expanding the scope of the study, ensuring the effectiveness of the review process, and concluding the volume.

The contributing authors were essential to the objective analysis in this comparative study. The contributors were: Nyasha Chishakwe, J.A. Ekpere, Ossama M. El-Tayeb, Abraham Gadji, Michael Kidd, Ibrahima Ly, Mariam Mayet, Arthur Mpeirwe, Godfrey Mwila, Samuel Nguiffo, Rolph A. Payet, Nat Quansah, Lovemore Simwanda, Godber Tumushabe, and Worku Damena Yifru.

A review panel was convened in January 2003 in Nairobi to discuss early drafts of the country case studies and the thematic chapters. The discussions were led by several of the editors—including—with assistance from Gacambi Maina Mwangi and Peter Munyi. The independent external reviewers, who participated in their personal capacity, were: Kolawole O. Adeniji, Kwesi Atta-Krah, Shakeel Bhatti, Susan Bragdon, David Cooper, Francois Gasengayire, Jan Glazewski , Onesmo ole MoiYoi, Elizabeth Mrema, Paul Mungai, Khungeka Njobe, Valérie Normand, Akpezi Ogbuigwe, Charles O. Okidi, Margaret Okorodudu-Fubawa, and Evans Olonyi Sikinyi. Additionally, Ossama El-Tayeb, Arthur Mpeirwe, and the editors participated in the review as contributors to the volume. Ibrahima Ly, Alejandro Argumedo, and Lovemore Simwanda reviewed and commented on draft chapters. The editors would like to thank Richard Bagine for his comments and assistance, particularly during the review meeting.

There are many others who have provided assistance along the way—particularly our families—to whom we owe a debt of gratitude. Thank you, all.

Nairobi & Washington, DC
August 25, 2003

FOREWORD

Africa abounds with biological resources and, without doubt, is one of the best naturally endowed regions of the world. The biological diversity of the region is immense, hosting a substantial proportion of the world's reservoir of genetic diversity. This diversity provided the cradle for humanity and, for millennia, has sustained the peoples of the continent. In turn these peoples have become its custodians, with the first formal expedition for the collection of useful plant species commissioned by the Egyptian Pharaoh, Queen Hathshepsut, some 3,500 years ago. Africa encompasses one of the widest ranges of agro-ecological zones, including numerous unique environments, that are home to an, as yet, only partially documented plethora of indigenous multi-purpose crops and plant species that are sources of food, fibre, feed, medicine, and crafts. Further, there are numerous under-utilised and neglected species, including the ever-expanding universe of insect, fungal, and microbial resources, with great potential for addressing problems of food security, nutrition, health, and industrial development. Thus far, most of these resources have been given only scant attention in research and development. For example, medicinal plants have been used by Africans to cure diseases and heal injuries since time immemorial, with a recorded history of some 4,000 years. However, it is only in recent decades that significant interest in traditional medicine as an element of national health care systems and as sources of modern pharmaceuticals and natural products has emerged. In a formal recognition and endorsement of traditional medicine as the most affordable and accessible form of health care for the majority of Africa's rural population, the Assembly of Heads of State and Government of the Organization for African Unity (OAU) at its 37th Ordinary Session and the 5th Ordinary Session of the African Economic Commission, held between 9-11 July 2001 in Zambia, declared the period 2001–2010 the Decade for African Traditional Medicine.

For centuries, Africa has contributed significantly to the world's reserve of clinically useful plants, food crops, animal genetic resources, and, increasingly, also industrially useful resources such as enzymes. However, while the vast potential of these resources has yet to be fully tapped, or often discovered, the benefits accrued from these resources, including human resources, have primarily flowed to states, enterprises, institutions, and individuals outside the region. In many cases these benefits have even been derived to the loss or detriment of Africa and its peoples. The colonial history of the region highlights the need to break the tragic cycle of Africa as a provider of cheap raw materials and consumer of high cost products developed from these materials.

Despite these overwhelming natural assers, as the world enters the 21st Century, Africa is still saddled with the most daunting development challenges in the world. Africa's enormous wealth in natural resources should provide opportunities for addressing the multifaceted challenges facing the continent. However, Africa's historical antecedents, as well as past modes of exploitation and management of natural resources have engendered many problems. The ownership, exploitation, and distribution of Africa's natural wealth too often has fostered and fuelled civil conflicts and war, compounding the already dire situation of poor countries and rural populations. As is the case in many other regions of the world, natural resources, such as food crops, useful plants, animals, and land, that form the foundation of the livelihoods of most Africans are being squandered or rapidly lost. Some of this loss is irreversible, resulting in the extinction of species of precious indigenous food crops and other useful plants and species.

For Africa, the prevailing trend of biodiversity loss is a major concern since the continent's economies, cultures, and political systems are heavily dependent, albeit precariously, on the conservation, management, and sustainable exploitation of biological resources. Food security, and agricultural development more generally, in Africa is representative of this situation and a critical issue for both governments and regional organisations. The emphasis placed on food security has been recognised by virtually all the meetings and major decisions of the African Union and its organs, including the Monrovia Declaration (July 1979), the 1980 Lagos Plan of Action for African Development of the Organization of African Unity (OAU), and, most recently, the New Partnership for Africa's Development (NEPAD).

Africa was one of the first regions to recognise the challenges it faced in the conservation and management of its biological resources and, in response, developed

the African Convention on the Conservation of Nature and Natural Resources in 1968 (Algiers Convention). The Convention on Biological Diversity, to which virtually all African countries have ascribed, establishes a global framework for the conservation of biodiversity that, in many respects, mirrors the approach of the Algiers Convention. Africa faces enormous challenges in implementing these frameworks. It is clear that for the conservation aspects of these frameworks to be effectively implemented, their second pillar, that of sustainable use, must be employed to contribute to the financial, technical, and human resources required for implementation. In addition, both conservation and sustainable use must contribute to economic development and, in particular, the building of technical and scientific capacity that will facilitate more active and sustainable participation by Africa in the global economic system. The foundation for initiatives in all these areas must be the development of appropriate human and institutional capacity to undertake them.

It is clearly understood by both African governments and the African Union that the chronic lack of human, organizational, and institutional capacity is a major constraint to sustainable development in Africa. While there is a reasonable level of capacity in the relevant core sciences, there are significant deficiencies in the legal and policy aspects of genetic resources use and conservation. Combined with adverse economic conditions, most countries in Africa lack the human resources to conduct research and implement policies that will assist in combating the threats of environmental degradation and loss of biodiversity, especially of indigenous food crops and other useful plants, animal species, and microorganisms. In addition, lack of access to training, literature, and opportunities for interaction both between African policy researchers and between these researchers and the global community, results in intellectual isolation of the few Africans engaged in the legal and policy aspects of natural resource conservation and management.

The similar challenges, and often shared biological resources, of the African countries that are the repositories of this genetic diversity have prompted efforts to explore collective forms of action, especially under the auspices of the African Union. These efforts have sought to develop legislation and policy as well as strengthen negociating capacity, both in determining forms of access and sharing of benefits, as well as designing new mechanisms for the promotion of African interests in different forums and international agencies. It is, therefore, crucial to continue facilitating exchange of existing information to help in building a strong negotiating block that would advance the collective interests of African countries on the international agenda. Consequently, one of the most important issues for most African countries is to build the requisite capacity to mobilize their natural and human resources for sustainable development. One element of this is the establishment of a systematic and long-term institutional basis for building capacity in science and technology policy analysis. This includes the capacity to participate effectively in relevant international negotiations to ensure that issues of African concern are fully taken into account.

In light of this, the Commission of the African Union welcomes this book as a valuable contribution to the process of exchanging information and experiences, as well as strengthening African capacity more broadly. It is, therefore, the hope of the Commission of the AU that this book will further help develop the capacity for linking natural resource knowledge to policy, problem-solving, and long-term planning processes, and generally creating public awareness in Africa, and beyond, of the issues involved in the effective conservation, management, and use of Africa's natural resources.

Mr. Amara Essy
Chairman of the Commission
of the African Union
Addis Ababa, 2003

CHAPTER 1
INTRODUCTION

Africa's biological wealth can be critical in alleviating poverty, ensuring food security, fostering industrial innovation, and developing new medicines. African peoples and communities depend on these resources for their economic, social, and cultural well-being. These gains can provide local, regional, and global benefits.

Yet, the full potential is only starting to be tapped. Africa's communities and developing economies could benefit significantly in the global search for new sources of food stocks, medicines, fiber, and other resources. For example, the U.S.-based company Pfizer is working with the genetic resources and indigenous knowledge of the San (indigenous peoples in Southern Africa) to bring to market a diet pill based on the hoodia cactus in an endeavour that could bring significant economic benefits not only to Pfizer but also to institutions and indigenous communities in the area.

Despite these needs and international commitments to promote access, most African nations lack effective legal and regulatory frameworks governing genetic resources. This lack of institutional and legal capacity restricts legitimate research and leaves the interests of African nations and their resources open to possible inequitable exploitation. For example, an enzyme discovered in a saline lake in Kenya is being used to make blue jeans, yet none of the benefits are accruing to Kenya.

Moreover, the nature of genetic resources and the activities that depend upon them are so unique and cross-cutting as to defy simple regulation. Regulation of genetic resources touches on intellectual property rights (IPRs), economic development, poverty alleviation, agriculture, pharmaceuticals, biotechnology, indigenous peoples' rights, habitat conservation, industrial development, international research efforts, and even climate change. Each of these topics includes numerous issues such as food security, seed collection and reuse, and benefit sharing.

Regulating genetic resources—who has access to them, and where the benefits of any new drugs, technologies, or crops should accrue—is a complicated process that has been evolving for three decades with many unanswered questions. For example, who owns the genetic resources, or is that even a relevant question? What are the terms for granting access? To whom? What types of products may be pursued, and can they be commercialised or patented? How should benefits be shared, and what types of benefits might be considered (e.g., cash payments and royalties, access to technology, and training)? Ethical and economic considerations often blend: for example, while patenting is a common practice for protecting intellectual developments, many developing nations oppose the patenting of lifeforms, including the genetic material that determines the specific characteristics a living entity.

Considered together, these disparate issues frequently require the creation of a sui generis regulatory regime, one that draws upon experiences in many different fields but is unique. Bilateral and multilateral initiatives have attempted to regulate genetic resources in Africa, as well as globally. At the same time, regional undertakings elsewhere, for example in the Andean Pact, have shaped perspectives on genetic resources. As described in chapter 4, these international processes focuses on various aspects of access to genetic resources, sometimes overlapping or conflicting with other initiatives.

National efforts to fulfil the commitments made in international agreements have faced many challenges in Africa, as in elsewhere around the world. Most countries have yet to enact implementing regimes, while many that have are being forced to revisit their approaches. Concerns over biotechnology[1] and traditional knowledge, as well as accusations of "biopiracy," have complicated the development of laws and institutions governing access to genetic resources, particularly those relating to food crops.

Africa's wealth of biodiversity and traditional innovations places it at the center of the debate regarding who should have access to genetic resources, and to whom the benefits of this genetic research should accrue. Moreover, African nations have voiced particular concerns about ensuring farmers' rights and breeders' rights,

[1] Genetically modified organisms (GMOs) have generated heated arguments, and, while frequently only tangentially relevant to access to genetic resources, the polarisation of the biotechnology debate has politically colored discussions on access. While GMOs are increasingly relevant in African nations, they are beyond the scope of this volume.

[2] The term "Farmers' Rights" is sometimes capitalised to denote higher order rights of farmers (for example, to collect, use, and trade seed) as opposed to exceptions within systems, such as the breeder's privilege. This volume utilises the term "farmers' rights" solely as a matter of editorial style—no inference should be drawn from the fact that the editors have opted not to capitalise the term.

as well as the broader rights of local communities and indigenous peoples.[2]

However, African nations and communities are faced with a daunting task when trying to govern access to genetic resources or ensure equitable sharing of benefits. The interaction of social, cultural, and economic factors in environmental and agricultural management is complex. Additionally, administrative regimes in African nations usually endure chronic shortages of financial and human resources. This is particularly challenging in the realm of genetic resources, which is simultaneously technical, legal, and policy-oriented, cutting across many disciplines.

With such capacity limitations, African nations are at a disadvantage in negotiating and implementing international commitments regarding access and benefit sharing. Accordingly, African nations are starting to move toward a more unified African approach with regards to governing genetic resources. The African Model Law and other regional initiatives indicate that African nations increasingly recognise the practical, political, and legal benefits of developing common African positions and approaches regarding genetic resources.[3] Such measures are similar to other African initiatives articulating a particularly African voice on environmental matters.[4]

1. THE PURPOSE OF THIS VOLUME

To respond to the dearth of technical expertise and skilled personnel available to African nations, the editors partnered with African scholars, activists, and officials to develop this reference book that analyzes legal, policy, and institutional systems governing genetic resources in Africa. This volume represents the culmination of three years of research on options for governing genetic resources in Africa, and is part of a broader research and capacity-building initiative to advance African perspectives on governing genetic resources. This volume and the broader project seek to:

- Share experiences of African nations in governing access to genetic resources;
- Assist African governments, researchers, communities, and nongovernmental organisations (NGOs) in identifying options for enabling access to genetic resources and weighing the potential benefits and costs of the various options; and
- Strengthen implementation of the national commitments to promote access to genetic resources and benefit sharing under the Convention on Biological Diversity (CBD), the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), and the Trade Related Aspects of Intellectual Property Rights (TRIPs)Agreement.

Accordingly, this volume is designed to help build African capacity to sustainably and equitably develop their biological resources. It seeks to provide a reference for those working in the areas of bioprospecting, biodiversity conservation, and agricultural research. It focuses on which approaches have worked and why, highlights priorities and gaps, and identifies what remains to be done regarding genetic resources in Africa. The book seeks to assist policymakers and NGOs in identifying areas that need special attention, providing guidance on what has been done elsewhere in Africa (and how effective those measures have been), and linking them with other African decisionmakers who have developed access legislation, policies, and institutions.

This volume is geared toward government decisionmakers, researchers, and NGOs who specialise in genetic resources, including agricultural and pharmaceutical researchers, community advocates, and those working to reduce poverty and improve food security. It seeks to provide the necessary resources for African policymakers developing regimes governing genetic resources. It is also expected to be of use for researchers, both academic and commercial, seeking access to genetic resources in Africa. While the book does not set forth the rules for all the countries a particular researcher might be interested in, it seeks to provide a clear picture of how various African governments are approaching the issue and some guidance regarding how they can most responsibly conduct their research. Finally, it is expected that the results will be able to provide information for delegations of African (and other developing) nations to the variety of international fora discussing issues relating to access to genetic resources and benefit sharing.

2. METHODOLOGY OF THIS STUDY

The research methodology for this volume entailed selecting country case studies, engaging authors, establishing and following a consistent questionnaire, developing the thematic analyses, convening a peer review

[3] *See* chs. 4 & 19 of this volume.

[4] One example is the Bamako Convention, which contextualises and extends the Basel Convention to the African socio-political context of hazardous waste management. Another example is the recently revised African Convention on the Conservation of Nature and Natural Resources. *See, e.g.*, ch. 4 of this volume.

meeting of the draft document, and incorporating the comments received into the final, published volume.

2.1 Country Selection

This book includes country profiles from 12 countries that represent diverse contexts throughout Africa. In selecting the countries for the case studies, the editors used several criteria to capture the diversity of African nations:

- Geography (East, West, Southern, North, and Central Africa);
- Size (island nations, medium-sized countries, and large nations);
- Level of economic development;
- Ecotomes and biological resources (tropical, savanna, semi-arid, arid, and island); and
- Legal systems (British common law, French civil law, Roman-Dutch civil law, and Islamic law).

With these criteria, the editors settled on Cameroon, Egypt, Ethiopia, Ivory Coast, Kenya, Madagascar, Nigeria, Senegal, Seychelles, South Africa, Uganda, and Zambia.

In all the countries analysed, a threshold criterion was that the country must have had experience regulating genetic resources that could be of interest to other nations. All of the 12 selected countries have attempted to develop legal, regulatory, and/or contractual systems to promote and govern access to genetic resources. Their experiences thus far provide lessons that may assist in developing, implementing, and enforcing systems governing access to genetic resources elsewhere. Together, the selected countries represent a wide range of cultural, legal, biological, and socio-economic contexts, which ensures that the research is applicable to many different nations around Africa as well as elsewhere.

2.2 Author Selection

For authors to conduct the country profiles, the editors sought in-country experts who are well-versed in the political, institutional, and legal systems governing genetic resources in their particular countries. The selected authors included a range of scholars, activists, and officials, although there was a preference for individuals with a reputation for balanced analysis. The list of authors, brief biographical information, institutional affiliations, and contact information is included as appendix A of this volume.

2.3 Conducting the Case Studies

The country case studies emphasise lessons learned from past, current, and emerging laws and practices in the 12 countries. The case studies are structured to provide options for nations seeking to implement their international commitments, for example, under the CBD and the ITPGR. Accordingly, the case studies consider what has worked, in what contexts, and why; what has not worked, and why it has not worked. En suite, the experiences of the nations considered—the nations at the vanguard of governing access to genetic resources in Africa—present a range of options that nations may seek to emulate, modify, or avoid.

In order to ensure comparability among country profiles, each profile followed a questionnaire developed by the editors. The questionnaire, which may be found in appendix D of this volume, built upon a similar questionnaire that ELI and partners utilised in a seven-country study of access and benefit sharing in the Americas.[5] The questionnaire outlines the roles of national and international NGOs, governmental institutions, and private sector institutions in the control, access, and benefit sharing of genetic resources. Specific questions address the legal provisions that govern ownership and access to genetic resources, as well as the benefit sharing of those resources. In addition to laws and policies in place, the questionnaire also covers draft laws, regulations, and new initiatives addressing access to genetic resources. In addition to sui generis laws directly governing genetic resources, the questionnaire also examines laws, regulations, and policies affecting genetic resources. Such legal frameworks range from environmental or sectoral laws (for example, generally governing forests) to intellectual property laws. Although each country's access to genetic resources regime is at a different stage of maturity, the questionnaire sought to assure that each country case study was balanced, complete, and objective, as well as generally considering the same questions so as to facilitate comparative analyses.

In responding to the queries posed by the questionnaire, authors drew information from laws, regulations, and policies, their own experience, interviews with other in-country experts and officials, and press reports on specific instances where access to genetic resources has been granted or denied. While the preference was for textual sources and those less subject to bias in interpretation, more subjective sources were useful in analysing the effectiveness of the regulatory regime.

---

[5] Susan Perkoff Bass & Manuel Ruiz Muller (eds.), Protecting Biodiversity: National Laws Regulating Access to Genetic Resources in the Americas (2000).

In addition to the country case studies, the book also includes chapters that examine emerging regional and sub-regional regimes governing access to genetic resources, including those of the African Union (AU) and the Southern African Development Community (SADC). The profiles for these two initiatives followed the questionnaire to the extent that the country-specific questionnaire was applicable. Drawing upon country and regional profiles, the editors developed thematic chapters, as outlined at the end of this introduction.

2.4 Peer Review

In order to enhance the accuracy, completeness, and objectivity of the research and to ensure a balanced perspective, the editors organised a review meeting on January 23-24, 2003, in Nairobi, Kenya. This meeting brought together agricultural researchers, genetic resource policy experts, NGO advocates, and government authorities to review and comment on the draft reference book. This meeting included five authors and editors, as well as 16 external reviewers (recognised in the Acknowledgements, above as well as in appendix B).

The reviewers included representatives from different disciplines and perspectives: agricultural and pharmaceutical researchers, governmental and intergovernmental organisations, organisations devoted to rural development and poverty alleviation, food security institutions, environmental NGOs, and indigenous advocates. Reviewers included representatives of African organisations, those working in Africa, and those working globally. This breadth of geographic expertise enabled the editors to integrate experiences from outside Africa into the analysis.

Comments were submitted in writing, and the editors also sought to capture the discussion of the review meeting for later incorporation into the manuscript. Throughout the meeting, reviewers sought to identify conditions under which specific legal and institutional approaches have been the most effective (or liable to have problems) in Africa.

Following the review meeting, the editors incorporated many of the suggestions into the draft chapters before sending the chapters back to the authors for revision. Some of the changes were global, such as providing a general introduction to the country and more clearly structuring the laws that directly relate to genetic resources and those that were relevant to the topic. Others were specific to the particular chapter.

3. OVERVIEW OF THE BOOK

This book is divided into four parts: synthesis, country case studies, regional profiles, and supporting materials. Part I (comprising Chapters 2 through 6) provides a series of thematic chapers, including an overview, historical background, and synthesis of the case studies. Chapter 2 examines the various reasons that genetic resources are important: improving food security, as a source of medicines and other products to improve health care, promoting conservation, alleviating poverty and promoting development, and strengthening scientific research capacity. It also considers how IPRs affect these different goals.

Chapter 3 summarises traditional African concepts of access to genetic resources and benefit sharing. This chapter considers both the pre-colonial concepts, as well as implications of colonialism for governing genetic resources in Africa. Building on these traditional views and practices, the chapter highlights potential implications for developing and implementing genetic resource frameworks.

Chapter 4 provides an overview of international developments in access and benefit sharing. The cross-cutting nature of genetic resources is further emphasised, as these international processes include the CBD and its progeny; the WTO; the International Union for the Protection of New Varieties of Plants (UPOV); the UN Food and Agriculture Organization (FAO), and in particular the ITPGR; the Consultative Group on International Agricultural Research (CGIAR); the AU and SADC; and various other regional institutions. The chapter considers the role that African nations have had in international processes regarding genetic resources, with an eye toward enhancing African contributions in this arena.

Chapter 5 synthesises the country case studies that constitute the weight of the volume. It examines current trends and patterns of the elements of a system governing access to genetic resources and benefit sharing. It examines approaches to governing genetic resources in various African contexts, as well as considering what these experiences mean for Africa and the global community. As such, this chapter includes the essential African perspectives on governing genetic resources and is thus the core of the book. This chapter summarises the different legal, regulatory, policy, and contractual approaches that African nations have adopted regarding genetic resources and biological resources more broadly.

While the bulk of the volume focuses on presenting as clear a picture as possible of the situation, Chapter 6

seeks to begin to move beyond that. It examines possible steps for addressing identified weaknesses while capitalising on opportunities at the local, national, regional, and international levels. Building upon African experiences at the international and national levels contained in the national case studies and regional profiles, this chapter offers a critical analysis of the current status of frameworks governing genetic resources in Africa. It highlights some of the gaps and unresolved challenges, and offers some thoughts on potential steps forward.

Part II (Chapters 7 through 18) sets forth the country profiles for the 12 nations examined in detail in this volume. These are, in alphabetical order, Cameroon, Egypt, Ethiopia, Ivory Coast, Kenya, Madagascar, Nigeria, Senegal, Seychelles, South Africa, Uganda, and Zambia.

Part III (Chapters 19 and 20) includes profiles of the two major regional and subregional initiatives in Africa relating to genetic resources. These are the African Model Law on The Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources and steps toward a similar endeavour by SADC.

A series of appendices follow the country case studies and regional profiles. These resources include the profiles of the contributors to this volume, information on the peer reviewers, the questionnaire that the authors used in developing the country profiles, and various reference material available on the internet. With permission of the African Union, the Model Law is included as appendix E.

PART I
EMERGING AFRICAN PERSPECTIVES

CHAPTER 2
THE SIGNIFICANCE OF GENETIC RESOURCES IN AFRICA

I. WHAT IS A GENETIC RESOURCE?

The term "genetic resources" has become commonplace in international agricultural, environmental, intellectual property, and trade policy circles. The Food and Agriculture Organization's (FAO) Commission on Plant Genetic Resources (CPGR, since 1995 the Commission on Genetic Resources for Food and Agriculture or CGRFA), established in 1983, was the first international forum dedicated to the subject, albeit only with regards to agriculture. However, it was the entry into force of the Convention on Biological Diversity (CBD) in 1993 that really made genetic resources a subject of heated debate and brought it fully to the international stage. Despite this 20-year history of international discourse, and the current situation where genetic resources are key features of two international agreements (the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture, or ITPGR) and the subject of negotiations in forums as diverse as, inter alia, FAO, the World Intellectual Property Organization (WIPO), the World Trade Organization (WTO), and the International Labour Organization, most diplomats and policy analysts are still ambiguous about defining exactly what a "genetic resource" constitutes. The ambiguity deepens if one seeks to distinguish between genetic resources, genetic material, and biological resources, all terms that appear in the CBD.

As the most prominent and widely adopted international agreement addressing genetic resources, the CBD is a natural starting point in seeking a definition of genetic resources. In article 2, on "Use of Terms," the CBD defines genetic resources as follows:

> "Genetic resources" means genetic material of actual or potential value.

The meaning of genetic resources thus rests on the CBD definition of genetic material:

> "Genetic material" means any material of plant, animal, microbial or other origin containing functional units of heredity.

This definition of genetic material is relatively clear, referring to all forms of biological entity with "functional units of heredity," or deoxyribonucleic acid (DNA), the basic building blocks of life. Genetic material encompasses all biodiversity, including plants, animals, arthropods, and microorganisms.

The question becomes, therefore, what is the distinction between genetic material and genetic resources? In the definition the distinction lies in the point of "actual or potential value." But what genetic material lacks potential value, particularly in the rapidly developing biological sciences? The distinction is actually a conceptual, rather than physical, one: a genetic resource is a genetic resource rather than genetic material because we perceive it as a resource, that is, we attach value to it.

If a genetic resource is such because we perceive it as a resource, a question arises as to the distinctions between a genetic resource and a biological resource, another term that is defined by the CBD:

> "Biological resources" includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

In scientific terms, this definition is not substantially different from that for genetic resources except on a few semantic points, including whether there is a difference between: (1) "material of plant, animal, microbial or other origin" and "genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems;" or (2) "actual or potential value" and "actual or potential use or value for humanity." The one point that distinguishes genetic resources from biological resources is that the former are identified as a subset of the latter. There is no substantive language, either in the definitions or elsewhere, which clarifies this point. Once again, this leads to the conclusion that any distinction that may exist is conceptual and not physical.

In essence, if one adopts a physical approach to these terms, genetic resources and biological resources are synonymous; while if one adopts a conceptual approach, then the terms can be distinguished. This suggests that

the CBD intends parties to the convention to adopt a conceptual, or utilitarian, rather than physical, or natural, view of genetic resources. However, the language of the CBD's definitions and other articles does not indicate how a utilitarian approach should, or could, be constructed. This discussion of utilitarian versus natural interpretations of genetic resources and biological resources may seem to be one of semantics, but it actually has serious consequences in examining article 15 of the CBD and how best to implement it: what is a genetic resource, and thus subject to access to genetic resources regulation, and what is a biological resource, and thus not subject to such regulation?

Numerous examples can be cited to illustrate the importance of this line-drawing exercise. For instance, is the seed, or tuber, of an agricultural crop a genetic resource or a biological resource? If one adopts a natural approach then it is both and thus subject to access to genetic resources regulation. This would be regardless of whether the intention in collecting, or exporting, the particular seed or tuber in question was that it was destined for a breeding program to improve the quality of a related variety, that a gene sequence was to be isolated for use in modern biotechnology, that a particular compound might be a useful pharmaceutical lead or, most importantly, that it was food for direct consumption. A natural approach to the definition of genetic resources would, in contrast, mean that all agricultural exports and, perhaps, even all domestically marketed agricultural produce would be subject to any access to genetic resources regime. In a global trading regime in which African agricultural produce already faces major problems, the addition of further regulatory transaction costs for export could completely price it out of the market.

Most utilitarian approaches focus on the idea that genetic resources exist in the DNA that codes for proteins, which in turn determine the functioning of the living organism in which they are found, as well as its basic functions (respiration, photosynthesis, and nutrient absorption in the case of plants) and its specific characteristics such as taste, resistance to diseases and pests, or the colour of the fruits.[1]

Therefore, if one adopts a utilitarian approach, the purpose in collecting a particular seed or tuber of an agricultural crop would define whether it was considered to be a genetic resource, and thus regulated, or a biological resource, and thus unregulated. It is at this point that the construction of the utilitarian approach becomes important. One reason is that seeds or tubers collected and sold purely for consumptive purposes are valued for their taste, colour, and other similar properties. The "genetic resource" does not lie in these properties per se, but rather, in the possibility that they may be multiplied, propagated, transferred into other varieties or species, or synthesised for use in some scientific or industrial purpose. Ensuring that this is reflected in a regulatory regime is purely a question of recognising the problem and carefully drafting accordingly.

However, there is an additional conceptual problem that requires a policy decision. An illustration of this problem is the case of the bark of the tree, *Prunus africana*. The bark has been heavily harvested in Cameroon and Kenya and exported, primarily to a French company, due to its qualities in treating prostate cancer. However, the active compound or compounds in the bark have not been synthesised, and it is not an extract of the bark that is exported but the bark itself. The fact that the harvesting of *P. africana* is purely extractive leads some experts in the field of access to genetic resources to suggest that it should not be considered as a genetic resource.[2] Making the distinction of the basis of extractive, or direct, uses versus more abstract applications has the advantage of clearly placing traditional agricultural produce outside the scope of access to genetic resources regulation. However, other commentators see the use of *P. africana* as the development of a high-value product based upon the tree's genetic qualities that should fall within the scope of access regulation.[3]

A final problem that must be considered in the development of a utilitarian definition of the term "genetic resources" is the possibility of dishonesty on the part of applicants for access to genetic resources. A famous example of such a situation, with enormous impact, is that of *Hevea brasiliensis*, the Brazilian rubber tree. At the end of the 19th century *H. brasiliensis* was the world's main source of rubber, giving Brazil a virtual monopoly in the industry. Claiming scientific interest, English botanists took samples of the tree for study at the Royal Botanic Gardens at Kew. Within a few years of these collections, a number of British colonies in South-East Asia had established *H. brasiliensis* plantations, and the Brazilian share of the rubber industry had been reduced to a mere 5 percent, triggering a major socio-economic crisis in that country: "What was stolen from Brazil was not just germplasm: a genetic resource was stolen."[4]

[1] Daniel Querol, Genetic Resources: A Practical Guide to their Conservation 22 (1993).

[2] This issue was discussed at a meeting of experts organized in Nairobi to review this manuscript on January 23-24, 2003.

[3] Querol, *supra* n. 1 at 1.

[4] *Id.* at 23.

Under a strict utilitarian approach, if the export of, for example, seeds was declared to be purely as grain, and thus for consumptive uses, it would not be subject to access to genetic resources regulation. Once a resource is out of its country of origin's jurisdiction, it is virtually impossible to control or influence its application and, therefore, to secure any associated benefits. However, an overly broad approach could create the same situation as would exist with a natural approach to defining genetic resources.

Just as the CBD leaves the approach to defining genetic resources to national discretion, this discussion does not provide a solution. Rather, it is intended to highlight what is an often overlooked, but potentially significant, issue. If a government implementing article 15 of the CBD does not clearly delineate what is and what is not a genetic resource, then it will not clearly identify what it is regulating, potentially with unintended consequences. Critical to making policy decisions on the definition of genetic resources is an understanding of their role and significance. This can be found in a range of fields, a number of which are examined in the rest of this chapter.

2. AGRICULTURE AND FOOD SECURITY

The role of genetic resources in agriculture has shaped the development of humanity throughout the past 10,000 years.[5] During this period, the principles of the cultivation of crops and husbanding of livestock spread from a relatively few centres of origin to the whole globe. The identification of these centres was a major element of the pioneering work of the Russian scientist, Nikolai Vavilov, after whom these centres are known today. The climax of Vavilov's work in this field was the 1940 paper, *The Theory of the Origin of Cultivated Plants after Darwin*.[6] This paper identified seven primary centres of origin for cultivated crops, based on ancient agricultural civilisations and the diversity of cultivated and related species of the crops in question:

- South Asiatic Tropical Centre (Indian and Indo-Chinese),
- East Asiatic Centre (Chinese),
- Southwestern Asiatic Centre (Iran, Asia Minor, Syria, and Palestine),
- Mediterranean Centre (Etruscan, Hellenic, and Egyptian),
- Abyssinian Centre (Ethiopian),
- Central American Centre (Mayan), and
- Andean Centre (Incan and pre-Incan).[7]

The nature of the process of dispersal of crops from these ancient centres has created a situation in which the majority of the world's population is dependent on only some 10 or so crop species for the bulk of their calorie intake.[8] As a region, Africa is no different from the rest of the world in this respect. The most commonly found staples throughout the region—maize, cassava, beans, and groundnut—all originate in Central and South America, while banana has its origins in Southeast Asia. The situation is not substantially different with secondary staples such as rice, wheat, or sweet potato as these originate in Southeast Asia,[9] the Middle East, and South America, respectively. Overall, Africa is estimated to depend on the world's 20 major food crops for 87 percent of its food,[10] although only one of them (sorghum) has its origins in the continent.[11] While these 20 crops provide the bulk of Africa's caloric intake, some other crops, such as tef in Ethiopia, are critically important at the national level. In fact, the general health and nutrition of the continent's people depends on a wider range of crops, both native and exotic, for key vitamins and micronutrients.

This process of the diffusion of, and thus global dependence on, a limited number of key crops is ongoing[12] and is thus of more than academic interest for several reasons. These include the maintenance of the vitality of crops, the further development and improvement of crop varieties, and an ability to react to changing circumstances such as pest and disease prevalence, climate change, or increasing soil salinity. Maintenance of the vitality of staple crops is probably the least significant of Africa's interests in the global interdependence on crop germplasm. The reason for this is that the activities of

5 See JARED DIAMOND, GUNS, GERMS AND STEEL: THE FATES OF HUMAN SOCIETIES 83-191 (1997) (detailing "The Rise and Spread of Food Production").

6 N. I. VAVILOV. IZBRANNYE TRUDY: PROBLEMY PROISKHOZHDENIYA, GEOGRAFII, GENETIKI, SELEKTZII RASTENII, RASTENIEVODSTVA I AGRONOMII [SELECTED WORKS: THE PROBLEMS OF ORIGIN, GEOGRAPHY, GENETICS, PLANT BREEDING, PLANT INDUSTRY, AND AGRONOMY], vol. 5 (1965), *discussed* in I.G. LOSKUTOV, VAVILOV AND HIS INSTITUTE: A HISTORY OF THE WORLD COLLECTION OF PLANT GENETIC RESOURCES IN RUSSIA 87-88 (1999).

7 The information provided in this list is derived from Loskutov, *supra* n. 6 at 88.

8 Rice alone is the staple food for more than half the world's population. M. Jackson & R. Lettington, *Conservation and Use of Rice Germplasm: An Evolving Paradigm under the International Treaty on Plant Genetic Resources for Food and Agriculture* at 2 (Presentation to the International Rice Commission, Bangkok, July 2002).

9 African rice is an exception, although it is not widely cultivated outside West Africa.

10 These crops are, in alphabetical order: banana, barley, beans, cassava, groundnut, maize, millet, oats, oil palm, peas, potato, rapeseed, rice, rye, sorghum, soyabean, sugarcane, sweet potato, wheat, and yam. This information is derived from *The Seed Map: The Centres of Crop Genetic Diversity*, prepared by the Rural Advancement Foundation International (RAFI), now the ETC Group.

11 However, of the millets, pearl millet is believed to have its origins in Africa.

12 Robert Lettington, *The International Undertaking on Plant Genetic Resources in the Context of TRIPs and the CBD*, BRIDGES BETWEEN TRADE AND SUSTAINABLE DEVELOPMENT, July/Aug. 2001, at 11.

innumerable smallholder farmers[13] over some 500 years[14] have made Africa a significant secondary centre of diversity for many crops. This diverse genepool is generally sufficient to allow for a crossing of varieties that avoids genetic uniformity and maintains vitality. These smallholder systems play a variety of important roles in African agriculture, apart from providing the genepool that is the basis of formal agricultural research and development. At a global level, they are playing an increasingly important role in providing out-of-season horticultural crops for developed country markets,[15] thereby providing food for these countries but also valuable foreign exchange income for poor economies. At the national and regional levels, smallholder systems are the dominant providers of the range of crops providing necessary vitamins and micronutrients. This role builds on the cultivation of a wide range of crops, and the collection of a multiplicity of semi-cultivated and wild plants is the basis of a balanced diet for rural populations. For example, in the Bungoma District of western Kenya, 47 percent of households collect some 100 wild species and 49 percent maintain wild species in their farms to domesticate certain species while in Sub-Saharan Africa as a whole 60 wild grass species are utilised as food.[16] The diversity of this farming system also acts as an insurance policy in that it mitigates the risks presented to predominantly rain-fed, low-input agriculture by adverse weather conditions or pests.

The diversity of the African crop genepool also assists in the further improvement of crops. Africa also makes significant use of varieties from the centres of origin of its major crops. The primary means for accessing this germplasm are the collections held by the Consultative Group on International Agricultural Research (CGIAR). Crop improvement usually seeks to enhance two basic types of trait. The first are general traits such as yield, drought, salinity tolerance, and grain quality. While these are sometimes associated with specific sources, such as the dwarf characteristics that were introduced to wheat and rice from a relatively few Asian varieties and formed the basis of the Green Revolution, they are more often developed incrementally and depend on tens, if not hundreds, of parental varieties.[17]

The issue of characteristics introduced from specific sources leads to consideration of the other type of trait that crop improvement programmes frequently seek to enhance: pest and disease resistance. The introduction of these traits is often associated with "magic bullet" solutions. A classic example of this is the introduction of resistance to grassy stunt virus into rice from just one accession of a close wild relative of the species being improved, *Oryza sativa*. The resulting rice variety, IR36, was at one time the most widely cultivated cereal crop globally.[18] Similar events have occurred with other major staple crops, particularly wheat and maize, but as with other desirable traits, the magic bullet is the exception rather than the rule. The majority of breeding programmes for any improved variety depend upon access to an enormous range of varieties that are slowly crossed to produce an improved variety. The ITPGR, discussed in more depth in chapter IV, is a specific policy response to this situation.

A significant exception to the incremental nature of traditional plant breeding is the increasing application of modern biotechnologies in agriculture. The most widely known example of this is genetic modification (GM). GM crops roughly correspond to the discussion of magic bullet solutions in crop improvement mentioned above. However, they vary from this model in two significant ways. First, the process of modification is dramatically accelerated as the plant breeder does not have to depend on evolution to select the desired traits, but rather artificially inserts the gene sequences expressing the desired traits directly. Second, the plant breeder is not restricted to close relatives of the target crop variety in their search for potential gene sequences. Some of the best-known GM modifications to date, such as the widespread use of *Bacillus thuriengesis* (*Bt*),[19] depend on crossing kingdom barriers, something that is impossible in traditional plant breeding. GM crops still depend significantly on a wide diversity of germplasm. The variety that is to be modified must perform sufficiently well in its other characteristics for modification to be worthwhile, something that still depends on traditional plant breeding. GM crops also rely on access to a wide range of genetic resources as the sources of the modifications: without access to *Bt*, one cannot develop *Bt* crops.

13 Understood as those cultivating two hectares or less. *See* ROBERT LETTINGTON, SMALL-SCALE AGRICULTURE AND THE NUTRITIONAL SAFEGUARD UNDER ARTICLE 8(1) OF THE URUGUAY ROUND AGREEMENT ON TRADE-RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS: CASE STUDIES FROM KENYA AND PERU 18 (forthcoming 2003).

14 The introduction of many of Africa's staple crops is believed to be tied to Portuguese and Spanish imperial expansion in the 16th and 17th centuries, partly accounting for the central role of Central and South American crops as African staple foods.

15 It is estimated that some 100,000 Kenyan smallholder farmers produce horticultural crops for the export market. Personal communication, Dr. Bernard Lohr, Director, ICIPE Plant Health Division, to Robert Lettington (June 2003).

16 *Sustaining the Multiple Functions of Agricultural Biodiversity: Agricultural Biodiversity, in* CULTIVATING OUR FUTURES: FAO/NETHERLANDS CONFERENCE ON THE MULTIFUNCTIONAL CHARACTER OF AGRICULTURE AND LAND 3, 8 (2000).

17 Jackson & Lettington *supra* n. 8 at 4; Lettington, *supra* n. 12 at 12.

18 Jackson & Lettington *supra* n. 8 at 4.

19 Bt is a soil microorganism that is toxic to insects but harmless to humans and has been inserted into a variety of crop species, including maize and cotton. In the case of Monsanto's products, the action of Bt in the host plant is frequently facilitated by the insertion of a gene sequence from the cauliflower, CamV35s.

Centres of origin for crop species usually host the greatest diversity of their wild relatives, and in many cases they also contain an enormous diversity of cultivated species. For example, in the district of Cusco, Peru, more than 1,300 varieties of potato have been recorded.[20] Access to such diversity is a huge asset for any plant breeder, whether seeking to improve the general characteristics of a variety or hunting for the solution to a particular pest or disease problem. To some degree, African states can cooperate amongst themselves to widen the pool of germplasm to which they have access for any given crop. However, access to crop germplasm at the international level, and particularly to that from centres of origin, is vital to most national agricultural research systems. Most importantly, it should be noted that the issue of access to the greatest diversity of germplasm possible is of importance not only to agricultural research institutions. Smallholder farmers in many parts of the world, and particularly in Africa, frequently blend new varieties of staple crops into their existing seed supplies in order to maintain vitality, improve key traits, or as less directed experiments.[21] Thus, smallholder farmers significantly benefit directly and indirectly from broad access to germplasm.

While the discussion in this section has, thus far, focused on the role of genetic resources in maintaining and improving varieties for crop-based agriculture, their role in agriculture is far broader. Many forms of inputs, such as fertilisers and pesticides, are based on genetic resources. Neem is a good example that applies to both types of input. *Bt* and the fungus *metarhizium* are genetic resource-based pesticides, while all forms of biological control and integrated pest management depend on genetic resources. Less obvious, but of equal importance to inputs, is the role of genetic resources in maintaining agricultural ecosystems. In all but the most industrialised of agricultural production systems, farmers are highly dependent on the range of plants, insects, fungi, and microorganisms that are not intentionally cultivated.[22] These play roles ranging from pollination to nitrogen fixation, which prevents soil erosion.

Any discussion of the role of genetic resources in agriculture would be incomplete without a mention of animal husbandry. The picture is somewhat similar to that of crop-based agriculture in that genetic resources play a multiplicity of roles in livestock systems. The most obvious role is that of the characteristics of livestock breeds themselves. As with plants, these include traits such as yield (whether in terms of meat or dairy production); quality; and resistance to factors such as pests, disease, and climate. Another key role of genetic resources in livestock production is as forage crops. The quality of the forage given to dairy cattle is one of the main determinants of their production levels while it can also have significant impact on animal health. Africa is the major centre of origin for most grass forages, but the continent depends significantly on Latin America for access to legume forages. These two centres of origin for forages are also of enormous significance to developed country livestock industries. Finally there is the question of veterinary medicine, both preventive and curative. As with human medicine, discussed below, veterinary medicine in many cases relies on genetic resources for raw materials. Also, as with human medicine, there is a significant body of traditional veterinary medicinal knowledge, or ethno-veterinary knowledge as it has come to be known. A number of modern veterinary medicines are based on this knowledge, and as research continues it is clear that there is still much untapped potential. Examples of non-traditional genetic resource-based veterinary medicines are also easy to find. The International Centre of Insect Physiology and Ecology's (ICIPE) work on tick repellents for cattle includes developments based on observations regarding chemical signals exuded by animals, both wild and domesticated, that attract and repel ticks.

While discussion of the importance of genetic resources to agriculture has focused on the production of crops for food, references to horticultural export crops hint at their wider significance in non-food fields such as forestry and floriculture. Their role in floriculture is particularly important. This is a sector with rapidly expanding importance as a source of foreign exchange for countries such as Cameroon, Kenya, and South Africa, while it is significantly dependent on foreign varieties as the basis of production.[23] Key varieties of popular species such as roses or carnations are almost invariably the subject of plant breeder's rights in these countries, pointing to the commercial significance of control over a particular variety.

In conclusion, agriculture and genetic resources are inseparable. Even crop production in a sealed greenhouse or the most intensive forms of livestock production depend on the characteristics of the crops or animals in question and a number of other factors in their food and environment that are based on genetic resources. Having access to the greatest diversity of genetic

20 Lettington, *supra* n. 13 at 27.

21 See *id.* at 19-45.

22 See Douglas Miller & Amy Rossman, *Biodiversity and Systematics: Their Application to Agriculture, in* Marjorie Reaka-Kudla et al. (eds.), Biodiversity II: Understanding and Protecting Our Biological Resources 217-29 (1997).

23 See, e.g., ch. 16 of this volume (describing current and potential floriculture initiatives in South Africa, drawing particularly on the country's unique flora).

resources maximises opportunities for maintaining and improving productivity levels in all aspects of agriculture, at whatever end of the technology spectrum one may be working. In this context, it is clear that genetic resources are fundamental to improving the food security of Africans, an issue of vital importance in many parts of the continent. In addition, the importance of these resources to the agricultural economy, the basis of most African economies and source of livelihood for most of the continent's people, as well as the basis of the source of substantial amounts of foreign exchange, cannot be underrated.

3. MEDICINES AND PUBLIC HEALTH

The uses of genetic resources in the fields of medicine and public health are probably the highest profile examples of their use, and the biggest influence in the concept of "green gold." The health sector provides a comprehensive example of the various contributions that genetic resources can make, including export potential and domestic development and application. There are three key aspects to the use of genetic resources in medicine and public health. The first is the importance of genetic resources as raw materials for the development of modern pharmaceutical products. The second, related to the first, is the role of traditional knowledge in facilitating the identification of useful genetic resources. The final key aspect is the potential contribution of traditional and natural medicines to primary healthcare and as nutritional supplements.

The use of genetic resources as the raw materials for medicines is probably as old as humanity itself, and is as old as recorded human history with written records going back some 5,000 years.[24] Many of the pharmaceuticals that are household names, such as aspirin or quinine-based antimalarials, are plant based.[25] From within Africa, a famous example is the development of the products vinblastine and vincristine from the Malagasy Rosy Periwinkle for the treatment of leukemia.[26] However, higher plants are only one of the forms of genetic resources with potential medicinal applications. Penicillin, derived from a fungus, is one of the most famous naturally derived products not based on a higher plant. A number of other products also have been developed from various sources such as insect and other venoms. Marine organisms are also increasingly being studied for their medical potential. In all, only 5 to 15 percent of higher plants and almost no marine organisms have been investigated for their medical potential, while the vast majority of microbial, bacterial, and fungal species are still unknown to science.[27] Thus, it is clear that the future contribution of genetic resources to the development of modern pharmaceuticals is potentially staggering.

The role and significance of traditional knowledge in facilitating the identification of useful genetic resources is sometimes disputed, but the evidence suggests that it is an important factor to both developed and developing country actors. Examples of the scale of the use of medicinal plants in Africa are manifold. A 1995 study identified several hundred species of plants employed to treat some 40 broad conditions ranging from cancer and heart disease to weight control and fertility in just one administrative division of Kenya.[28] At the sub-regional level, a 1993 study identified some 3,000 plant species in regular use for medicinal purposes in East Africa.[29] In a more formal context, almost all African countries have some level of public research focusing on traditional medicines. The main reason that this activity has not translated into the development of pharmaceutical products is invariably a lack of finances.[30] The most successful projects generally seem to focus on two strategies. The first is the development of infrastructure and skills in collaboration with developed country institutions and corporations. The Nigeria-Cameroon International Cooperative Biodiversity Group (ICBG) project, discussed below, is a good example of this with the activities of South Africa's Council on Scientific and Industrial Research (CSIR) constituting a more homegrown situation. The highest profile success of the CSIR to date has been the development of the hoodia plant as an appetite suppressant.[31] CSIR conducted the initial investigations of hoodia, including the identification of its active compounds, and then sold the rights to its research to a small British biotechnology company, which then sold them on to the international pharmaceutical giant Pfizer for a sum reported at more than US$20 million. As with any collaboration where devel-

24 C.M. Cragg & D.J. Newman, *Drugs from Nature: Past Achievements, Future Prospects, in* M. Iwu & J. Wooton (eds.), Ethnomedicine and Drug Discovery 23, 24 (2002).

25 M. Iwu, *Ethnobotanical Approach to Pharmaceutical Drug Discovery: Strengths and Limitations, in* Iwu & Wooton, *supra* n. 24 at 309, 314 (aspirin); Cragg & Newman, *supra* n. 24 at 24 (quinine).

26 In 1992, it was estimated that global annual needs for these two products only amounted to some 5-10kg, but at a cost of US$5 million per kilo, the US$25-50 million market is significant for a developing country. A. Sasson, Biotechnology and Natural Products: Prospects for Commercial Production 36 (1992).

27 Cragg & Newman, *supra* n. 24 at 35.

28 Ikolomani Division of Kakamega District, comprising 1,394 km^2. See N. Olembo, S. Fedha & E. Ngaira, Medicinal and Agricultural Plants of Ikolomani Division Kakamega District (1995).

29 See J. Kokwaro, Medicinal Plants of East Africa (1993).

30 See, e.g., W. Kofi-Tsekpo, *Drug Research Priorities in Kenya with Special Emphasis on Traditional Medicine, in* I. Sindiga *et al.* (eds.), Traditional Medicine in Africa 168-70 (1995).

31 See ch. 16 of this volume.

oping countries provide genetic resources for commercialisation by developed country corporations or institutions, joint projects involving traditional medicines can be highly controversial for a number of reasons, including community rights and general issues of equity. These controversies imply a need for developing countries to focus on reaching balanced agreements, something that requires well-informed, skilled negotiators. The fairness of an agreement often is judged at the national level, and thus policymaking processes of a quality equal to negotiators are also needed to establish basic guidelines if a state is to derive maximum benefits while also ensuring that all stakeholders' interests are served. The second successful strategy for research into traditional medicines involves their use in the provision of primary healthcare, as discussed below.

Developed country interest in traditional medicines as leads for the development of pharmaceuticals is also significant. Studies show that at least 25 percent of prescription pharmaceuticals in the United States are derived from higher plants, and that 74 percent of these resulted from studies of traditional medicines.[32] In terms of ongoing research, the clearest evidence for developed countries comes from the United States with the most obvious examples being the ICBG projects and the activities of Shaman Pharmaceuticals. Shaman Pharmaceuticals emphasised the systematic investigation of traditional medicines as a basis of modern drug discovery and development. Although Shaman was ultimately unsuccessful as a business, the approach has been further developed by the only ICBG project currently being conducted in Africa, that in Nigeria and Cameroon. The origin of the ICBG projects was a request for proposals made jointly by the U.S. National Institutes of Health (NIH), the National Science Foundation (NSF) and the United States Agency for International Development (USAID). The request solicited "applicants who could put together programs to address the inter-dependent issues of biodiversity conservation, sustained economic development, and improved human health."[33]

The Walter Reed Army Institute of Research (WRAIR) is one of the main partners on the U.S. side of the African ICBG project, although it should be noted that three universities are also involved. WRAIR focuses on the development of drugs for diseases that may threaten the U.S. military. In its technical activities, it has traditionally operated in a manner almost identical to that of a major pharmaceutical corporation.[34] As a public sector institution, the scale of the activities of WRAIR is probably unique. Previous multi-million dollar pharmaceuticals developed at WRAIR include flucanozole for the treatment of cryptococcal meningitis and other fungal infections (marketed as "Diflucan" by GlaxoSmithKline) and the anti-malarial mefloquine (marketed as "Lariam" by Roche). WRAIR's interest in traditional medicines was prompted by its concern that of every 5,000 to 10,000 chemical compounds initially screened for activity against a particular target disease, an average of only one would become a final pharmaceutical product. WRAIR was also concerned that this one product could take between two and 10 years to initially identify and up to a total of 15 years to be available to patients. To increase the efficiency of this process, the Institute began to focus on traditional medicines as a source of leads that could be screened for activity.

In the context of the ICBG project, WRAIR's new strategy has been a success with 70 percent of 500 traditional anti-malarials tested showing activity.[35] These samples have led to the selection of 18 plants for further research, providing 23 compounds displaying potent antimalarial activity. Similar success has been found in research on other diseases such as leishmaniasis, cancer, trypanosomiasis, trichomas, cryptosporidium, toxoplasmosis, and several viruses.

Genetic resources currently play an important role in primary healthcare in Africa and have the potential to play an even greater role. The World Health Organization (WHO) estimates that 80 percent of the world's population depends on traditional medicine for primary healthcare.[36] Africa is no exception, with Sub-Saharan Africa having an average of 14,000 people per trained healthcare worker.[37] When this ratio is considered in the context of increasing populations and deteriorating economies, and thus health budgets, in much of the region, it is clear that states are generally unable to provide comprehensive Western-style medical healthcare to their populations. The majority of rural populations have limited or no access to Western healthcare facilities, and where these are accessible they are frequently unable to provide a minimum level of service due to lack of human, financial, and infrastructural resources. In addition, the Western medical system is not always appropriate to the cultural situation of rural populations.[38] In

32 Cragg & Newman, *supra* n. 24 at 25.

33 B. Schuster, *Development of Antimalarial Agents and Drugs for Parasitic Infections Based on Leads from Traditional Medicine: The Walter Reed Experience, in* Iwu & Wooton, *supra* n. 24 at 163, 166.

34 *Id.* at 163-64.

35 *Id.* at 170.

36 C. Obijiofor, *Integrating African Ethnomedicine into Primary Healthcare: a Framework for South-eastern Nigeria, in* Iwu & Wooton, *supra* n. 24 at 71-79.

37 N.J. Mahwah, 1998 World Almanac and Book of Facts (1997).

38 See Obijiofor, *supra* n. 36; I. Sindiga, *Traditional Medicine in Africa: An Introduction, in* Sindiga et al., *supra* n. 30 at 1-15.

response to this situation, some African governments, with the encouragement and support of WHO, have sought to integrate traditional medicine into their primary healthcare strategies. Traditional medicine depends almost exclusively on genetic resources for its raw materials. With existing traditional medicines, further research into their composition may lead to higher standards of quality control and, in some cases, even efficacy without significant increases in the cost of delivery to patients. Conservation of known medicinal plants is a concern, as there are reports from across the region regarding the increasingly short supply of what are usually resources harvested from the wild. However, as noted earlier, there is also an enormous untapped potential for the development of new medicines that could be delivered through the same mechanisms as existing traditional medicines if information were to be made widely available.

While formally developed pharmaceutical products and locally available primary healthcare are obvious applications, African traditional medical knowledge and genetic resources with, often as yet unidentified, medical properties have a number of other medical and cosmetic applications that are particularly significant in terms of their commercial potential. On the medical side, phytomedicines and nutraceuticals (dietary supplements) are increasingly popular, with rapidly expanding markets in Europe and the United States. An early example is that of limes being carried on board early European exploration ships to ward off scurvy. From these humble beginnings, scientists are now exploring the possibilities of a range of compounds derived from plants. For example, flavanoids, such as Quercetin (found in many plants including the onion, *Allium cepa*), have applications, inter alia, as anti-inflammatories, antimicrobials, antivirals, and to combat tumours.[39] Some African examples are relatively well known, such as that of Devil's Claw (*Harpagophytum procumbens*) from Southern Africa. The tubers of Devil's Claw are used in traditional medicine as an analgesic and anti-inflammatory remedy,[40] and today the tubers are processed into commercial phytomedicines, creating an active export market from several Southern African countries to Europe and bringing some US$2 million per annum in foreign exchange to Namibia alone.[41] Genetic resources have been a fundamental ingredient of cosmetics for many years, ranging from the use of southern and eastern African aloes in skin creams and soaps to the more recent use of fruit acids for their positive effects on skin and hair, such as papaya face masks and the use of a variety of oils and fatty acids from plants, such as coconut, jojoba, shea, and almond, in cosmetic lotions and creams.[42] Considering that the cosmetics market runs into the millions of U.S. dollars in developing countries, and billions in developed countries, there is strong commercial potential for developing genetic resources in this sector.

Phytomedical and cosmetic applications of genetic resources usually involve far lower development costs than pharmaceutical products, primarily due to simpler technologies and fewer regulatory requirements, and the timeframe for bringing them to market is much shorter. This, combined with the expanding market for phytomedical and cosmetic products, suggests that they may be a more feasible and attractive prospect for value-adding investment by African countries than pharmaceuticals.

4. INDUSTRIAL AND RESEARCH & DEVELOPMENT APPLICATIONS

The previous discussions of the agricultural and health applications of genetic resources have highlighted the fact that they have varied potential uses. However, the existing and potential fields of use go far beyond these two. The landmark 1980 patent case of *Diamond v. Chakrabarty* in the United States revolved around claims over a combination of microorganisms that could be used to clean up pollution spills.[43] Microorganisms have also recently begun to be applied in the mining industry, where they have the potential to dramatically decrease smelting costs and minimise the associated pollution and energy consumption by biologically separating ore from its surrounding rock. Extremophiles, organisms found in extreme environments such as hot springs or on ocean floors,[44] have also recently become of significant interest. An example of the every day utility of extremophiles is the case of an enzyme recently discovered in a saline lake in Kenya that has been applied in the multi-million dollar business of bleaching denim.

39 L. Meserole, *Health Foods in Anti-aging Therapy: Reducers of Physiological Decline and Degenerative Diseases, in* Iwu & Wooton, *supra* n. 24 at 173, 176-77.

40 H. Krugmann, International Biotrade in Devil's Claw from Namibia: A Review of Activities, Trends, Opportunities and Threats 2 (2000).

41 *Id.* at 3.

42 Meserole, *supra* n. 39 at 176.

43 Diamond v. Chakrabarty, 447 U.S. 303 (1980) (upholding such a patent).

44 One of Diversa Corporations's most promising discoveries is that of a microbe living in temperatures of more than 90 degrees Celsius on the wall of a deep sea vent in the Atlantic Ocean. It is believed to be the most heat-resistant organism known. *See* Craig Brett, *Like Faded Jeans? Thank the Enzyme with the Flamingo* (Bloomberg News, Mar. 21, 2002), *available at* http://www.bloomberg.com (last visited Aug. 5, 2003). The question of genetic resources found on ocean floors can be particularly problematic, as the high seas, beyond a country's 12 nautical mile national territory or its larger exclusive economic zone (EEZ), have customarily been regarded as the common heritage of mankind, and thus not subject to the jurisdiction of any individual government.

Industrial enzymes are one of the lower profile aspects of the genetic resources field, but their potential value should not be underestimated: the current annual value of the industrial enzyme market has recently been estimated at approximately US$1.5 billion.[45] The market seems set to expand with increasing application in fields as diverse as animal feeds (where enzymes increase an animal's absorption of nutrients) to pollution control (enzymes absorbing pollutants) to the extraction of mineral ores (mentioned above). The use of enzymes in medicine is also expanding, with their use already common in the diagnosis of diabetes and options for the treatment of conditions such as cancer under intense scrutiny. The main interest in Africa, as in many other parts of the world where enzyme-hunting companies are active, is extremophiles, as noted above.

While genetic resources, in many of their applications, are extremely versatile in terms of low or high technology contexts, technological capacity is becoming increasingly important. Modern agricultural biotechnology and pharmaceutical development requires significant technological and financial resources, and they are also a prerequisite for most potential industrial applications of genetic resources. In such a situation, countries with a significant scientific infrastructure have a distinct comparative advantage. Accordingly, technological and financial capacity has both domestic and export related consequences with regards to developing genetic resources.

On the domestic front, the ability of a state to make use of its genetic resources requires the capacity to develop phytomedicines and nutritional supplements or, in advanced cases, even fully fledged pharmaceutical products in the medicinal field. In agriculture, traditional plant breeding is well within the reach of most African states, but agricultural biotechnology and the development of pesticides and other inputs are more complex and capital-intensive activities. In the industrial and chemical fields, a minimum level of capacity is required even to identify what one is seeking, let alone to develop specific leads or potential products.

Collaborative efforts must be considered within the understanding of the export related aspects of genetic resources. The majority of collaborative projects currently operating in Africa have the ultimate goal of the development of a product by a foreign corporation or institution. Where a state has minimal scientific capacity, it is able to conduct initial investigative and early product development activities independently. The advantage of such activities is the same as in manufacturing: the more a developing nation can refine or develop raw materials before exporting them, the greater the value of those materials when exported. A simple example is the situation with medicinal plants; a purified sample of a plant with demonstrated activity against a particular disease or condition is worth significantly more than a random plant sample. Similarly, if the structure of the isolated active compound has been elucidated, or if additional basic indicators of toxicity are available, then the value again increases commensurately.

There is clear evidence from a number of countries that access to genetic resources can be used to leverage technical cooperation, training, and the provision of capital equipment. In many cases, it seems that it is actually easier to negotiate for such benefits than it is to seek high royalty or milestone payments. Most countries that have iterated a policy on genetic resources have some form of capacity building as a priority. Similarly, most institutions, whether state or international, also seem to place a priority on such activities.

A key point to note regarding the success or failure of access to genetic resources as a means of leveraging capacity building seems to be that targets should be realistic. This has two implications. The first is that targeted benefits, and to the degree possible research conducted, should be compatible with immediate national goals. The second is that the targeted benefits should be compatible with existing national capacity. There is no point in training staff in advanced biotechnological techniques if the necessary finances and infrastructure are not available for them to make use of these skills.

5. CONSERVATION

Conservation is a recurrent theme in the majority of policy debates on access to genetic resources. It is likely that this high profile results from at least three related factors. The most immediate is the simple fact that inclusion of the subject of genetic resources in the CBD placed it within the mandate of environmental authorities and lobbyists. The environmental sector, by its very nature, tends to focus on conservation issues as its core activity and priority. The second factor is that genetic resources are integral to biodiversity: without genetic resources there is no biodiversity, and loss of biodiversity entails a loss of genetic resources. This is not to suggest that the two are synonymous, but rather that any consideration of the conservation of biodiversity must, even if indirectly, allow for the conservation of genetic resources. The third factor is a partner to the expanding knowledge of the role of genetic resources, examples of

[45] *Id.*

which have been discussed under the sections on agriculture and medicine above. An increase in understanding regarding the utility of genetic resources is inevitably intertwined with an increase in understanding of their role in ecosystem balance and, thus, their importance to conservation. The relationship between access to genetic resources and conservation has several central themes, namely: the intrinsic value of diversity, the commercial potential of genetic resources, and the question of alien invasive species. There are two sides to each of these themes, one reflecting a symbiosis between access and conservation and another revealing potential conflicts.

A. The Intrinsic Value of Diversity

Access to genetic resources has the potential to contribute to ecosystem conservation activities in a number of areas. In a direct sense, the exploration and cataloguing of biodiversity associated with access can be extremely useful. These activities allow for the detailed identification of what one is trying to conserve, while also providing information on the interactions between the components that comprise an ecosystem. This latter role has become increasingly important as understanding of the ecosystem functions of rarely studied species, such as arthropods and soil microorganisms, increases. More detailed documentation of ecosystem components also allows for effective monitoring of the status of these components and consideration of their use as indicators of ecosystem health. However, while access to genetic resources frequently leads to increased knowledge and understanding, it also frequently involves the extraction of resources from an ecosystem. If extractive activities are not to prejudice conservation objectives, they must take place within some form of sustainable use framework. It is this issue that leads to the less direct aspects of the relationship between conservation and access to genetic resources.

The less direct aspects of the relationship between conservation and access to genetic resources come in forms as various as those of its direct aspects. For example, while genetic resources are often the basis of the problem of alien invasive species, they can often present a solution to the problem, thereby allowing for interventions that can restore balance to a degraded ecosystem. This is discussed in sub-section 3 below. The more widely known indirect aspects of the relationship between access and conservation relate to the concept of sustainable use that has become the basis of much conservation policy and discourse in recent years.[46] At a technical level, the compilation of data about ecosystem components provides a detailed picture of an ecosystem that allows for a more accurate assessment of what is sustainable and what is not. However, the most discussed issue relating to access and sustainable use is that of benefit sharing: the fact that conservation activities are increasingly required to pay for themselves, or at least to mitigate some of their costs in an era of pressure on central government budgets. Thus, the issue of benefit sharing is inextricably entwined with that of the commercial potential of genetic resources.

B. The Economic Potential of Genetic Resources

The past commercial success of genetic resource-based products—particularly cosmetic, medical, and industrial applications—demonstrates the potential of genetic resources to provide funding for conservation activities. This approach can be found in the some of the discussions that led to the inclusion of article 15 in the text of the CBD. These discussions reflected the trend among some environmental policymakers and analysts that effective conservation should be based upon market incentives. This includes both direct and indirect elements. The direct element is the immediate derivation of financial benefits; if a plant, animal, or area hosting genetic resources is generating profits, then there is a clear incentive to maintain it or even enhance its condition. The indirect element is the potential value of biodiversity that has yet to be identified; one never knows which plant or microorganism will lead to the next multi-million dollar product, and there is thus a commercial incentive to conserve all biodiversity. This type of thinking is similar to that which has previously been applied to protected areas in some developing countries: if they pay for themselves and provide jobs and income, then people will have reasons to support them.

However, the commercial potential of genetic resources does not necessarily lead to positive conservation outcomes. One of the main reasons for this is that the identification of value in a specific resource may enhance its conservation through the limiting of overharvesting but may equally have no effect or even prove detrimental. In pharmaceutical, industrial, and chemical development, the interested corporations and institutions are usually looking for genetic resources that can be readily synthesized or, in some cases, resources that can be cultivated easily. The wild genetic resource is important as a lead to particular compounds or organisms, and once this purpose is served it is no longer important.

[46] *See, e.g.,* Environmental Law Institute, Brazil's Extractive Reserves: Fundamental Aspects of Their Implementation (1995).

Two cases illustrate the potential risks implicit in access to genetic resources serving as an independent conservation policy. The case of *P. africana*, discussed above, is one. The European company that is the primary processor of *P. africana* depends on the natural product, and several wild populations of the tree have been decimated despite attempts by forestry authorities to establish plantations to ameliorate the pressure on the wild populations. An example of the natural product not being required for processing but exploitation of the resource still posing a problem is the case of *Maytenus buchananii* in Kenya. In the 1970s, the U.S. National Cancer Institute (NCI) discovered, on the basis of information from Digo traditional healers, that the plant was active against pancreatic cancer.[47] NCI harvested large quantities of the shrub (27.2 tonnes) that were subsequently found to constitute almost the entire adult population, thus posing a grave risk to the survival of the species.

The publicity of responsibly conducted commercial access to genetic resources should also not be underestimated in terms of its benefits. Many of the potential larger scale commercial applicants for access are sensitive to public opinion and are thus keen to be associated with "trophy projects" that can be publicised in terms of their positive impacts for local communities and developing countries generally. Positive publicity is also useful for states providing access, not least in attracting applicants and even donor assistance where donors are seeking to promote public-private partnerships.

C. Alien Species

"Alien … species are not little green men from outer space, but are even more sinister."[48] This quote refers to alien invasive species, the most commonly known of alien species. An alien species is one "occurring outside of [its] natural range and dispersal potential,"[49] while an alien invasive species is one that is "an agent of ecosystem change, especially when threatening biological diversity."[50] There are three primary reasons for the introduction of alien species to new habitats: accident, such as pests that arrive with agricultural produce; import for a specific purpose, such as ornamentals or pets; or, deliberate introduction, such as biological control or for commercial advantage.

The positive aspects of alien species usually relate to those that are intentionally introduced. Alien species have been introduced to Africa at least as far back as the dawn of the colonial era in the 17th century. Today, introduced crops such as maize, cassava, and groundnut make up the bulk of agricultural output in most African countries. Had these species not been introduced, Africa would undoubtedly have either developed native crops or have introduced crops from regions other than South and Central America. However, the value of these crops to the continent cannot be doubted today, and thus their introduction can be assumed to be positive. Similarly, the introduction of alien species of flower and horticultural crops that has formed the basis of agricultural export industries in several countries would appear positive. While Africa's key agricultural crops are transcontinental introductions, alien species can be introduced at a smaller geographical scale. The introduction of the Nile perch to Lake Victoria is an example of an introduction with the origin and new habitat both in the same subregion. The case of agricultural crops highlights the commercial motives behind the introduction of many alien species, but as noted above, some species are introduced for ornamental or other less directly commercial purposes. For example, the introduction of alien species for the purpose of biological control, such as that of a wasp from Brazil to control the cassava mealy-bug, is another apparently benign form of introduction. Positive introductions of alien species undoubtedly have profound effects on the ecosystems to which they are introduced—witness the hectares of maize fields in many African countries—but they are judged, on balance, to be beneficial. However, as is to be expected given the complexity of even a small ecosystem, alien species sometimes have unforeseen consequences that alter this balance, and some introductions are not intended at all.

Whether the negative aspects of the introduction of alien species are the result of accidental introduction or the unforeseen consequences of an intended introduction, the consequences can be equally grave. These negative aspects are almost invariably related to the invasive nature of an alien species. The problem is frequently severe, as the alien species has no natural predators in its new environment and thus multiplies uncontrollably, overwhelming the native species in the ecosystem. It is estimated that at least 38 different alien invasive species are present in East Africa alone.[51] The need for alien species in biological control hints at the main problem in agriculture—as crops are transferred from one region of

[47] The active compound is known as maytansine.

[48] E. Lyons & S. Miller (eds.), Invasive Species in Eastern Africa: Proceedings of a Workshop held at ICIPE, July 5-6, 1999 at 4 (2000) (quoting Prof. Michael Samways of the University of Natal).

[49] *Id.* at 8.

[50] *Id.* at 9.

[51] *Id.* at 4 (East Africa is understood here to include Ethiopia, Kenya, Tanzania, and Uganda).

the globe to another, the pests that feed on these crops are often also introduced inadvertently. This may or may not occur when the crop is introduced. For example, alien stem-borer species have entered Southern, East, and West Africa in the past century; the most recent of these is enormously destructive to stored maize harvests and is believed to have entered East and West Africa as a stowaway in food shipments from North America in the 1980s.[52] It is hoped that a biological control method for this pest might be found among its traditional predators in Central America. Another well-known alien invasive species in Africa is the water hyacinth (*Eichhonia crassipes*), which has created enormous problems from Zimbabwe to Egypt to Nigeria. Egypt alone is estimated to spend at least US$7 million per annum controlling the plant.[53] Estimates of the total economic costs of alien invasive species in Africa are rare but, considering that the United States estimates its own cumulative costs over the last 100 years at some US$100 billion,[54] these are likely to be considerable.

As the question of alien species involves the movement of species from one region or ecosystem to another it has an obvious relationship with access to genetic resources. In some instances, alien species can bring significant commercial benefits, but they can also be enormously destructive of native biodiversity. Equally, the introduction of alien species for biological control can, when based on comprehensive research, help to mitigate earlier destructive introductions.

6. POVERTY REDUCTION AND DEVELOPMENT

The situation of rural communities in Africa, the majority of which are poor and marginalized, has been central to many debates over access to genetic resources. It is now generally acknowledged that these communities hold the key to the survival of many species. At the same time, they are the focus of many national and international development strategies, the most frequently stated goals of such projects being the eradication of poverty and the creation of security and opportunity for all. The recent reorientation of IMF and World Bank structural programmes under the heading of "poverty reduction strategies" is a case in point.

The need to focus poverty reduction and development strategies on rural populations, combined with the fact that these populations have played, and continue to play, a central role in the conservation of genetic resources, provides a clear opportunity. The possibilities for regimes governing genetic resources to contribute to poverty reduction and development strategies are as varied as the uses of genetic resources themselves. The discussions of the agricultural and medicinal applications of genetic resources above have obvious potential. Agricultural development, if appropriately directed, can help to increase the productivity and profits of the smallholder farmers that make up the majority of rural African populations while also to some degree mitigating the risks they face from pests and variable climates. In the same vein, research into the medicinal applications of genetic resources has the potential to improve the quality of primary healthcare for rural populations. Such an improvement would, inter alia, increase labour productivity while also possibly limiting the financial burden of primary healthcare and thus contribute to poverty reduction. In a more indirect form, effective genetic resource regimes may contribute to poverty reduction through the general stimulation of research activities due to enhanced ability to leverage access to capacity building and technology, as discussed in section 1.4. Such stimulation has the potential to promote industrial and commercial activity as part of broader, long-term strategies.

The concept of enhanced research activity contributing to economic activity provides a link between poverty reduction and development strategies. Augmenting research activity has obvious implications for long-term development due to its impacts on education and industrial development. However, more immediate impacts on development and poverty reduction can be seen in the potential of genetic resource activities to provide alternative sources of income for rural communities. This may be in the form of payments, financial or in-kind, for providing or facilitating access, but it may also entail more substantial involvement by communities. The example of the cultivation of the raw materials for the product "Naturub" (derived from the *ocimum* species, Naturub is a salve for the relief of colds and flu and aches and pains) by farmers in Kakamega, Kenya, fits into this latter category. The fact that the project envisages an incremental increase in the role of the farmers in the value-adding processes in the production of Naturub reinforces the potential for contributing to the diversification and augmenting of rural incomes.

The demonstrated effectiveness of microlevel, community-oriented projects in Africa in recent years suggests that the focusing of the benefit-sharing strategies of a number of African states on such projects should prove effective. This is reinforced by the fact that the majority

52 Personal communication from Dr. Bernard Lohr, Director ICIPE Plant Health Division, to Robert Lettington (June 2003).

53 Lyons & Miller, *supra* n. 48 at 43.

54 *Id.* at 8.

of the genetic resource initiatives undertaken to date seem to count benefits in the thousands of dollars, with multi-million dollar breakthroughs being a rarity. This level of benefits may provide only marginal advantages to national programmes, although these can sometimes be critical, but will invariably have a major impact at the local level. An emphasis on community-oriented applications of benefits derived from access to genetic resources also has the advantage that it can serve conservation objectives by directly demonstrating the value of biodiversity to the communities that live alongside it.

7. INTELLECTUAL PROPERTY RIGHTS AND ACCESS[55]

The relationship between intellectual property rights (IPRs) and access to genetic resources is a complex one. IPRs should not be considered as a homogenous whole, as the range of rights that fall within this group vary in their nature and thus in their potential impacts. The focus here is on issues relating to patents and plant variety protection as the rights that are currently most directly applicable to genetic resources.

Patents provide the strongest form of protection of any IPR. With only limited exceptions,[56] patents are applied for on a national basis and are applicable only in the jurisdictions in which they are granted. The basic conditions for a product or process to qualify for patent protection are that it should be new, non-obvious, and useful. The protection provided by a patent allows the holder to exclude others from any commercial activity involving the patented product or process for a limited period, normally 20 years, unless the others are able to obtain (normally for a fee) express permission from the patent holder.

Plant variety protection (PVP) generally provides similar rights to those associated with patents, although the rights are more limited and the conditions for the grant of the right correspondingly less strict. As with patents, PVP rights are generally granted on a national basis. Unlike patents, PVP rights have a limited application: plant varieties. In some jurisdictions this is further limited by the requirement that varieties must be useful in agriculture. PVP rights normally have a minimum duration of 20 years. The standard conditions for the grant of PVP are that a variety be new, distinct, uniform, and stable. PVP rights allow the holder to exclude others from making use of the variety that is their object, although the range of these exclusions is usually more limited than is the case with patents.

The essential concept behind patents and PVP rights is that society benefits from access to knowledge and innovations. It is far more difficult to invent something than it is to copy it, and thus if a government does not provide some form of monopoly control there is little incentive for innovators to make their innovations widely available. The exact nature of the rights granted is thus intended to be based upon a balance between the gain to society from access to innovations and the loss to society resulting from the granting of the monopoly. A more recent justification for patents and PVP is more rights-oriented and relates to the idea that the effort, resources, and creativity that goes into innovation deserves a reward.

IPRs are significant in that they allow, to varying degrees, for the control of the potential utility of a genetic resource once that utility is identified. The key issue is that of "control," which depends upon the power to exclude. This has obvious implications for access to genetic resources, as the power to exclude includes the power to refuse access in many instances. As a consequence, IPRs potentially impact all of the areas discussed in earlier sections of this chapter, although these impacts vary considerably depending upon the particular field and, sometimes, also within fields.

IPRs have been a particularly controversial issue in the context of agriculture for a number of reasons. As discussed earlier, much of the utility of genetic resources in agriculture depends upon access to the greatest diversity of germplasm possible. The creation of monopoly rights over elements of this diversity through IPRs limits access and is thus often considered detrimental. Perceived problems in this area primarily relate to patents and to a lesser extent PVP. The reason that patents are of particular concern is the increasingly frequent broad interpretations of the new and non-obvious conditions for the grant of rights. This leads to a blurring of the distinction between invention and discovery and thus potentially allows for the privatisation of naturally occurring plants and other organisms. These concerns have multiplied with the advent of modern biotechnolo-

55 For a basic introduction to intellectual property rights, see Paul Goldstein, Copyright, Patent, Trademark & Related State Doctrines (2002). For more advanced discussion of particular issues, see Graham Dutfield, Intellectual Property Rights, Trade and Biodiversity (2000); Darrell Posey & Graham Dutfield, Beyond Intellectual Property: Toward Traditional Resource Rights for Indigenous Peoples and Local Communities (1996); Philip Grubb, Patents for Chemicals, Pharmaceuticals and Biotechnology: Fundamentals of Global Law, Practice and Strategy (1999); and F.H. Erbisch & K.M. Maredia, Intellectual Property Rights in Agricultural Biotechnology (1998).

56 Currently, the EU and the Francophone African countries that belong to the Organisation Africaine de la Propriété Intellectuelle (OAPI) are the only regions that grant regionally enforceable patents. The African Regional Intellectual Property Organisation (ARIPO) provides a framework for applying for patents in a number of Anglophone African countries simultaneously. The World Intellectual Property Organisation (WIPO) is currently in the early stages of discussing a possible patent law treaty that would allow for internationally applicable patents, but it is not yet clear what direction these talks will take.

gies and the consequent patenting of genetic sequences within organisms, thus potentially providing a means for the control of any organism containing the protected genetic sequence. The conditions for the grant of PVP rights are significantly more flexible than those of patents, even without any broadening of their interpretations. However, PVP rights are not considered as problematic as patents in the context of the privatisation of genetic resources as they only apply to a collection of characteristics in the form of a variety and not to any of the particular elements that go to make up the whole.

Where PVP and patents are of equal concern in agriculture is with regards to the question of the increasing uniformity of key agricultural species. Since both types of IPR require the identification of a specific, distinct innovation, it is argued that they promote the development of uniformity in species of major commercial interest—those of greatest importance to nutrition. There are two aspects to the question of uniformity in key agricultural species. The first is that uniformity inherently increases the risks in agriculture. The greater the uniformity in a species, the greater the risk that a single pest or disease can cause crippling damage to, or even wipe out, that species. Greater uniformity—and the corresponding decline in diversity—erodes the capacity of a species to address new pest and disease threats, as there is less opportunity to identify resistant varieties of the species. The second aspect of the problem of uniformity is that, since patents and PVPs focus on monopolies as a means to maximise profits, innovators are encouraged to focus on the most broadly applicable varieties of a species possible. These tend to be those that are suitable for intensive, commercial agriculture, often in developed countries, and that depend on the significant use of inputs such as fertilisers and pesticides. Such a focus on creating advantages for the more capital intensive agricultural sectors risks further marginalising resource-poor farmers, who, if they derive any benefits from such innovations at all, do so only incidentally.

The final key area of concern regarding patents and PVPs in agriculture relates to misappropriation. The basic problem is that the innovations of resource-poor farmers often form the basis of patented or PVP-protected innovations but are neither recognised in this context nor considered eligible for protection in their own right. Some countries, such as those of the Andean Pact, have sought to address this concern by making a declaration of the origin of any constituent elements of a biologically based innovation a condition for the grant of IPRs.[57] African states have broadly supported this approach at the international level, in fora such as WIPO and the WTO, but have yet to implement it in national legislation.

Underlying the general question of the role of IPRs in agriculture is the concern that agricultural development benefits most people when there is a free flow of genetic resources that allows farmers, plant breeders, and other researchers the maximum flexibility in developing new varieties. There is a risk that, in the process of seeking to balance the rights of the economically powerful and poor, one will simply create more restrictive rights aimed at benefiting the poor in the short term. Such restrictive rights may create some limited immediate benefits for the economically poor, although the value of these benefits is far from clear when one considers the multiple varieties that contribute to the development of a new variety, and the difficulties and costs involved with assessing the relative contributions of these varieties. The risk is that these immediate benefits are likely to be outweighed by the lost opportunities resulting from diminished agricultural innovation due to the increase in transaction costs and consequent restriction of access to germplasm.

The role of IPRs in the medical applications of genetic resources has some aspects in common with the agricultureal context. Chief among these are issues relating to marginalisation and misappropriation. Where modern pharmaceutical development is based on traditional medicinal knowledge, there is concern that the traditional medicine that forms the lead for the innovation is generally not eligible for any form of rights. As a consequence, the developer of the pharmaceutical product is under no obligation to recognise or compensate this underlying innovation, something that is considered to be misappropriation by many commentators. Current efforts to address this issue focus on the introduction of declarations of origin, accompanied by the recognition of genetic resource regimes to facilitate benefit sharing, and the exploration of options for the development of rights regimes for traditional knowledge holders.

The main problem of marginalisation relates to the fact that the provision of protection for a specific innovation encourages innovators to focus on products aimed at the most lucrative markets, usually those primarily of concern in wealthier countries. Thus, investment in research related to so-called "lifestyle" problems, such as appetite suppressants and fertility drugs, tends to be far greater than that for critical developing country concerns such as malaria, tuberculosis, or HIV/AIDS. This is a more difficult problem to address than that of misappro-

[57] Decision 486 de la Comisión del Acuerdo de Cartagena, Régimen Común sobre Propiedad Industrial, arts. 26(h), (i), 75(g), (h).

priation. However, conditions on access to genetic resources, such as requirements for the provision of research results for adaptation to developing country conditions or more explicit support for the creation of developing country applications, have sought to do so.

There are two key distinctions between medicinal and agricultural applications of genetic resources. The first relates to the nature of research in the two fields. While agricultural research normally depends on a wide range of parental varieties that contribute to the development of a single new variety, pharmaceutical research usually involves a single natural compound leading to the development of a new product. The second distinction relates to the economic value of the final product. Agriculture faces a climate of declining commodity prices and thus diminishing profit margins, while the pharmaceutical sector is one of the most profitable in the world. The combination of clearly identifiable raw materials with substantial profits makes cases of successful pharmaceutical products, and even phytomedicines and nutraceuticals, developed from natural products viable propositions in terms of direct and immediate benefit sharing. This is particularly the case where the benefit sharing sought consists of royalties or other financial compensation rather than in-kind benefits. The same cannot be said of agricultural genetic resources, as any benefits accruing would be likely to be far smaller and would have to be considered in the context of tens, if not hundreds, of contributing varieties whose relative contributions are difficult to acccess.

The examples of the role of IPRs in agriculture and medicines discussed above highlight the negative aspects of IPRs. However, while awareness of these issues is important when negotiating access and benefit-sharing agreements, refusing to allow for the claiming of IPRs is not a viable option for avoiding them. The difficulty is that potential IPRs are often the key asset sought by applicants for access, particularly where the applicant is from the private sector, and increasingly with academic institutions. The reason for this is that IPRs are seen as the primary means of harnessing economic profit from any genetic resource initiative. If an agreement precluding the claiming of IPRs is a condition of access, many researchers will simply go elsewhere.

This highlights the fact that IPRs constitute one, often the most important, possibility in the range of benefits that may be considered when constructing an agreement on access to genetic resources. As with other potential benefits, IPRs are open to negotiation. For instance, agreeing to allow a foreign partner to claim IPRs on genetic resources does not restrict resource-providing countries or institutions from requiring that they should not apply in the providing country or a particular group of countries. The variations that parties to an agreement may choose to make regarding IPR clauses are only limited by the extent to which they can agree on them.

The variety of blanket IPR clauses reflects varying perceptions of how IPRs should be implemented. As discussed in chapter IV, , since the Seattle Ministerial Conference of the WTO in late 1999, the African Group has generally opposed the patenting of lifeforms. However, the question of the patenting of lifeforms is not quite such a clear-cut issue as it at first appears. The main distinction is with regards to the potential for patenting naturally occurring organisms as opposed to only granting rights over those somehow altered by human intervention. In the majority of African states, legislation leaves these issues subject to the interpretation of national authorities. This is due to the fact that while the patentability of plants, animals, or microorganisms might be addressed, such provisions are still held to be subject to standards of novelty. Thus, naturally occurring organisms could potentially be held to be discoveries, and thus precluded from protection. The fact that African legislation generally allows for considerable flexibility in interpretation highlights the need for better understanding of genetic resource issues by authorities charged with regulating IPRs. This is particularly true when one considers that approaches to IPRs can condition some aspects of access to genetic resources.

8. CONCLUSION

Genetic resources at the local, national, and international levels, play a critical role in the lives of all Africans. The most obvious aspect of this is food. African farmers face an unenviable array of pests and in recent years have suffered devastating climatic events in several subregions of the continent. The ability to mitigate the impacts of these challenges in agriculture is fundamentally dependent on access to a broad diversity of germplasm from which pest and disease resistance, adaptability to climatic events, and other desirable characteristics, such as yield and quality, can be incorporated into existing varieties. While Africa has a considerable capacity to use its domestic crop diversity in these activities, it is still, in common with all regions of the world, substantially dependent on access to international collections due to the fact that the majority of its staple crops originated in other continents.

Medicinal uses of genetic resources are the next most obvious aspect of their role in everyday African lives. The

fact that some 80 percent of Africans do not have reliable access to Western-style healthcare systems, and thus rely on traditional healthcare, means that they depend directly on genetic resources for medicines. When one also considers that a significant proportion of medicines in Western healthcare systems are derived from genetic resources, this dependency increases. As with agriculture, the dependence is not simply contemporaneous: genetic resources are likely to provide many of the solutions for healthcare problems as yet unresolved and unforeseen.

While genetic resources are enormously important to Africans in a direct manner, they also play numerous indirect roles. As the building blocks of biodiversity, genetic resources are crucial to environmental conservation. As understanding of microorganisms and arthropods increases, this role becomes ever more apparent. Conservation is not, of course, a purely aesthetic exercise, and maintenance of the environment has broad implications for poverty reduction and other development goals throughout Africa. In reality, almost all aspects of genetic resources have potential implications for poverty reduction and development. Increased productivity in agriculture has been frequently heralded as a means of addressing rural poverty, while the labour productivity implications of the effective harnessing of genetic resources for medicinal purposes are also significant.

The potential for external collaborations based on agreements granting access to genetic resources has perhaps the highest public profile of any use of genetic resources. This profile is largely due to the highlighting of instances of "biopiracy" by NGOs and resulting concerns regarding inequity in agreements governing access and benefit sharing. However, there is increasing evidence of successful initiatives in this area. African states and institutions are deriving significant benefits in training and support in the development of scientific infrastructure. There is little evidence to date of major benefits being derived in the form of royalties and milestone payments, and it seems that in-kind benefits will have the most potential in this area for some time to come.

These examples demonstrate the importance of genetic resources, both from within the region and from other regions to Africa. This situation leads to two conclusions. One is that Africa's potential to use its genetic resource heritage to leverage access to technology and other benefits highlights the need for effective policies governing access to genetic resources and benefit sharing. The range of fields in which genetic resources play a significant role reinforces the need for effective policies: access to genetic resources does not exist in isolation; rather it has the potential to provide support to key economic and social interests. For example, while seeds are the foundation of crop-based agriculture, an agricultural system that focused on seeds alone would surely fail. This calls for an integration of access to genetic resources policy, particularly with regards to benefit sharing, with wider national priorities. The second conclusion relates to the fact that, despite their significant genetic resource heritage, African countries still need access to the genetic resources of others, whether from within the continent or beyond. A genetic resource policy that focuses on a country's role as a provider of genetic resources to the exclusion of its role as a consumer can only ever address half of the picture.

CHAPTER 3
TRADITIONAL AFRICAN CONCEPTS OF ACCESS

I. INTRODUCTION

What is "traditional" about traditional knowledge is not its antiquity, but the way it is acquired and used, which is in turn unique to each indigenous culture.
Russel Lawrence Barsh[1]

There are hundreds of distinct ethnic groups and languages in Africa, with more than 250 in Nigeria alone, each with its unique culture and traditional practices matched by a correspondingly great diversity in genetic resources and ecosystems. One quarter of the world's languages are spoken in Africa alone—no other continent approaches such cultural and human diversity.[2] Jared Diamond observed the link between cultural and geographic diversity in Africa:

> Africa's people resulted from its diverse geography and its long prehistory. Africa is the only continent to extend from the northern to the southern temperate zone, while also encompassing some of the world's driest deserts, largest tropical rainforests, and highest equatorial mountains. Humans have lived in Africa far longer than anywhere else ...[3]

As a result of this human and natural resource diversity as well as the wide variety of traditions, cultures, and practices, the specific modes of managing natural resources and handling access to genetic resources in Africa frequently differ from one society to another. For instance, the practices and customs in pastoral groups are significantly different from those of settled farming societies, and both differ from hunter/gatherer peoples.

However, one of the most common attributes of all these peoples is the near-total dependence on, or rather interdependence with, nature and natural resources for survival and existence.[4] In this milieu of interdependence, one of the defining factors is the fact that

> despite the diversity of traditional resource management systems on the continent, it can be said that traditional institutions were part of the community, and the resource users and the decision-makers were in close proximity, if not one and the same.[5]

As a result, the members of local communities evolved unique ways of interacting with and acquired immense knowledge of their natural environment. As a further result of this close relationship and interdependence, the process of the interaction is continually evolving as the environment and circumstances vary, and nature and human community must adapt to each other. Thus, there is a continuous evolution and dynamic development of norms and rules governing the interaction with nature, individually, collectively, and amongst members of the society.

Traditional peoples tend to possess detailed and innovative knowledge about the resources upon which they depend, built upon generations of adaptation to their environments.[6] Literature abounds with examples of how indigenous communities have sustainably managed biological resources and developed, protected, and shared the associated knowledge, from deliberate selection and storage of seeds to complex cropping systems.[7] They have also developed multiple and integrated strategies for their farming systems, almost all of which are based on a sophisticated management of genetic diversi-

[1] Russel L. Barsh, *Indigenous Knowledge in Biodiversity*, *in* DARRELL POSEY (ED.), CULTURAL AND SPIRITUAL VALUES OF BIODIVERSITY 73, 74 (1999).

[2] *See* JARED DIAMOND, GUNS, GERMS AND STEEL: THE FATES OF HUMAN SOCIETIES 376, 377 (1997).

[3] *Id.*

[4] It is estimated that over 70 percent of the continent's population resides in rural communities and derives subsistence and income principally from agriculture and biological resources.

[5] Alison Field-Juma, *Governance and Sustainable Development*, *in* CALESTOUS JUMA & J.B. OJWANG (EDS.), IN LAND WE TRUST: ENVIRONMENT, PRIVATE PROPERTY AND CONSTITUTIONAL CHANGE 9, 17 (1996).

[6] Robert Lettington, *Conceptualizing the Protection and Promotion of Traditional and Marginalized Knowledge Within the Context of Access to Genetic Resources*, Paper Presented at the 15th Session of the Global Biodiversity Forum, held in Nairobi, Kenya, 12-14 May, 2000.

[7] Helen Zweifel, *Biodiversity and the Appropriation of Women's Knowledge*, *in* INDIGENOUS KNOWLEDGE AND DEVELOPMENT MONITOR 5(1) (Apr. 1997), *available at* http://www.nuffic.nl/ciran/ikdm/5-1/articles/zweifel.htm (last visited Aug. 4, 2003).

ty.[8] Recent studies have firmly established the active role that rural communities in Africa and other parts of the world have played in: (a) generating knowledge based on a sophisticated understanding of their environment, (b) devising mechanisms to conserve and sustain their natural resources, and (c) establishing community-based organizations that serve as fora for identifying problems and dealing with them through local-level experimentation, innovation, and exchange of material and information with other societies.[9]

Local communities have also developed sophisticated resource and knowledge management systems, most of which are informal and oral. Invariably, certain informal protocols and norms have arisen from these systems. Some of these norms, over time, crystallised into indigenous legal systems and became embedded into the customary laws existing within the communities. According to Russel Lawrence Barsh:

> Consistent with [certain] general principles, [local and] indigenous peoples possess their own locally specific systems of jurisprudence with respect to classification of knowledge, proper procedures for acquiring and sharing knowledge, and the nature of the rights and responsibilities that are attached to possessing knowledge. Some categories of knowledge may be attached to individual specialists, and other categories of knowledge to families, clans or the tribe ... The complexity of local laws governing the distribution of knowledge has important political implications, because no one, and no family or clan, can possess sufficient knowledge to act alone. Decision making requires sharing of knowledge, hence a balancing of all interests, including the concerns of non-humans.[10]

Generally, the idea of private ownership of knowledge is also alien to local communities in Africa, as within those communities there is a continuous sharing, transmittal, and exchange of information. Indeed, Tewolde observed that "[t]he communal approach to discoveries and inventions was strengthened by social values which saw communal action as essential for survival. For this reason, no systematic record, oral or written, is kept of who innovated, and who else used the innovation."[11] Even in cases where knowledge resides in or is held by particular individuals, for instance a traditional healer, such knowledge is acquired by virtue of his or her membership in the community. The healer is, therefore, a custodian and, even though he or she makes a living from it, holds the knowledge for the benefit of the entire community. The status and privileges that are associated with such positions are matched by definite responsibilities, which include the protection and expansion of such knowledge and the transmission to designated persons determined either by lineage or some other criteria established by the beliefs and customs of the community.[12]

2. SPIRITUAL AND ETHICAL CONCEPTS OF PROPERTY, BIODIVERSITY, AND LIFE

Throughout the millennia, traditional societies in Africa have developed profound knowledge about genetic resources and have, in some cases, actively developed and improved them for their food, medicinal, and other needs. Traditional agriculture, for instance, is characterised by its great diversity of genetic resources. Local farmers are highly skilled in managing this diversity so as to ensure sustainable farming systems. Not only the local crop varieties but also the numerous local breeds of livestock testify to the skills of traditional livestock-keepers to manage genetic resources. While local plant varieties and animal breeds are partially a result of natural selection, they are also a result of deliberate selection for specific traits,[13] and the products of these initiatives are exchanged or distributed informally at the local level, usually for free or in the spirit of reciprocity.

Traditional livelihood systems, though constantly changing and adapting to new social, economic, and environmental conditions, embrace principles of sustainability and emphasise certain general, though not necessarily universal, values. These values include:

- Cooperation;
- Family bonding and cross-generational communication, including links with ancestors;
- Concern for the well being of future generations;
- Local-scale self-sufficiency and reliance on locally available natural resources;

8 *Id.*

9 Michael D. Warren, *Indigenous Knowledge, Biodiversity Conservation and Development*, International Conference on Conservation of Biodiversity in Africa: Local Initiatives and Institutional Roles, National Museums of Kenya, Nairobi, Kenya, Aug. 30-Sept. 3, 1992.

10 Barsh, *supra* n. 1 at 73.

11 Tewolde Berhan Gebre Egizabher, *The Convention on Biological Diversity, Intellectual Property Rights and the Interest of the South, in* S. TILAHUN & SUE EDWARDS, THE MOVEMENT FOR COLLECTIVE INTELLECTUAL RIGHTS 16 (1996).

12 *See* Field-Juma, *supra* n. 5.

13 C. REIJNTJES, *ET AL.* (EDS.), FARMING FOR THE FUTURE: AN INTRODUCTION TO LOW-EXTERNAL INPUT AND SUSTAINABLE AGRICULTURE (1992).

- Rights to lands, territories, and resources which tend to be collective and inalienable rather than individual and alienable; and
- Restraint in resource exploitation and respect for nature, especially for sacred sites.[14]

While there is no homogenous traditional African approach to managing access to genetic resources, there are, by and large, certain basic structures and values governing the relationship with and the utilisation of natural resources that are relatively consistent throughout the continent. While these are the general values that govern issues of resource management, the details of the rules regulating access to natural resources manifest in different ways in different cultures, depending on other historical, social, and environmental factors.

The first defining characteristic of local African societies is the predominantly communal nature of genetic (and biological) resource use and management. Communities largely organised themselves to produce for and cater to their members, as well as for interacting with other communities. Sharing and exchange is well established as the norm and a necessity for survival. Accordingly, innovations generally have resulted as the accretion of the discoveries and inventions of the members of communities over time. The compelling force for innovations may have been personal gain as well as survival, but it was not conceivable to extract royalties from any person who used somebody else's invention or discovery. As a result, the inventor or the discoverer never tried to personalise her/his achievement. Improvement occurred as contributions from all users of the discovery or invention.[15]

In this context, "resource use systems relied upon building reciprocal relations among families and communities, for example through livestock sharing...."[16] By and large, generosity and reciprocity are core values of most local cultures, and people generally share knowledge and resources.

Since the resources are communally owned and managed, access to genetic resources in most cases is not personalised or controlled by an individual.[17] Generally, "ownership" is not absolute but is usually linked to usage and resource management. For instance, according to Storas, "property ownership among the Turkana pastoralists [of Kenya] is not definite, but intimately related to the social organisation of the people" to make optimal use of the vegetation.[18] According to Barrow, "[t]his social organisation has ecological implications; it enables people to regulate the exploitation of natural resources. Such regulations are vital in a vulnerable natural environment."[19] In that case, access is only obtainable in conformity with specific local customs and practices that are observed by the community as a whole, which creates not only general rights but also specific obligations with respect to them. "Thus the person who has rights of access and use of those resources has to maintain communal agreement so that his rights are established by use... This helps to maintain flexibility in resource management both in space and in time, and in relation to other users."[20]

The second defining characteristic of local African societies is that spirituality is an integral aspect of the relationships between people, earth, and nature and the defining linkage among them. Deeply rooted in this is the belief that humanity belongs to the land and nature, and people should be a custodian rather than the owner of their components. Thus Posey observed that, "[a]lthough conservation and management practices are highly pragmatic, indigenous and traditional peoples generally view this knowledge as emanating from a spiritual base. All creation is sacred, and the sacred and secular are inseparable."[21] All aspects of existence are interconnected and there is, for instance, no distinction between religious and other elements of everyday activities. The distinctive feature of traditional African religion is that it is: "A way of life, [with] the purpose of order[ing] our relationships with our fellow men and with our environment, both spiritual and physical."[22] As

14 Darrell A. Posey, *Introduction: Culture and Nature - The Inextricable Link*, *in* POSEY, *supra* n. 1, at 3, 4 (1999). This is not to say that traditional practices are in all cases sustainable or beneficial to the environment. There are instances of highly destructive practices in some traditional societies. For example, in ancient Abyssinia (now Ethiopia), the capital was moved from territory to territory before it finally settled in Addis Ababa. This pattern of movement followed every hundred or so years after each successive area of settlement and surrounding forest had been depleted of firewood and other resources. Article 10(c) of the CBD implicitly recognises that some practice may be unsustainable, calling for the protection and encouragement of customary use of biological resources in accordance with traditional and cultural practices that are compatible with conservation or sustainable use requirements.

15 Tewolde, *supra* n. 11.

16 Field-Juma, *supra* n. 5.

17 Although knowledge and resources are by and large shared, there are cases where conscious and overt efforts are made to safeguard them or prevent others from undue access. This is particularly so with knowledge relating to medicine and healing, which often entail magical powers and are associated with some level of political authority or significance. However, as already stated, even in cases where knowledge resides in or is held by particular individuals, for instance a medicine man, such knowledge is acquired by virtue of his membership of the community and he is, therefore, a custodian and, even though he makes a living from it, holds the knowledge for the benefit of the entire community. *See* Field-Juma, *supra* n. 5; Tewolde, *supra* n. 11.

18 EDMUND BARROW, THE DRYLANDS OF AFRICA: LOCAL PARTICIPATION IN TREE MANAGEMENT (1996).

19 *Id.* at 85.

20 *Id.*

21 Posey, *supra* n. 14. Among the Acholis of northern Kenya, all components of the natural world—stones, plants, etc—are considered to be spirits to be negotiated with in the course of their regular existence. Therefore, nature and its components are things with which people interact, rather than objects with which they deal.

22 K.A. Opoku, *West African Traditional Religion* (Lagos FEP International Pvt., 1978), *cited in* POSEY, *supra* n. 1 at 4.

a result of this, "most traditions recognise linkages between health, diet, properties of different foods and medicinal plants, and horticultural/natural resource management practices—all within a highly articulated cosmological/social context."[23]

The distinctions between medicine, food, and health are Western distinctions. For many local African peoples, foods are medicines and vice versa, so the Western division between the two makes little sense to many traditional peoples.[24] While in many cases there are clear distinctions between access to genetic resources for either food or agricultural purposes on the one hand, and for medicinal or personal care purposes on the other, in most cases it is not so clear cut because biological (and genetic) resources typically serve multiple purposes. For example, extracts from food crops have often served as the bases for medicinal and personal care products.[25]

The third defining characteristic is that, for most local communities, land is life and every aspect of life and existence is inextricably linked to land and nature. People's relationships with the land is fundamental and, in most African cultures, is seen as the critical link between the people, nature, their ancestors, their descendants, and their deities. According to Graham Dutfield,

> communally shared concepts and communally owned property are fundamental aspects of many traditional societies. Traditional proprietary system is often highly complex, and varied, but a common characteristic is collective responsibility for land and territory.[26]

In the same vein, land is neither private property nor is it communally owned and worked in the socialist sense. Rather, land in most cases is held in communal trust; it belongs to the group, to all members of the community. However, within that common property ownership, each individual has his or her own piece of land for which they alone (including their immediate and extended family) are responsible and from which they alone can benefit.[27]

The peculiar, dynamic, and non-absolute nature of traditional tenure is exemplified by the practice and understanding in many rural communities across Africa whereby if a particular piece of land is cultivated, it is recognised to be under the exclusive control and use of the farmer. However, once the crop has been harvested, access is open to both man and livestock to take whatever remnants or other resources are left on that land until the next planting season. Individuals and families may hold lands, resources, or knowledge for their own use, but ownership is often subject to customary law and practice and based on the collective consent of the community.[28] Generally, communities had some form of equilibrium with land and stable cultures. However, this equilibrium has been disrupted because land tenure systems are changing rapidly, and the sense of ownership has disrupted the new sense of custodianship which shaped the inter-relationship between people and nature and amongst past, present, and future generations. Nevertheless, for any African conception of access and benefit-sharing arrangement to be comprehensive, it must also involve serious consideration of land rights and incorporate traditional land tenure systems.

The fourth defining characteristic is the core belief that life, existence, and being is a continuum from generation to generation. The old Native American saying that "we do not inherit the earth from our parents, we only borrow it from our children" is an apt description of this belief and underscores the basic worldview to which most traditional African societies subscribe. Moreover, the belief that humanity is part of nature and cannot, therefore, own it or any part of it, as well as the deep respect for sacredness of life is core to all known African traditions and customs. As a result, the concept of ownership as understood in the contemporary Western sense is alien to African communities. Accordingly, the notion that one can exercise ownership over life or life forms is one of the major controversies of the TRIPs Agreement from the African perspective. This belief is at the heart of the strong opposition that the African Group has exhibited against the patenting of life or lifeforms as they cannot be "owned" or otherwise be susceptible to individual control to the exclusion of others. This position has been consistently been held by the African Group in all the relevant negotiations under the WTO, ITPGR, WIPO, and CBD.

23 Darrell A. Posey, *The "Balance Sheet" and the "Sacred Balance": Valuing the Knowledge of Indigenous and Traditional Peoples, available at* http://www.ubcic.br.ca/docs/Posey_Balance.pdf (last visited Aug. 21, 2003).

24 POSEY, *supra* n. 1 at 4.

25 Examples include potatoes and certain vegetables. This is also the basis for the debate on drawing a distinction under the International Treaty for Plant Genetic Resources for Food and Agriculture between access to genetic resources from the Multilateral System for food/agricultural purposes and other purposes. Article 12.3(a) of the treaty stipulates that, "Access shall be provided solely for the purpose of utilization and conservation for research, breeding and training for food and agriculture, provided that such purpose does not include chemical, pharmaceutical and/or other non-food/feed industrial uses. In the case of multiple-use crops (food and non-food), their importance for food security should be the determinant for their inclusion in the Multilateral System and availability for facilitated access."

26 Graham Dutfield, *Rights, Resources and Responses, in* POSEY, *supra* n. 1 at 505.

27 Richard B. Peterson, *Central African Voices on the Human-Environment Relationship, in* POSEY, *supra* n. 1.

28 Dutfield, *supra* n. 26.

3. IMPACT OF THE COLONIAL "FOOTPRINT"

As already established, long before the colonial period, local communities in Africa had evolved protocols for interaction and exchange of genetic resources not only within the community, but also between communities which "left to themselves, related to one another as independent entities exchanging ideas and materials."[29] In many instances, however, colonial forces precipitated the fragmentation of contiguous communities, and in other cases the clustering of disparate communities, by imposing "national" and other territorial (e.g., tribal) boundaries. This led to the disruption of long-established modes for exchange and interaction.

This disruption also "had the effect of reducing the reciprocity possible between [communities and] ethnic groups, such as trade and multiple resource use, by heightening ethnic identity and competition for increasingly scarce natural resources."[30] For instance, pastoral peoples, such as the Fulani in West Africa, traditionally keep their livestock in more arid areas during the wet season, where forage quality is relatively high. In the dry season, when water becomes scarce in the north, they move their animals further south to more humid areas, where the livestock can graze the crop residues in harvested fields and the still-green grass in low-lying areas along streams and rivers. These herds are important sources of manure for arable farming and thus help to maintain a cycle of cooperation and interdependence between the pastoral and farming communities. However, this particular system of resource use, amongst so many others, was disturbed by the drawing of national boundaries by colonial powers during the 19th and early 20th centuries.[31] As a result of these artificial boundaries, restrictions were enforced on the natural movement of these herdsmen. Meanwhile, the colonial authorities set up to govern the newly demarcated territories initiated drastic changes to land use patterns in the region.[32] These included the establishment of plantations of cash crops, exclusive nature reserves, and game parks. These measures had the effects of cutting communities off from their traditional pasture and hunting grounds, the reduction in the use and subsequent loss of local varieties, and the disruption of traditional farming systems that had been evolved and adapted to the local environments over the centuries.

The principal objective of the colonial powers was the maximum exploitation of human, mineral, and agricultural resources. Accordingly, development was driven by political and economic imperatives. The natural environment was seen as a free good and colonial governments were preoccupied with how to control as much of it as possible for their own economic benefit.[33]

Natural resources extraction was carried out without giving consideration to the immediate or long-term environmental repercussions or to the rights and customs of local communities.[34] The laws and institutions that were set up during the colonial era regarding natural resources use and management were, of course, dictated by the special interests, needs, and expectations of the ruling colonial authorities. For instance, in most cases, colonial authorities introduced seed registration laws stipulating that only seeds registered and approved by them could be marketed or commercially cultivated. The standards for registration were usually for seeds used or needed in the colonial home countries or markets, without regard to local varieties, their utility, or functions in the local agro-ecosystems. Local laws and customs were restricted or otherwise considered repugnant and prohibited completely, except where such laws and customs served the special interests of the colonial authorities.

Beyond agricultural, geographical, and political disruptions precipitated by the colonial experience, major disruptions also affected indigenous legal systems. Considering the clash of legal systems, Justice Weeramantry observed that:

> The 19th Century [Western] lawyers both national and international were somewhat arrogant and dismissed with contempt the wisdom of all the traditional systems of law that they encountered in the world. These attitudes were partly due to the views of the positivistic school of jurisprudence.[35]

In the last century or so, the Austinian School, which was one of the leading positivistic schools, taught that a customary rule is not worthy of the name of law

29 Tewolde, *supra* n. 11.

30 Field-Juma, *supra* n. 5 at 19.

31 REIJNTJES *ET AL.*, *supra* n. 13.

32 See Field-Juma, *supra* n. 5 (observing that "excision of game reserves and national parks from the remaining pastoral areas ... further limited pastoralists' access to water and dry season grazing resources").

33 *Id.*

34 BARROW, *supra* n. 18 at 86 ("Customary law distinguishes in detail between resources and is a complex bundle of rights of access, of renewable or consumptive use, and of disposal. Such rights may be disaggregated by resource; [different resources] may be subject to different rights by product and by time, for instance when to grow or browse").

35 Christopher G. Weeramantry, *Sustainable Development: An Ancient Concept Recently Revived*, Opening Address to the Global Judges Symposium on Sustainable Development and the Role of Law, Johannesburg, South Africa, Aug. 18-20, 2003, *available at* http://www.unep.org/dpdl/symposium/Documents/Country_papers/Weeramantry.doc (last visited Aug. 9, 2003).

unless it is written, proceeds from the will of the sovereign, and has a specific sanction or punishment to enforce it. Otherwise, according to this school of thought, the entirety of such customary rules was not a legal system.[36] In many instances, colonial laws actually prohibited or outlawed traditional practices relating to genetic resource use and management.[37]

In addition to legal and policy measures that sought to change traditional practices to Western-oriented values and standards, colonial agricultural officers attempted to change farming practices which have evolved and adapted to particular localities over the years. For example, traditional practices such as shifting cultivation and inter-cropping, which were designed to allow soil recuperation and prevent soil erosion, were not fully understood by these officers who encouraged or prescribed intensive farming and mono-cropping which subsequently had devastating effects on soil fertility and led to the loss of local varieties. The concerted efforts by the colonial authorities and professionals to change or disparage African traditional practices were not restricted to the agricultural sector. In the area of health care, traditional healers and herbalists were characterised as "witch doctors"—a derogatory appellation that persists even today—and contributed to the negative official attitude to traditional medicine (considered to be "witchcraft") that is prevalent in many countries in Africa today, despite the fact that it provides the health care needs of an overwhelming majority of the peoples in the region.[38]

As the paradigm moved from trade to domination during the colonial era, colonial administrators made concerted efforts to control the sources of the biological resources that formed the raw materials needed by the market and industry in European countries. For example, the cultivation of certain classes of plants and crops was prohibited by law. This was often enforced physically through restricting access to, and the movement of, necessary propagating materials. In certain cases, colonial authorities claimed exclusive rights to the production, supply, or marketing of particular species or varieties, such as wheat, sugar, coffee, and palm oil.[39] It thus became illegal for local farmers to cultivate or trade these crops or their products outside the colonial administrative framework or marketing structures. As a result, local farmers could not determine for themselves what they should cultivate or produce commercially. Moreover, they lost control of the benefits that they could derive from the resources, as quotas and prices were externally determined.

When granting independence to new African nation-states, colonial administrations in most cases deliberately set up structures that would perpetuate the production and administrative systems that they had created. In some instances the colonial administrators created a political class that would help to ensure that they still maintained some degree of control. As a result, the legacy of deprecating local customs and practices and denying the rights of local communities was, in many cases, also carried over to the independent African states that arose after direct colonial rule. So, for many local communities, their modern nation not only failed to legislate recognition of community rights associated with the use of genetic resources, but in fact often legislated against their traditional rights, for example by prohibiting them from continuing to produce their own seed as they had done for thousands of years.[40] Thus, independence placed key natural resources—including water, minerals, forests, wildlife, and land—under the control of governments bearing the colonial imprint of the centrality of state power.[41]

Despite the position advanced by the African Group in various international negotiations, and the prevalence and dependence of the large majority of the African populace on traditional knowledge, such knowledge is not formally recognised by law in many African countries. Similarly, property rights related to knowledge do not enjoy any protection under most national legal systems that make specific provisions for the protection of intellectual property rights (IPRs). In addition, traditional knowledge and customs also fall outside the definitions of intellectual property (IP) used by existing international treaties on trade and IPRs to which African nations are party. Even in the cases where attempts have been made to recognise traditional knowledge or related customary laws, they are almost explicitly made inferior and subject to contemporary legal concepts, especially with respect to property.[42]

In many Anglophone countries in Africa, there is concurrent application of two legal systems—English

36 *Id.*

37 For instance, the prohibition of the cultivation of certain crops or plants—such as coffee, tea, cotton, and tobacco—without authorisation or outside designated territories.

38 The World Health Organisation (WHO) has, in recent times, consistently encouraged and promoted the use of traditional medicine and its incorporation into the healthcare systems of developing countries in recognition of the role that it has and will continue to play in effective health care delivery in these countries.

39 Kent Nnadozie, *The Convention of Biological Diversity: The Emergence of IPRs in the Field of Access to Genetic Resources and Benefit Sharing* (2002), *available at* http://www.ictsd.org/dlogue/2002-07-30/docs/Kent.pdf (last visited Aug. 21, 2003).

40 Tewolde, *supra* n. 11 at 22.

41 Field-Juma, *supra* n. 5 at 21.

42 For instance, in most Anglophone African countries, customary laws are subject to statutory law and even common law, are regarded as secondary, and are applied only in special circumstances or where there is no applicable statutory or English common law. Furthermore, customary laws are subject to a number of validity criteria, for instance, the "repugnancy test," which implies that they are "lower" or "inferior" laws.

common/statutory law and customary law—with varying degrees of deference to local customs. While they exist side by side, integrating these systems has not been easy. The Honourable Weeramantry, the former Vice-President of the International Court of Justice succinctly articulated the impediments to their integration and the factors that form the basis of potential friction between the different legal systems:[43]

> 1. There is a concept that is very strongly entrenched in modern law that only the living generation has rights under the law. Most contemporary legal systems, be they the common Law systems or the Civil Law systems, concentrate exclusively on the rights of those who are living here and now. This does not accord with the philosophies of traditional systems which emphasise that there is a duty on the present generation to look beyond itself to those who are to come as well as to look back at the past and respect those who went before it.
> 2. Another rather narrow attitude of modern law is to hold that it is only human beings that have any recognisable rights. That is not the case in traditional law under which there is a very deep understanding of the rights of other living creatures to earth and its resources.
> 3. Yet another approach of modern law is to concentrate almost exclusively on the rights of individuals. There is a great stress on individualism. However, traditional societies flourished not only on the basis of individual rights but also on the basis of group rights. This is the crux of the debate on IPRs in contradistinction to communal or collective rights to knowledge and resources.
> 4. Modern law thinks largely in terms of rights rather than duties. The entire emphasis seems to be on rights, whereas traditional legal systems heavily accentuate duties. Every individual had duties towards his or her group and every villager had duties towards the village. For instance, the ancient irrigation systems of certain communities could not have been maintained in all its complexity if the members of each village did not have duties of maintenance and repair in regard to the village tank and the local irrigation channels.
> 5. Modern legal systems emphasise concepts such as absolute freedom of contract, and absolute ownership or property. The concept of absolute ownership means that if a man owns an item of property, he has the absolute right to do with it what he wills. The same concept is extended to land and he can treat land, if he is the owner, in the same way that he can treat movable property. The owner of movable property can destroy it if he so pleases. Likewise, the owner of land can mine it to destruction, fell primeval forests and reduce it to wasteland. He can do what he will, for he is the absolute owner. Traditional law would not tolerate such treatment of land or other resources.

In current practice, English common law enjoys greater recognition and application in the courts of Anglophone African countries than customary law does, despite decades of independence from the United Kingdom. It is ironic that common law is essentially based on customs and conventions, but it is actually English customary laws that are being applied to the detriment of the customary norms of the local peoples, while it is the latter that should enjoy primacy having evolved and been applied by the local people themselves over centuries. There is, however, an increasing awareness among policymakers in the region of the need to incorporate components of local customs and practices into the process of governing access to genetic resources and benefit sharing.

This new-found awareness is of fairly recent origin. After independence and during the years that followed, even up to the 1992 UN Conference on Environment and Development, preoccupation with nation building, political and economic issues, and persistent instability in the policy generally sidelined conservation and local environmental issues. The situation was aggravated by high levels of poverty, illiteracy, and low levels of education. In certain instances, the prevailing global paradigms such as the Green Revolution and the structural adjustment programmes prescribed by international financial institutions also affected local control over resources. Large tracts of land were compulsorily acquired and put under large scale agricultural projects. Most of these projects utilised imported or hybrid varieties without any serious consideration of the local factors or resources. The Green Revolution, while a considerable success in Asia and Latin America, is considered to be largely unsuccessful in Africa, while precipitating sig-

[43] Weeramantry, *supra* n. 35.

nificant negative impacts on local agro-ecosystems and genetic diversity.[44]

For Africa as a region, the year 1968, with the adoption of the African Convention on the Conservation of Nature and Natural Resources,[45] ought to have marked the beginning of a new era of natural resources regulation, control, and joint action in the area of natural resources conservation and management. However, the momentum was neither seized nor sustained, as preoccupation with other issues moved the convention and the implementation of its objectives, which then probably appeared esoteric, to the back burner. The Convention has now undergone extensive review and was re-adopted by by the Assembly of the African Union (AU) on July 11, 2003 in Maputo.[46] This growing consciousness in the region and the fact that so much effort is now being invested in understanding the basis for indigenous natural resource management indicates that the negative attitudes commonly held about indigenous knowledge during the colonial era have begun to change.

While there is great diversity in the culture, practices, and customs of African peoples, there is unity in the whole and an amazing degree of similarity in the underlying philosophies and worldviews that regulate how people interact with nature, its resources, and each other. That similarity is the spirituality believed to be inherent in all existence, as well as a holistic perspective of the relationships that all living things and material objects have with each other and between themselves. Traditional land use systems were based on use rights to certain resources. These use rights were bounded by time and the needs of other community members, allowing for multiple uses of resources and simultaneous production (for example, of wildlife, livestock, tree crops, fuelwood, and medicinal plants). But this ethos was systematically stamped out by colonial enterprise,[47] drastically altering the landscape of norms governing access to and control of natural resources in the region. This legacy was inherited, and in many cases reinforced, by the governments of the subsequently independent nation-states. Most African countries are still struggling, with varying degrees of success, to deal with the contradictions of their colonial past and the inherited jurisprudential and legal systems vis-à-vis the customary laws and norms of the people.

4. IMPACT OF GLOBALISATION

Subsequent to the colonial past, Africa is now coping with potentially more potent forces—global trade and globalisation—and their impact on genetic resources issues. With the advent of the World Trade Organisation (WTO), trade issues have rapidly become the predominate subject of international diplomacy and negotiations at both bilateral and multilateral levels. The WTO agreements have expanded the scope of international trade rules into previously independent aspects of domestic production and marketing, including IPRs, agriculture, and sanitary and phytosanitary measures.[48] As noted above, African countries depend on genetic resources for their development, while poverty alleviation and food security are among the most critical dimensions of sustainable human development in the African context. These needs are being affected to a large measure by trade liberalisation and globalisation.

In various ways, the WTO agreements have been seen as sidelining African and developing countries, keeping them perpetually dependent on developed countries and their multi-national corporations.[49] While there is still some debate in this regard, current global trade regimes remain skewed against developing countries that lack the capacity to compete effectively or take advantage of the opportunities that the new trade regimes provide.[50] According to the Policy Document of the New Partnership for Africa's Development (NEPAD), Africa has been integrated into the world economy as "supplier of cheap labour and raw materials draining Africa's resources rather than industrialising Africa. Of necessity this has meant the draining of Africa's resources rather than their use for the continent's development."[51]

---

44 The lack of significant success of the Green Revolution in Africa, while a very controversial issue, is attributable to a number of factors. The most agreed-upon point is the ostensible oversight of the proponents of Green Revolution of the local conditions and practices as well as the policy and institutional context into which it was introduced. *See, e.g.*, Peter Matlon, Comments Made at the ECOSOC Roundtable on the Theme: The Role of Agriculture and Rural Development in Eradicating Hunger and Poverty 30 April, 2003, *available at* http://www.rockfound.org/Documents/601/ECOSOC_Comments_Apr_03.pdf (last visited Aug. 21, 2003).

45 Known as the Algiers Convention, it was approved by the Council of the Organisation of African Unity at its 11th Ordinary Session in Algiers in September 1968, and subsequently signed by the heads of state and government of the OAU at their 5th Ordinary Session, which immediately followed. It entered into force on June 16, 1969, and 30 African states were parties to it before its current revision and re-adoption.

46 Discussed in further details in section 9.2 of chapter 4 of this book.

47 Field-Juma, *supra* n. 5 at 23.

48 K. Nnadozie *et al.*, Plant Genetic Resources in Africa's Renewal: Policy, Legal and Programmatic Issues Under the New Partnership for Africa's Development (2003, *in press*).

49 *See, e.g.*, New Partnership for Africa's Development (NEPAD) Policy Document, para. 2, *available at* http://www.nepad.org (last visited Aug. 21, 2003). Paragraph 18 states that "The impoverishment of the African continent was accentuated primarily by the legacy of colonialism, the Cold War, the workings of the international economic system, and the inadequacies of and shortcomings in the policies pursued by many countries in the post-independence era."

50 O. Hassan, Janice Olawoye, & Kent Nnadozie, Impact of International Trade and Multinational Corporations on the Environement and Sustainable Livelihoods of Rural Women in Akwa-Ibom State, Niger Delta Region, Nigeria (2002).

51 NEPAD Policy Document, *supra* n. 49, para. 19.

One of the most controversial WTO agreements, and perhaps the most relevant to the present discussion, is the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs). Under article 27(3)(b), TRIPs requires that countries should provide intellectual property protection for plant varieties, either through patents or an effective sui generis regime. Thus, the issue of access and benefit sharing now is discussed primarily within the commercial context, and international regimes increasingly determine the rules of the game.[52] This is occurring along with the rising power and influence of the private sector in international agenda setting and commercial transactions. Of significant relevance here are the pharmaceutical, agro-chemical, and biotechnology sectors. In these circumstances, developing countries have made frequent claims that their knowledge and resources have been expropriated, and the IPR regimes that evolved from the developed countries have facilitated this expropriation. Developing countries are currently under tremendous pressure to modify their laws or enact new ones to conform to the new global standards regarding intellectual property and trade liberalisation, especially with regard to genetic resources.

These current and emerging global trends are redefining how access to genetic resources is obtained, as well as the rules for sharing the benefits that arise from their utilisation.[53] Their continuing impact on traditional concepts and modes of access and benefit sharing has been significant, and this has created dilemmas for African countries. One of these dilemmas is how to reconcile the commitment to create an intellectual property regime envisaged by TRIPs that recognises private and individual ownership of genetic resources on the one hand, and recognises and protects traditional resources rights that are predominantly communal and inter-generational in nature on the other. To a large extent, the same impacts that the colonial experience had on traditional concepts and modes of access and benefit sharing are now being re-enacted and, in some cases, amplified by global trade regimes and the process of globalisation.[54] To this extent, the emerging global trends conflict with the traditional concepts of access and benefit sharing. As stated above, local communities depend heavily on a range of natural resources and environmental goods for their livelihoods—including land, potable water, water for agriculture, fisheries, and forest products—and they are or will be significantly affected when conditions change or their access to these resources is limited, denied, or determined by processes beyond their conception and control, such as the WTO or CBD. There is, however, a growing demand for the need to take these factors into account at the international level, and a growing number of efforts seek to protect, promote, and account for traditional perspectives and the interests of local and indigenous peoples in this context.

International legal regimes increasingly shape—or even determine—the direction of national law and policy regarding the use and conservation of genetic resources. With this growing trend, there is a need to address the lack of capacity of African countries to participate meaningfully in international negotiations in order to ensure that matters of special concern to them are taken into consideration and that their domestic priorities are reflected in international trade rules.[55] For example, it has been argued that defined rights to natural resources, and the effectiveness of customary laws governing access to genetic resources, can be used as a basis for sustainable development and influence the legal process from the bottom up.[56]

5. CONCLUSION

While there is concurrent application in many African countries of inherited Western legal systems and traditional legal systems and concepts, there are also both real and potential frictions between them, because they arose out of different worldviews. With respect to genetic resources use and management, traditional wisdom and practices can offer guidance that goes beyond the rather limited vision of modern legal systems. These include:

- The concept of inter-generational equity and reciprocity;
- Community cohesion and joint action;
- Deep respect for life and nature; and
- The concept of the unity of existence and the interconnectedness and interdependence of all living things in and with nature.

The recognition of these principles is one of the core considerations that informed the preparation of the African Model Law for the Protection of the Rights of

52 For instantce, article 15 of the CBD sees access and benefit sharing in this context. Even the Bonn Guidelines are based on the premise of commercialisation of genetic resources, as are the access and benefit sharing provisions of the multilateral system under the International Treaty on Plant Genetic Resources for Food and Agriculture. *See infra* ch. 4 of this volume.

53 *See id.*

54 While a country such as Ethiopia neither went through a colonial experience nor is a member of the WTO, it is still responding to global trends even though there are conscious efforts to protect traditional practices relating to use and conservation of genetic resources within the context of the CBD.

55 Africa's participation in the various relevant international negotiations is discussed in more detail in chapter 4 if this volume.

56 BARROW, *supra* n. 18 at 92.

Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources.[57] To date, several African countries are in the process of enacting access laws that specifically incorporate the recognition of traditional practices and systems of conservation and utilisation of natural resources. There is also a growing trend by the donor and development community to incorporate elements of traditional practices and concepts in their programmes and projects. Such incorporation recognises the inherent value of traditional approaches, as well as their appropriateness to the success of community-oriented (and even national and regional-level) programmes and projects on conservation and sustainable utilisation of natural resources. These trends will most likely influence emerging regimes and frameworks for access and benefit sharing in the region. The nature, extent, and form of their incorporation, though, are likely to remain a matter of national policy and legislation in the individual countries.

[57] During the Summit in Ouagadougou in May 1998, the Organisation of African Unity (now the African Union) endorsed the draft model law on Access to Biological Resources and the Protection of Community Rights. It recommended that African countries should enact national legislation, based on the draft model law, to enable them regulate access to their genetic resources and to legally protect the rights of their communities. *See infra* ch. 4 of this volume.

CHAPTER 4
INTERNATIONAL FRAMEWORKS FOR ACCESS AND BENEFIT SHARING

This chapter discusses some of the more significant international instruments and processes touching upon genetic resources, particularly the access and benefit sharing (ABS) aspects. The linkages between ABS on the one hand and related issues such as traditional knowledge and intellectual property rights on the other will be examined. The scale and pace at which the various aspects of the multiple processes impinging on ABS are evolving in the international arena make it difficult to cover all these issues completely in a single chapter. However, an attempt is made to capture succinctly the key factors and directions as they affect or may affect Africa. The chapter also looks at some of the major institutional stakeholders and emerging initiatives within the region with respect to ABS and the related issues. It further considers how the issues are evolving in these processes, the major concerns and constraints of African countries with respect to relevant issues, and how the region has responded to them.

1. THE CONVENTION ON BIOLOGICAL DIVERSITY

In 1992, the United Nations Conference on Environment and Development (UNCED) adopted the Convention on Biological Diversity (CBD). The main issues and lessons of the UNCED have been well documented. Perhaps one of the most prominent implications arising from it is that biodiversity, like all natural resources, has become a new focus of global politics. Many of the issues were debated and contested along "North" vs. "South" lines, and this dichotomy between developed and developing nations has since trailed subsequent negotiations of the relevant conventions, especially the CBD. The CBD was, however, quickly embraced by most developing countries who viewed it as empowering them and affirming their stake in the emerging global economic transactions and processes pertaining to biological resources. This is especially due to the fact that most of the world's biological resources are found in their territories. Particularly important for them was the re-affirmation of sovereignty over the natural resources within their territories, the concomitant authority to regulate and control access, and their right to demand and derive benefits from the exploitation or utilisation of those resources. That almost all the African countries have either signed and ratified or acceded to the CBD is, therefore, a clear statement of conviction in its objectives.[1] In fact, African countries have started to implement some of its components, especially by establishing National Biodiversity Strategies and Action Plans (NBSAPs). Some—such as Ethiopia, South Africa, Egypt, and Kenya—are in the process of enacting legislation to implement the access and benefit sharing aspects of the convention, while several others are considering legislation.

The CBD is largely a framework treaty that sets out the general parameters of the obligations and rights of member states but leaves the actual implementation of much of its components to decisions of the Conference of Parties (COP), which is the supreme body of the convention, and to the parties through national legislation, strategies, or policies. The greater onus of implementing the convention is on the parties at the national level, while administrative matters are to be handled by the convention secretariat.[2] Under the convention, the COP may at any point create specialist bodies or groups to address specific issues either on a limited or ongoing basis.[3] While the convention created the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA),[4] the COP has constituted several others in the course of its business. These include the Panel of Experts on Access and Benefit Sharing, the Ad Hoc Working Group on Access and Benefit-Sharing, and the Ad Hoc Working Group on Article 8j. Since the Convention's entry into force, the COP has reached hundreds of decisions on virtually all of its provisions with respect to substantive, procedural, and administra-

1 Fifty-two African Countries have either ratified or acceded to the CBD as of December 2002. Only Somalia, which is currently in an uncertain position of statehood, has yet to do so.

2 CBD, art. 24.

3 Art. 23, para. 4(g) (providing that the COP may "establish such subsidiary bodies, particularly to provide scientific and technical advice, as are deemed necessary for the implementation of this Convention.").

4 Article 25 establishes the SBSTTA to provide the COP with timely technical advice relating to the implementation of the convention.

tive aspects. The access and benefit sharing provisions have generated a fair amount of these decisions.

Additional protocols and other instruments could be negotiated under the convention in order to make its provisions precise enough for implementation by the parties.[5] Prominent among those that have been adopted to date by the COP include the Cartegena Protocol on Biosafety[6] and the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (Bonn Guidelines).[7]

1.1 Objectives

Article 1 of the CBD, which sets out its objectives, is one of the broadest provisions in any convention in recent times.[8] Encapsulated within this single article are the many beliefs, concerns, needs, expectations, positions, and reservations of the states that negotiated it. It is a remarkable summation, in which every word or phrase connotes fundamental commitments with far-reaching implications for the member states.

The first two components, conservation and sustainable use, are universally shared ideals, although the parties are not agreed on the particulars, and the modalities of implementation are evolving. The convention recognises that every state has keen and vested interests in the conservation of biological diversity as "a common concern of humankind," being conscious of its importance "for evolution and for maintaining life sustaining systems of the biosphere," as well as for diverse ecological, genetic, social, economic, scientific, educational, cultural, recreational, and aesthetic values. Article 1 further recognises the significant threat that biological diversity faces globally as a result of human activities, calling for global cooperation in addressing these concerns.[9] For African countries, the prevailing trend of biodiversity loss is a major concern since Africa's economies, cultures, and political systems are primarily dependent, albeit precariously, on how sustainably biological (including genetic) resources are managed.[10] These concerns, therefore, underpin their expectation of a fair and equitable share of the benefits accruing from the utilisation of their biodiversity and associated knowledge. These concerns and expectations have informed their enthusiastic adoption and increasing implementation of the provisions of the convention, especially as they relate to access and benefit sharing.

1.2 Principles

Article 3 of the convention affirms that states have the sovereign right to exploit their resources as they deem fit, but it imposes a matching obligation on their part to conserve biodiversity and use the resources in a sustainable manner.[11] Some have argued that this is the first international legal instrument outside the Charter of the United Nations in which the principle of sovereignty is made operational.[12] The provision is also a restatement of the well-established principle of *sic utere* under international law.[13] In this context, states must not exploit their natural resources in such a manner as to jeopardise those of neighbouring states, but the issue of sovereignty of states over their natural resources and their rights to control access is established more substantively in article 15.

1.3 Access and Benefit Sharing

Articles 1 and 15 of the convention are central to the issue of access and benefit sharing (ABS). Article 15 sets out the basic principles and concepts for access to genetic resources and provides as follows:

> 1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.
> 2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.
> 3. For the purpose of this Convention, the genetic resources being provided by a Contracting Party, as referred to in this Article and Articles 16 and 19, are

5 Article 28 of the CBD relates to adoption of protocols, while article 30 provides for the adoption of annexes to the convention.

6 The protocol was adopted on Jan. 29, 2000 in Montreal, Canada, after more than three and a half years of negotiation. It will enter into force Sept. 11, 2003.

7 The Bonn Guidelines were adopted at the fifth session of the Conference of Parties to the CBD by paragraph 3 of Decision VI/24 and are discussed in further details below.

8 "The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding."

9 *See also* art. 5.

10 K. Nnadozie *et al.*, Plant Genetic Resources in Africa's Renewal: Policy, Legal and Programmatic Issues Under the New Partnership for Africa's Development (2003, *in press*).

11 *See also* fifth preambular statement.

12 *E.g.*, Institute for Sustainable Development, The Convention on Biological Diversity with Some Explanatory Notes from a Third World Perspective (2000).

13 *Sic utere tuo ut alienum non laedas*, a common law maxim meaning, literally "so use your property as not to injure your neighbour's." *See, e.g.*, Black's Law Dictionary 1380 (1990).

> only those that are provided by Contracting Parties that are countries of origin of such resources or by the Parties that have acquired the genetic resources in accordance with this Convention.
> 4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.
> 5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.
> 6. Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.
> 7. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilisation of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.

The access and benefit sharing provisions of the convention have raised a considerable amount of debate among the parties with respect to the interpretation of its components and the terms for their implementation. The debate surrounding these provisions has been accentuated both by the expectations of significant benefits by some of the parties (mostly developing countries) and the concerns of other parties (mostly developed countries), that the provisions might precipitate undue restrictions on access to genetic resources that could hinder research and development.

The aspect requiring "the fair and equitable sharing of benefits arising out of the utilisation of genetic resources" under article 1 has become, for African and indeed most developing countries, a profound stipulation that acknowledges that the previous global system of access to and utilisation of their genetic resources had not been fair. It also expresses their expectation of a significant change in the system that would enhance development in the region. For centuries, Africa has been a cheap source of resources—including genetic material, but more prominently, human resources, biological resources, and minerals—for industrial development in the West, contributing significantly to the enhancement of agriculture and production of industrial goods and pharmaceutical products. To date, many valuable chemical compounds have been extracted from African plants and trees for use in the pharmaceutical, nutraceutical, and personal care products industries.[14] Unfortunately, Africa has been unable to derive adequate benefits or extract the best possible dividends from the exploitation of its genetic resources. In other words, access has been given, or in many cases obtained by force or subterfuge, without commensurate benefits flowing back to the region. For the region, therefore, the formal provision for benefit sharing is a global affirmation of the need to ensure equity and fairness in transactions involving the utilisation of its genetic resources. It is also the validation of the reciprocal relationship between access on the one hand and benefit sharing on the other. This connection between access and benefit sharing and its significance in the implementation of the convention is further expanded upon in articles 16.1, 16.3, 17, 18.4, and 19.1 of the CBD.

The centrality of the issue of access and benefit sharing to the implementation of the provisions of the convention led to the establishment of the Panel of Experts on Access and Benefit Sharing and, subsequently, the Ad Hoc Working Group on Access and Benefit Sharing. The COP at its fourth session decided:

> to establish a regionally balanced panel of experts appointed by Governments, composed of representatives from the private and public sectors, as well as representatives of indigenous and local communities ... The mandate of this panel would be to draw upon all relevant sources, including legislative, policy and administrative measures, best practices and case-studies on access to genetic resources and benefit-sharing arising from the use of those genetic resources, including the whole range of biotechnology, in the development of a common understanding of basic concepts and to explore all options for access and benefit-sharing on mutually agreed terms including guiding principles, guidelines, and codes of best practices for access and benefit-sharing arrangements.[15]

The Panel of Experts met in San José, Costa Rica, from 4 to 8 October 1999 and submitted its report[16] to

[14] Institute for Sustainable Development, *supra* n. 12.
[15] See UNEP/CBD/COP/4/27, Decision IV/8, para. 3.
[16] See UNEP/CBD/COP/5/8.

the fifth session of the COP in May 2000 in Nairobi. The COP decided, inter alia, to reconvene the Panel of Experts on Access and Benefit Sharing with a concrete mandate and agenda. The panel was to conduct further work on outstanding issues from its first meeting, especially to assess user and provider experience in access to genetic resources and benefit sharing and study of complementary options; and identify approaches to involvement of stakeholders in access and benefit-sharing processes. The panel was mandated to submit its report to the Ad Hoc Working Group on Access and Benefit-Sharing, which was further established by the same decision of the COP.[17] A principle output of the working group since its establishment are the Bonn Guidelines (discussed below), which were adopted by the COP at its sixth session at The Hague in April 2002.

It is significant that the provisions of the convention, including the access and benefit-sharing stipulations, do not apply to genetic resources collected prior to the convention's entry into force.[18] Thus, seed banks and ex situ collections in existence before it came into force do not require equitable sharing of benefits otherwise envisaged under the convention. For African countries, this was an unresolved issue that required specific action, since many genetic resources were taken from the region before the CBD, and some of these resources have yielded tremendous benefits to the holders or subsequent recipients. Most of these resources still remain in collections outside the countries of origin,[19] especially in the genebanks of the Consultative Group on International Agricultural Research (CGIAR) centres,[20] and have continued to yield benefits to parties accessing them. To the countries of origin in Africa and elsewhere, some mechanism for reparation or sharing of some of these benefits was considered imperative. Since it was not possible to establish a system for sharing future benefits from these resources under the CBD, it became one of the principal elements for the negotiation and conclusion of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR).[21]

17 Decision V/26A, para. 11.

18 See art.15.3.

19 Meaning, in this context, the countries from where they were originally collected.

20 Out of the nearly 600,000 accessions being held in CGIAR centres worldwide, 129,315 were collected from Africa.

21 It was in recognition of the shortcoming with respect to this category of genetic resources that the COP to the CBD "ceded" primacy over agricultural biodiversity to the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA). In its fifth session, by paragraph 7 of Decision V/26, the CBD COP urged members to take into account the multilateral system of access and benefit sharing that was being developed by the CGRFA in developing national legislation on access.

1.4 The Bonn Guidelines

As already stated, the COP established an Ad Hoc Open-Ended Working Group to address a range of unresolved issues regarding access and benefit sharing.[22] The working group is composed of representatives, including experts, nominated by governments and regional economic integration organisations. This working group was mandated to develop guidelines and other approaches for submission to the COP and to assist parties and stakeholders in addressing access to genetic resources and benefit sharing.[23] Specific issues for consideration included:

- terms for prior informed consent and mutually agreed terms;
- roles, responsibilities, and participation of stakeholders;
- relevant aspects relating to in situ and ex situ conservation and sustainable use;
- mechanisms for benefit sharing, for example through technology transfer and joint research and development; and
- means to ensure the respect, preservation, and maintenance of knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. These means should take into account, inter alia, work by the World Intellectual Property Organization (WIPO) on intellectual property rights issues.[24]

The COP further stipulated that these elements should, in particular, serve as inputs when developing and drafting legislative, administrative, or policy measures on access and benefit sharing, as well as contracts or other arrangements under mutually agreed terms for access and benefit sharing. The results of the deliberations of the working group, including draft guidelines and other approaches, have taken into account the reports of the Panel of Experts on Access and Benefit-Sharing and other relevant information. The results were to be submitted for consideration by the COP at its sixth meeting.

The Ad Hoc Open-Ended Working Group on Access and Benefit-Sharing met October 22-26, 2001 in Bonn, Germany, and developed Draft Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization.

22 Decision V/26A, para. 11.

23 Decision V/26A.

24 UNEP/CBD/COP/6/6.

The guidelines were further discussed and adopted by the COP at its sixth meeting in April 2002.[25] These voluntary guidelines are designed to help in the development and drafting of legislative, administrative, or policy measures on access and benefit sharing and in the elaboration of contracts or other arrangements for access to genetic resources and benefit sharing.

The Bonn Guidelines contain comprehensive provisions covering a range of issues and options. They also contain a number of significant disclaimers. They are not to be: construed as changing the rights and obligations of parties under the convention; intended to substitute for relevant national legislation; interpreted to affect the sovereign rights of states over their natural resources; or interpreted as affecting the rights and obligations relating to genetic resources arising out of the mutually agreed terms under which the resources were obtained from the country of origin.[26] In scope, they apply to all genetic resources and associated traditional knowledge, innovations, and practices covered by the CBD, as well as to benefits arising from the commercial and other utilisation of such resources, with the exclusion of human genetic resources.[27] They are to be applied in a manner that is coherent and mutually supportive of the work of relevant international agreements and institutions, with particular reference to the ITPGR and to the work of WIPO, as well as existing regional legislation and agreements on access and benefit sharing.[28]

The guidelines stipulate that there should be a single national focal point for access and benefit sharing to inform applicants regarding access, procedures for acquiring prior informed consent, and mutually agreed terms, including benefit sharing, through the clearing house mechanism.[29] It is, however, recognised that there could be more than one national competent authority that would be responsible for granting access and for advising on a range of other issues, including the negotiating process, implementation and enforcement of access and benefit-sharing agreements, and participation of different stakeholders.[30]

The guidelines further provide a "balanced list of roles and responsibilities," including key elements to be acted upon by both providers and users of genetic resources. These elements include a review of policy, administrative, and legislative measures and the stipulation for prior informed consent to ensure compliance with article 15 of the convention. Also provided for is the stipulation for the participation of indigenous peoples and local communities in benefit sharing and decisionmaking as well as respect for their customs, traditions, values, and customary practices.[31] Part IV contains provisions regarding the ABS process, including procedures for obtaining prior informed consent as well as an indicative list of mutually agreed terms, basic elements of material transfer agreements (MTAs), and the types, timing, mechanisms, and distribution of benefits to be shared, which are all in consonance with article 15 of the convention.

Remarkable from a provider point of view are the provisions of article 16(d), which state that:

> Contracting Parties with users of genetic resources under their jurisdiction should take appropriate legal, administrative, or policy measures, as appropriate, to support compliance with prior informed consent of the Contracting Party providing such resources and mutually agreed terms on which access was granted. These countries could consider, inter alia, the following measures:
>
> (ii) Measures to encourage the disclosure of the country of origin of the genetic resources and of the origin of traditional knowledge, innovations and practices of indigenous and local communities in applications for intellectual property rights;
>
> (iii) Measures aimed at preventing the use of genetic resources obtained without the prior informed consent of the Contracting Party providing such resources.

This provision is significant, particularly in light of the concerns and claims by many developing-country providers of genetic resources that current intellectual property regimes in developed countries encourage appropriation, without compensation, of genetic resources and associated knowledge, especially of indigenous and local communities in developing countries, a practice now known as "biopiracy." The implication of the provision is that user countries or countries where users are located are expected to adopt measures to check the continued appropriation of such resources and knowledge through intellectual property rights (IPRs). These measures might include the presentation of certificates of origin from the countries of origin of genetic resource before IPRs are granted, a proposal that is being

25 Decision VI/24A, para. 3 & ann.

26 See arts. 2-6.

27 Art. 9.

28 Art. 10.

29 Art. 13.

30 Art. 14.

31 Art. 16.

advocated by many developing countries and stakeholders. Such measures will help ensure that there is, at a minimum, prior informed consent by the owners or holders of the resources or knowledge and, hopefully, adequate benefit-sharing arrangements.

At the adoption of the guidelines, the African ministers issued a statement to the High Level Ministerial Meeting held in parallel with the COP, and also addressed to the approaching WSSD, on the role of biodiversity in sustainable development and poverty alleviation. In the statement, the ministers called for a legally binding international instrument on access and benefit sharing and urged African governments to use the Bonn Guidelines and national instruments in the interim.

Two other important elements of Decision VI/24 on access and benefit sharing relating to genetic resources are also worth referring to. First, Decision VI/24C addresses the role of IPRs in ABS arrangements. In paragraphs 1 and 2, the COP invites parties and governments to encourage the disclosure of the origin of genetic resources and related traditional knowledge in applications for IPRs, where the subject matter of the application concerns or makes use of genetic resources or related traditional knowledge in its development. However, the COP also recognises that further work is needed on these issues. Second, in Decision VI/24B, the COP decided to convene an open-ended expert workshop on capacity building for ABS to further develop draft elements of an action plan on capacity building for ABS. A workshop held in December 2002 agreed on a draft action plan to be submitted to COP VII in 2004 for its adoption.[32]

1.5 Traditional Knowledge

The issue of how to protect traditional knowledge and indigenous and local communities' rights is inextricably linked to access and benefit sharing, and is especially relevant to Africa. This is particularly so in light of the fact that what is often accessed is not so much the physical genetic material as the knowledge of their use and properties. This has been one of the most debated issues in practically all the COPs since the adoption of the CBD, as well as in the course of the review of the International Undertaking leading up to the adoption of the ITPGR. Achieving consensus on its various aspects has been extremely difficult, and several other international processes have also been grappling with this issue, including the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Commission on Sustainable Development (CSD), the International Labour Organization (ILO), WIPO, and the World Summit on Sustainable Development (WSSD). This issue has also found its way to the negotiations in the World Trade Organisation (WTO), especially in light of the provisions of its TRIPs agreement and the implications of the agreement in relation to genetic resources and traditional knowledge.

It is no longer debatable that contemporary IPR laws are inappropriate and inadequate for benefit sharing and defending the rights and resources of local communities and indigenous peoples. IPRs, as defined under TRIPs and most domestic laws, are individual and exclusive rights based on classical economic notions of property rights. Traditional or community knowledge, however, is usually shared and communally owned, such that even the holders of restricted knowledge in communities generally do not have the right to commercialise it for personal gain. Instead, they are perceived to be holding such knowledge in custody for the entire community. Moreover, the benefits from that knowledge are not always in terms of economic rewards. The social aspects are more critical in most instances. The focus in contemporary IPRs, such as patents, on novelty, exclusivity, and individual contribution precludes local collective or communal activity.[33]

Traditional knowledge was one of the critical issues for the African Group during the negotiation of the CBD and since its adoption, and it has remained a key issue for indigenous peoples and local communities. With more than 65 percent of African people living in rural areas, the continent's biological resources have been maintained and nurtured by generations of people in rural communities through traditional practices and customs. These customs include traditional farming practices, health care delivery through traditional medical practice, and conservation through sustainable utilisation of natural resources. In addition to having profound knowledge of local wild plants and animals, local and indigenous peoples have, through selection and experimentation, developed and enhanced the diversity of crops and domestic animals from which new varieties

32 The draft action plan is contained in the report of the workshop (UNEP/CBD/ABS/EW-CB/1/3) and *available at* the CBD website http://www.biodiv.org (last visited Aug. 20, 2003).

33 P. Kameri-Mbote & P. Cullet, Biologival Diversity Management in Africa: Policy Perspectives (1999).

and breeds are created and upon which further development depends.[34]

The CBD specifically recognises indigenous and local communities as a source of knowledge and practices relevant to the conservation of biodiversity and as "embodying traditional lifestyles on biological resources."[35] Article 8(j) calls for promoting the wider recognition, application, and protection of the "knowledge, innovations and practices of indigenous and local communities ... for the conservation and sustainable use of biological diversity ... with the approval and involvement of the holders of such knowledge, innovations and practices." The article further stipulates that "the equitable sharing of benefits arising from the utilization of such knowledge, innovations and practices" should be encouraged. Further, article 10(c) provides that "each contracting Party shall protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements." Therefore, no discussion of ABS with respect to genetic resources is complete without due consideration of associated traditional knowledge, which is often the most important and beneficial component to the user. However, fashioning and agreeing upon appropriate mechanisms for accessing traditional knowledge and sharing benefits arising from its use has been an exceptionally challenging process.

The critical linkage between ABS and traditional knowledge was addressed early on in the CBD process. During its third session, the COP[36] decided that an inter-sessional process should be established to advance further work on the implementation of article 8(j) and related provisions with a view to producing a report for consideration at the fourth meeting of the COP.[37] It particularly noted that implementation of article 15 is closely linked to that of other articles, such as 8(j).[38] Given the connections between genetic resources and local and indigenous knowledge and innovations, which have been recognised in Decision III/15, it is important that article 8(j) be implemented in conjunction with article 15. For example, procedures of prior informed consent as required in article 15.5 might also provide that access seekers must obtain the informed consent and approval of local and indigenous communities. By Decision IV/9 at its fourth session, the COP decided that an ad hoc open-ended inter-sessional working group be established to address the implementation of article 8(j) and related provisions of the convention. The working group shall report directly to the COP while also providing advice to the SBSTTA. The working group has been instrumental to the advancement of the work on article 8(j), making substantial input to the CBD process and decisions on the subject. It has also ensured that due consideration is given to the provisions of the article in every other aspect of the convention's implementation, especially the ABS provisions.

It is partly in response to the stipulations of article 8(j) and the particular concerns of the African countries that the Organisation of African Unity (OAU) (now the African Union) prepared the African Model Law for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources. During its 1998 summit, the OAU endorsed the model law and recommended that African countries should enact national legislation based on the draft model law to enable them to effectively regulate access to their genetic resources and to legally protect the rights of their communities.[39]

1.6 Multi-Year Programme of Work and WSSD Outcomes

At its sixth session, the COP decided to hold an open-ended inter-sessional meeting to consider the multi-year programme of work for the COP.[40] The meeting was held March 17-20, 2003 and discussed several key issues including: legal and socio-economic aspects of technology transfer and cooperation; the outcomes of the WSSD as they relate to the convention process; an international regime for access and benefit sharing; future evaluation of progress in implementing the convention and the strategic plan; and the CBD's contribution to the Millennium Development Goals and the Commission on Sustainable Development process.

The issue of an international regime for access and benefit sharing was one of the most intensely debated items on the agenda, especially as to what nature such a

34 Tewolde Gebre Egziabher, *Synergies between the Convention on Biological Diversity, the International Undertaking on Plant Genetic Resources for Food and Agriculture, the World Trade Organisation, and Intellectual Property Rights, in* G.Y. Mkamanga et al. (Eds.), Implications of International Instruments on Sustainable Management of Biodiversitry. Proceedings of the African Regional Workshop on Understanding Biodiversity-Related International Instruments, Lusaka, Zambia, 11-15 January 1999 (1999).

35 Art. 8(j).

36 Decision III/14, para. 7.

37 The Workshop on Traditional Knowledge and Biological Diversity was subsequently convened in accordance with paragraph 9 of Decision III/14 of the COP, in Madrid, from 24 to 28 November 1997, at the invitation of the Government of Spain. *See* Report of the Workshop on Traditional Knowledge and Biological Diversity (1997), Doc. No. UNEP/CBD/TKBD/1/3, *available at* http://www.biodiv.org/doc/meetings/tk/wstkbd-01/official/wstkbd-01-03-en.pdf (last visited Aug. 20, 2003).

38 Decision III/15.

39 The AU Model Law is discussed in more detail in section 4.6.1 below.

40 Decision VI/28.

regime should take.[41] Some parties argued for a step-by-step approach, which would involve more studies and learning from the experiences of applying the voluntary Bonn Guidelines. Others, especially developing countries, called for a legally binding regime based on the Bonn Guidelines, noting that a voluntary regime would not guarantee fair and equitable benefit sharing.

The discussion of this issue as well as the outcome of the meeting is significant in the sense that it could be said to be the beginning of the formal deliberations on that issue. At the end of the meeting, however, the parties agreed on a final document that recognised the Bonn Guidelines as a useful first step toward the implementation of CBD provisions related to ABS, as well as the need for the proposed regime to respond to different parties' priorities and address both access and benefit sharing. The meeting also noted the mandate of the ABS Working Group to advise the COP on outstanding issues, including other approaches. It finally recommended that the working group should consider the process, nature, scope, elements, and modalities of the international regime in its consideration of other approaches and provide advice to the seventh session of the COP. Although no outstanding agreement was reached on the nature of the international regime, it is expected that this issue will take centre stage in the international debate on ABS in the years to come, in both the CBD process and in other relevant international fora.

2. UNITED NATIONS FOOD AND AGRICULTURE ORGANISATION (FAO)

2.1 The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

The FAO adopted the ITPGR in November 2001. The principal objectives of the treaty are:

> the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of benefits derived from their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.[42]

While marking a further key step in the evolution of international frameworks for access to genetic resources and benefit sharing, the ITPGR also adds a new dimension to the chequered international processes with which developing countries, especially in Africa, have to contend.

The treaty provides a multilateral approach to access and benefit sharing in which the sovereign rights of states over their own genetic resources are recognised.[43] The treaty also agreed to establish an open multilateral system of exchange in the form of a Multilateral System of Access and Benefit-sharing (MLS). The MLS will include the plant genetic resources for food and agriculture (PGRFA) listed under annex 1 of the treaty and which are under the management and control of contracting parties and in the public domain. The MLS currently applies to more than 60 plant genera, which include 64 major crops and forages. The MLS will provide for facilitated access in accordance with certain conditions relating to benefit sharing, especially where IPRs are taken out with respect to products arising from materials obtained from the system. The treaty's benefit-sharing provision is triggered only when someone accesses material from the MLS, uses it, commercialises it, and protects the resulting product in a manner that restricts further access to and use of the resultant product.[44] For instance, where materials accessed from the MLS are used in breeding programmes, and the IPRs are obtained with respect to the resulting varieties or lines, the benefit-sharing requirements will then apply, and the recipient will be obliged to pay some amount into the benefit-sharing mechanism.[45] On the other hand, where such a product is available without restriction to others for further research and breeding, the recipient who commercialises it shall be "encouraged" to make such payment. However, the precise terms of the benefit-sharing requirements—level, form, and manner of the payment—have yet to be determined. This is one of the first issues that will have to be addressed by the Governing Body of the Treaty (composed of countries that have ratified it) at the first meeting upon the treaty's entry into force. The treaty states, however, that the benefits to be provided will be "in line with commercial practice."[46]

Benefit sharing is achieved through mechanisms of information exchange, access to and transfer of technology, capacity building, and the sharing of financial benefits arising from commercialisation. These conditions

41 Paragraph 44(o) of the WSSD Plan of Implementation called for the negotiation within the CBD framework of an international benefit-sharing regime, bearing in mind the Bonn Guidelines, to promote and safeguard the fair and equitable sharing of benefits arising out of the utilisation of genetic resources.

42 Art. 1.1.

43 This is a major difference from the International Undertaking, from which the Treaty evolved. The IU considered genetic resources the common heritage of mankind that should be accessed freely and without any restrictions.

44 Art. 13.2(d)(ii).

45 Cary Fowler, *The Status of Public and Proprietary Germplasm and Information: An Assessment of Recent Developments at FAO, in* IP STRATEGY TODAY, No. 7-2003, *available at* http://www.biodevelopments.org/ip/index.htm (last visited Aug. 20, 2003).

46 Art. 13.2d(ii).

will be set out in a standard MTA that will be established by the governing body at its first meeting.

The list of crops in this multilateral system was determined on the basis of the dual criteria of importance to food security and the interdependence of the world's regions for access to the germplasm of the particular crop. The treaty covers all plant genetic resources for food and agriculture, and the annex 1 list of crops represents only the starting point for what most parties hope will eventually become a much longer list. The current annex 1 list is only a beginning; the spirit of the treaty is that more and more species will be included in the MLS over time. Toward this end, the treaty spells out a mechanism through which new species can be added to the list.[47]

The ITPGR, by recognising farmers' rights, highlights the enormous contributions of farmers around the world in conserving and improving plant genetic resources and making them available for use and further development by others.[48] Stipulating that the responsibility for realising farmers' rights rests with national governments, the treaty asks governments to "take measures to protect and promote Farmers' Rights."[49] Such measures include protecting traditional knowledge relevant to plant genetic resources, as well as promoting farmers' rights to share equitably in the benefits arising from the use of genetic resources and to participate in national-level decisionmaking on matters related to their conservation and sustainable use.[50] Countries, especially in Africa, therefore, have to make specific provisions to ensure that those rights are formally recognised, protected, and promoted in their national legislation. Such rights will include protection of traditional knowledge relevant to PGRFA, and the rights to share in the benefits arising from the utilisation of PGRFA and to participate in decisionmaking on matters relating to PGRFA. Now, African nations are considering how better to implement the obligations to which they committed under this international treaty. In some cases, this may mean reconciling the new obligations with rapidly emerging national regimes governing access to genetic resources; in other cases, governments will need to develop new access legislation that implements commitments under both the International Treaty and the CBD.[51]

By ensuring access to genetic resources that can improve food stocks, the treaty stands to strengthen food security throughout the world, including in developed countries, and ensures that the benefits from commercialisation of crops are shared with farmers, particularly those in less-developed countries. This treaty is significant because it takes concrete steps to promote access to genetic resources, rather than focusing on the heated debate of ownership rights, as many of the other international initiatives and agreements have done. The importance of the treaty to agricultural development and food security in Africa is underpinned by the fact that several African countries were among the first signatories to the International Treaty, while several have already ratified it.[52]

In accordance with article 28, the treaty enters into force 90 days after the deposit of the 40th instrument of ratification, acceptance, approval, or accession. Once the treaty comes into force, the member states that have ratified it will then form its governing body. The first meeting of the governing body will address such important questions as the nature and level of monetary payment on commercialisation, standard MTA for genetic resources under the treaty, mechanisms to promote compliance, and a funding strategy. At the conclusion of the sixth session of the CBD COP in April 2002, the African ministers attending the meeting issued a statement, amongst others, calling on African governments to immediately ratify the treaty in order to enable them to actively participate in the decisionmaking processes of the governing body. However, each country is expected to develop its own legislation or regulations to implement the treaty. Genetic resources scientists and stakeholders in respective countries also need to ensure that they are informed on the developments in relation to the treaty, as such developments are likely to affect their activities in significant ways. There is also the need for involvement, at the national level, of the different stakeholders who are likely to be affected. This is because, in most countries, the focal point for the treaty is the ministry or department responsible for agriculture, although the issues are multisectoral. Unless there are mechanisms at country level for inter- and multisectoral dialogue and collaboration on this issue, the International Treaty will not benefit from a broad ownership and use within countries, and its potential will be hindered.

47 For instance, article 19.3 lists as one of the functions of the governing body to "(i) consider and adopt, as required, amendments to annexes to this Treaty, in accordance with the provisions of Article 24." Article 23 stipulates the procedures for amendments to the treaty.

48 Art. 9.1.

49 Art. 9.2.

50 *Id.*

51 See CBD COP V/26, para. 7 (which "stresses that it is important that, in developing national legislation on access, Parties take into account and allow for the development of a multilateral system to facilitate access and benefit-sharing in the context of the International Undertaking on Plant Genetic Resources."). It is noteworthy, however, that in the few examples where attempts are currently being made to institute legislation governing access to genetic resources under the CBD, this has not been the case.

52 As of August 2003, the African countries that have approved, ratified, or acceded to it are: Algeria, Central African Republic, Ivory Coast, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mauritania, Mauritius, Sierra Leone, Sudan, and Uganda. Practically all the remaining African countries have already signed the treaty, but have yet to ratify or accede to it.

2.2 The International Code of Conduct for Plant Germplasm Collecting and Transfer

The International Code of Conduct for Plant Germplasm Collecting and Transfer[53] is part of the Global System on Plant Genetic Resources. The code seeks to promote the rational collection and sustainable use of genetic resources, to prevent genetic erosion, and to protect the interests of both donors and collectors of germplasm. The FAO developed the code, which is voluntary, and the FAO member states negotiated the final text through the FAO Commission on Plant Genetic Resources. The FAO Conference adopted the code at its 27th session in 1993.

Consonant with the CBD, the code is based on the principle of national sovereignty over plant genetic resources and sets forth standards and principles to be observed by those countries and institutions that adhere to it. The code further stipulates procedures for requesting and issuing licences for collecting missions; provides guidelines for collectors; and extends responsibilities and obligations to the sponsors of missions, the curators of genebanks, and the users of genetic material. In further accord with the CBD, the code calls for the participation of farmers and local institutions in collecting missions and proposes that users of germplasm share the benefits derived from the use of plant genetic resources with the host country and its farmers.

The primary function of the code is to serve as a point of reference until such time as individual countries establish their own codes or regulations for germplasm exploration and collection, conservation, exchange, and utilization. The code is not only compatible with the CBD, it is also in harmony with the ITPGR and it is expected that the code will be reviewed by the Commission on Genetic Resources for Food and Agriculture, the Governing Body of the ITPGR, or both when the treaty enters into force.

In the absence of formal standards, the code could serve as a guide to the relevant stakeholders in the course of germplasm collection to ensure that the processes of accessing and collecting genetic resources are ethical, fair, and equitable. It also provides some of the basic elements and general principles that a country could take into account in designing a formal set of rules to regulate the collection of germplasm by genebanks, researchers, the private sector, and others, or in formulating bilateral agreements on the collection of germplasm.

53 See http://www.fao.org/biodiversity/CCPGCT_en.asp (last visited Aug. 24, 2003); ftp://ext-ftp.fao.org/waicent/pub/cgrfa8/GS/CCgermpE.pdf (last visited Aug. 24, 2003).

3. THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

Several institutions and organisations operating in the African region have engaged for a long time in extensive collection of genetic resources for research, commercial, and conservation purposes. Some also host active and well-maintained gene banks. The most active and sustained gene banks are those maintained by the Consultative Group on International Agricultural Research (CGIAR or CG) centres. The CGIAR, established in 1971, consists of 16 international agricultural research centres around the world, with four headquartered in Africa. One of CGIAR's principal research objectives is to contribute to the preservation of agrobiodiversity by establishing ex situ collections of plant genetic resources. These collections currently comprise about 600,000 accessions of more than 3,000 crop, forage, and pasture species. The agricultural research centres of CGIAR in Africa that maintain genebanks include: the International Center for Research in Agroforestry or World Agroforestry Center (ICRAF), the International Livestock Research Institute (ILRI), the International Institute of Tropical Agriculture (IITA), and the West Africa Rice Development Association (WARDA). Several other CG centres—such as the International Rice Research Institute (IRRI), the International Centre for Research in Semi-Arid Tropics (ICRISAT), and the International Centre for Research in Dry Areas (ICARDA)—have programmes in Africa and have conserved germplasm originating from the continent in their gene banks located in other regions of the world, while the International Plant Genetic Resources Institute (IPGRI) carries on policy and capacity-building programmes in the region. Out of the total accessions being held by the centres worldwide, approximately 129,315 were originally collected from Africa with the highest national numbers—19,711 and 14,694—coming from Ethiopia and Nigeria, respectively.[54]

The CGIAR played a significant role in the events leading to the negotiation and signing of the CBD and subsequent meetings discussing the various mechanisms for its implementation. It also played a prominent role during the negotiations and adoption of the ITPGR. In fact, the MLS (discussed above) is directed considerably at the CG centres with specific provisions in the ITPGR dedicated to the status and modalities for the utilisation

54 See SINGER—the System-wide Information Network for Genetic Resources, *available at* http://singer.cgiar.org (last visited Aug. 20, 2003).

of the genetic resources in their collections.[55] As already noted, the CBD did not address the special problem of pre-CBD ex situ collections such as those being held by the CGIAR centres. In fact, while the CGIAR is the world's largest international collection of crops and forest germplasm, most of the accessions were collected prior to 1993 when the CBD came into force and therefore fall outside its provisions. The status of most of these collections, including the question of ownership and terms of access and benefit sharing, is expected to be regulated by the ITPGR when it comes into force by virtue of Article 15 of the Treaty.

The CGIAR faces a serious dilemma in light of the changing global research environment and increasing private sector involvement and investment in research, especially biotechnology, with its concomitant increase in applications for intellectual property rights (IPRs). This has raised concerns, especially among the developing countries that are the original sources of most of the collections, that since the collections are being accessed by private interests, the resources might be "privatised," especially as there is no requirement for benefit sharing. As one of the devices to address such concerns and show transparency, the centres have placed most of their genebank accessions in trust with the FAO. Since 1994, access to these materials has been governed by an agreement between FAO and the centres. This agreement places certain "designated" collections "in trust" for the international community under the auspices of FAO. Under this arrangement, the centres offer free access to the materials and routinely distribute germplasm[56] to breeders under the terms of a material transfer agreement (MTA) that prohibits recipients from claiming ownership over the materials received and from seeking IPRs over them. This is intended to guarantee that genebank samples cannot be subjected to an exclusive monopoly under an IPR system. The principal objective is to ensure that these genetic resources remain accessible and available for all to use. Through the FAO Commission on Genetic Resources, countries have endorsed the FAO-CGIAR Agreement and thus implicitly recognized the international and public status of the germplasm. The centres have also called for a moratorium on granting of IPRs on designated plant germplasm collections held by them around the world. However, this has not entirely prevented the appropriation of materials derived from their collections or the acquisition of IPRs on the materials by private interests.[57]

Although not legally bound by the terms of the CBD, the national and international policy environment in which the CGIAR generally operates is clearly being shaped by the CBD process. However, while the CGIAR has no collective identity and as such has no power to sign or ratify the CBD, in principle the centres identify generally with the objectives of the convention and "adhere[s] as closely as possible to the terms of the various Articles."[58] As a result of the large number of accessions they maintain, their technical capabilities, and other resources, the CGIAR centres are key players in the African region and are taken into account one way or another in national and regional programmes and policies relating to the conservation, management, and utilisation of genetic resources.[59] The CGIAR centres play a considerable role in the conservation and use of biodiversity, as evidenced by past collections and conservation initiatives and the subsequent use of the germplasm in crop improvement programmes. They have also been responsible for restoration of germplasm after natural disasters and civil strife in several African countries. While some aspects of their operations remain controversial, the comparative scientific advantage, flexibility, and non-partisan involvement of the CG centres provide the countries in Africa with an opportunity to continue drawing upon international expertise in addressing issues relevant to the implementation of the CBD, the ITPGR, and other biodiversity-related initiatives.[60]

4. THE GROUP OF LIKE-MINDED MEGADIVERSE COUNTRIES

The Group of Like-Minded Megadiverse Countries is a consultation and cooperation mechanism that aims to promote the member countries' common interests and priorities related to conservation and sustainable use of biological diversity. It was formed in February 2002 with the Cancun Declaration after a meeting of the members in Cancun, Mexico.[61] It is composed of Bolivia,

55 A.F. Attere *et al.*, *The Experience of the CGIAR and IPGRI in the Implementation of the CBD*, *in* G.Y. MKAMANGA *ET AL.*, *supra* n. 34. Note, however, that the genetic resources to which the treaty applies are restricted to those listed in the annex. The CG centres would continue dealing with the rest of their collections in accordance with existing policies and agreements.

56 Fowler, *supra* n. 45.

57 Genetic Resources Action International (GRAIN), *The CGIAR's Systemwide Review*, 15(4) SEEDLING Dec. 1998, *available at* http://www.grain.org/publications/dsp_publications.cfm?type_id=6&type_type=1 (last visited Aug. 21, 2003); see *also A Greener Than Green Revolution*, *in id.*; Rural Advancement Foundation International (RAFI), *Pinning the Tail on the Ostrich: The Australian PBR Scandal* (Jan. 30, 1998), *available at* http://www.etcgroup.org/article.asp?newsid=189 (last visited AUG. 21, 2003).

58 *Supra* n. 54; Geoff Hawtin & Timothy Reeves, *Intellectual Property Rights and Access to Genetic Resources in the Consultative Group on International Agricultural Research*, *in* INTELLECTUAL PROPERTY RIGHTS III GLOBAL GENETIC RESOURCES: ACCESS AND PROPERTY RIGHTS (Crop Science of America & American Society of Agronomy eds., 1998), cited in MKAMANGA ET AL. (EDS.), *supra* n. 34.

59 NNADOZIE *ET AL.*, *supra* n. 10.

60 Attere *et al.*, *supra* n. 55.

61 *Available at* http://www.semarnat.gob.mx (last visited Aug. 20, 2003).

Brazil, China, Colombia, Costa Rica, Ecuador, the Philippines, India, Indonesia, Kenya, Malaysia, Mexico, Peru, South Africa, and Venezuela. From the African perspective, this group is important for three principal reasons. First, the countries that make up the group together possess, within their territories, over 70 percent of the world's biological diversity. Second, they have, as a group, come to be one of the most remarkable forces in the CBD process, with the potential to significantly influence the outcome on various issues under negotiation, especially ABS and traditional knowledge. They have also extended this alliance to the discussions on the relevant issues in other fora, such as the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC), the WTO, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Finally, two key African countries—Kenya and South Africa—are members of the group.

This group presents an important opportunity for biodiversity-rich countries to ensure that their interests are met in the international processes where the various relevant issues are under debate. By identifying common interests, this group represents a landmark initiative for cooperation among the megadiverse countries, helping them to form a stronger negotiating block within the different international fora and multilateral organisations linked to access and benefit sharing of genetic resources. Meeting in Cusco, Peru in November 2002, ministers and high-ranking representatives of the Like-Minded Megadiverse Countries assembled to discuss access to genetic resources, traditional knowledge, and IPRs. At the end of the meeting, they adopted the Cusco Declaration,[62] pledging to continue cooperation and committing to define and present joint positions in the different international negotiation fora related to the issues of access to genetic resources, traditional knowledge, and intellectual property, particularly the fifth WTO Ministerial Meeting and the CBD. In light of this, the positions taken by the group need to be monitored by the African countries to assess how such positions correspond to or counteract the wider interests of the region. Such actions could help to ensure that the African membership of the group represents and advocates positions that are in the best interest of Africa, while also ensuring that the African Group positions are not fragmented in the process.

62 *Available at* http://www.comunidadandina.org/ingles/document/cusco29-11-02.htm (last visited Aug. 20, 2003).

5. THE INTERNATIONAL CENTRE FOR INSECT PHYSIOLOGY AND ECOLOGY (ICIPE)

ICIPE was created in 1970 in Nairobi, Kenya as a centre of excellence for capacity building and research on tropical insects and other arthropods. This was in recognition of the fact that arthropods (such as insects, spiders, mites, and ticks) are the most ubiquitous and varied kind of life on earth, constituting about 75 percent of all known species. While fundamental to the life-sustaining complex of the earth and playing a vital role in balancing the component ecological systems, arthropods have also been the source of genetic resources important to the agricultural, nutrition, industrial, and health sectors, among others. At the same time, arthropod pests and disease vectors are important constraints to development. Due to the way that arthropods (insects in particular) are inextricably intertwined with the fabric of life on earth, the mandate of ICIPE is, therefore, much more than just collecting and studying insects. In light of these realities and as the only international institute working primarily on arthropods, ICIPE's mandate is broadly dual but corresponding: on the one hand, to build capacity and conduct research and develop methods, for managing pests and disease vectors in environmentally friendly ways, and on the other, harnessing the benefits and enhancing the useful effects of arthropods for agriculture, health, and sustainable development. This is exemplified in the four-programme structure of the centre, dubbed the 4Hs—Human, Animal, Plant, and Environmental Health. ICIPE's overall focus is, therefore, on the promotion of greater food security, environmental integrity, and sustainable livelihoods for citizens of the tropical developing world.

In the course of its core programmes of developing many integrated pest and vector management, and insect-based income generating technologies, the centre is invariably involved in bioprospecting activities. These include bioprospecting for and testing of botanicals; microbial control agents; novel applications of neem (*Azidirachta indica*); and pheromones, biological control, and biological-based early warning for locust management. In accessing genetic resources of local knowledge, the centre adheres strictly to the principle of prior informed consent. Consent is sought both from the government and the local community, either directly or through a relevant community-based organisation. In so doing, the centre establishes mutually agreed terms for carrying out collections and the treatment of any results or inventions resulting from relevant research activity. These terms would also categorically include financial

and non-financial benefit-sharing arrangements with a guaranteed minimum of the financial benefits accruable to the community, usually between 10 and 33 percent, depending on the circumstances. However, financial benefits have thus far been a minor or negligible aspect of benefit sharing. Key benefits for communities have come with their involvement in research and production with concerted efforts made to move them up the value-added chain.

Because the centre also maintains a collection of material that external parties or researchers may wish to access, it has established a standard MTA to which all transfers of material and related information must be subject. The agreement ensures that the integrity of the materials, or the interests of the centre or source community and country, are not abused or compromised in any way, and that the recipient adheres to certain standards and procedures in handling, use, and possible transfer to third parties in that regard.

ICIPE is probably the only international institution operating within Africa that has developed a comprehensive Intellectual Property Management Policy. Adopted in 2000, the policy stipulates generally how the centre deals with IP issues both within (with in-house researchers, visiting scientists, etc.) and with outside parties (including developing countries, local communities, and the private sector). The policy document consists of the main policy and a guide to the policy. It states clearly that the institutional objectives are: to conduct mission-oriented research aimed at developing technologies to alleviate poverty and to ensure food security and good health for the peoples of the tropics. To this end, research results have to be applied principally to the interests of its primary constituency—developing countries in the tropics. The centre may on occasion seek or obtain intellectual property protection for qualifying research results, in this case purely for defensive purposes, in order to transfer them to the public domain or license them to developing country governments and citizens free or on cheapest possible terms. However, when private interests seek to obtain and use such results, through licensing or transfer for instance, the policy provides safeguards that guarantee that the results shall still be available to developing country governments on a concessional basis or the cheapest possible terms. On occasions, the recipients may be required to maximise the relevance of their future work to developing countries. Transfers to third parties must also incorporate similar requirements. Further, the centre must retain the rights for internal educational and research purposes.

5.1 Southern Environmental and Agricultural Policy Research Institute (SEAPRI)

In 2003, ICIPE established SEAPRI as an autonomous legal and policy unit within the centre. A combination of factors led to the decision to establish SEAPRI. One of these is ICIPE's established need for specialised legal and policy expertise to support its primary scientific activities. In this regard, SEAPRI provides legal and policy research and analysis to complement the scientific activities of ICIPE, especially in the area of intellectual property, genetic resource management and material transfers, biotechnology and biosafety, and international fora. Another factor in its establishment are the external demands of ICIPE's informal legal and policy capacity over the years, which have demonstrated the need for such specialised expertise in other institutions that are unable to support it from their own resources. The primary aim of SEAPRI is to fill a perceived gap in the availability of high quality, objective legal and policy analysis, especially in developing countries.

The status of ICIPE as an international agricultural research centre (IARC) ensures that activities are restricted to analysis and technical support. The mandate of ICIPE is also relevant, as its focus on agricultural, environmental, and related trade challenges in tropical developing countries also broadly defines SEAPRI's areas of activities. SEAPRI also conducts independent legal and policy research, producing policy briefs and in-depth studies that provide comprehensive and reliable information for all stakeholders on key agricultural, environmental, and trade issues. These studies are primarily aimed at improving access to information and thereby broadening participation in policy discourses while also improving the quality of debate, particularly in the area of genetic resources use, management, and conservation.

6. INTELLECTUAL PROPERTY RIGHTS

The linkages among genetic resources, indigenous and local community knowledge, and intellectual property rights are clearly recognised by the CBD,[63] and numerous decisions of the COP have tried to elaborate on and sought to deal with the contradictions and possible frictions that arise from these linkages. This relationship has been of great concern for the African Group. It is possible that patents, for instance, may limit the rights

[63] For example, article 16, paragraph 5, provides: "The Contracting Parties, recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention, shall cooperate in this regard subject to national legislation and international law in order to ensure that such rights are supportive of and do not run counter to its objectives."

of indigenous peoples and local communities to use traditional crop varieties and to receive appropriate returns from the application and utilisation of traditional knowledge in the developed world. In this respect, the perceived unfairness of, for instance, patenting genes lies not only in the pretence that the discoveries relating to genes is an invention and thus patentable, but also in the denial of the innovation of indigenous and local communities that conserve and produce the varieties and hence protect their genes.[64] This is possible because the intellectual achievements of local and indigenous communities are not fully recognised and formally protected under contemporary legal systems.

The principal IPR categories applicable to the utilisation of genetic resources include patents, plant breeders' rights, and local and indigenous communities' rights. More recently added to that is the class of genetic resources that are within the international public domain for which no IPR may be obtained under the ITPGR. At the international level, the principal instruments outlining IPR issues for genetic resources management are the CBD, the International Convention for the Protection of New Varieties of Plants (UPOV Convention), ITPGR, and the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs). The property rights recognised under these regimes range from stringent and exclusive individual rights to indigenous peoples and local community rights. The interactions among these different categories of rights and the relevant regimes have become the source of current tensions and intense international debate at different fora where they have arisen or are being addressed. These tensions became more accentuated with the conclusion of the TRIPs agreement.

The global IPR situation is further confounded by the multiplicity of stakeholders and their differing claims, agenda priorities, and interests, spanning from governments and research communities through local communities and civil society to the private sector. These different interests are often not congruent and these incongruities are symbolic expressions of the tensions and contradictions inherent in the issues that have arisen in the various processes that touch upon genetic resources. Balancing or harmonising these diverse and often conflicting interests while achieving the objectives of the CBD and the ITPGR is by no means simple and smooth.

64 Tewolde, *supra* n. 34.

6.1 UPOV AND THE WTO

Issues arising out of the WTO running parallel to CBD and FAO discussions have also added to the complexity of the situation and significantly increased the challenges faced by African countries. Pressure from trading partners, donors, and other international agreements may also oblige countries to comply with the TRIPs agreement and a specific interpretation of its article 27.3(b). For example, to comply with the requirements for plant variety protection, pressure may be applied to persuade a country to join UPOV. This convention is considered by some to be the only effective form of sui generis legislation, despite the lack of reference to UPOV in the WTO text or any other options that may be better suited to a country's own needs that could be developed.[65] Some African countries, such as Kenya and South Africa, have signed on to UPOV (1978 version), which has been promoted as a sui generis system instead of developing their own regimes.[66]

The TRIPs Agreement is the most exhaustive international IPR regime providing for minimum standards of protection for all forms of IPRs. Article 27 of TRIPs specifically requires that patents be granted in all fields of technology, implying that patents are applicable to technologies (products and processes) using or involving genetic resources as far as they satisfy the standard requirements for patentability.[67] Article 27.3(b) specifically imposes an obligation on WTO members to protect plant varieties "by patents or by an effective sui generis system or by any combination thereof."

Under the terms of the TRIPs Agreement, by now several African countries ought to have brought their laws in line with its provisions, while the rest have until 2005 to do so: but so far, very few have actually done so. The provisions of article 27.3(b) allow members not to have patent regimes for plants or animals, but microorganisms and biological processes for producing plants or animals must be patentable. It does, however, require countries to provide some form of intellectual property protection for plant varieties. How this provision is interpreted and applied will invariably influence what choices African

65 Patrick Mulvany, *TRIPs, Biodiversity and Commonwealth Countries* (1999), *available at* http://www.ukabc.org/TRIPs/trips99.pdf (last visited Aug. 20, 2003).

66 Fairly recently, Francophone countries in Africa negotiated the Bangui Agreement, a new law to be administered by the African Intellectual Property Organization (OAPI), which requires members to adopt UPOV-type legislation for the protection of plant varieties as dictated by article 27.3(b). This agreement, signed by OAPI's 15 member states in February 1999, introduces a regime of intellectual property rights on seeds and is largely contrary to the OAU model legislation adopted at the OAU Summit in 1998. The Bangui Agreement was revised recently and restricts the rights of farmers to save seeds from their harvests and imposes a system of royalty payments on commercial planting material.

67 The requirements are that they are new, involve an inventive step, and are capable of industrial application.

countries have regarding access to, the sustainable use of, trade in, and benefits arising from the use of plants, animals, and biological processes. There is a general agreement, however, that article 27.3(b) gives member states some leeway in fashioning national laws that are consistent with their interests and contribute to their ability to address issues of food and livelihood security for its citizens.

The flexibility accorded by TRIPs presents an opportunity for African countries to develop a plant variety protection regime that is germane to their needs and conditions. Significantly, individual African countries have not seized the opportunity to devise sui generis regimes, the alternative provided for under TRIPs, for the protection of plant varieties. This is in spite of the fact that the African Union, through its Scientific, Technical and Research Commission, developed a model law with provisions covering breeders' rights that could serve as a starting point for developing national legislation. There are also a number of other models that are emerging to help local communities and indigenous peoples develop the basis of future legal systems to protect the rights to their knowledge and resources. These rights embody both biological and cultural rights and thus may go beyond other sui generis models (i.e., rights or legally recognised systems that are adapted to the particular needs of a country or community), that concentrate only on the biological resource.[68] Some of these rights are embodied in the CBD, especially article 8(j), as well as in the ITPGR, but have yet to be enacted in national laws in most African countries.

6.2 The Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC), and the World Intellectual Property Organisation (WIPO)

In 1999, WIPO initiated exploratory work on traditional knowledge and biodiversity "to identify and explore the intellectual property needs and expectations of new beneficiaries, including the holders of indigenous knowledge and innovations."[69] Following recommendations from the consultation process, member states of the WIPO agreed to create an Intergovernmental Committee (IGC) to serve as a forum to continue discussions on intellectual property in the context of three main issues: (1) access to genetic resources and benefit sharing; (2) protection of traditional knowledge, whether or not associated with those resources; and (3) the protection of expressions of folklore. The IGC was established formally by the WIPO General Assembly, at its 26th session in 2000. The committee was mandated with the task of considering intellectual property (questions related to genetic resources, amongst others).

These issues were seen as cutting across the conventional branches of intellectual property law and therefore not fitting into existing WIPO bodies, such as the Standing Committee on the Law of Patents (SCP), the Standing Committee on Copyright and Related Rights (SCCR), the Standing Committee on Trademarks, Industrial Designs and Geographical Indications (SCT), and the Standing Committee on Information Technologies (SCIT). The work that the IGC pursues is also expected be consistent with and complementary to the work that is being undertaken by the CBD and the FAO.[70] At the end of its sessions, the IGC will make recommendations to the WIPO General Assembly for action.

Pursuant to its mandate, the IGC has held several sessions. The fourth meeting took place from December 9-17, 2002 in Geneva and following from previous ones, focused on possible ways of providing legal protection for traditional knowledge and folklore, including through the use of databases, a multilateral sui generis system, and disclosure requirements for country of origin, benefit sharing, and prior informed consent in patent applications. Venezuela, supported by many developing countries, including the African Group, called for a document to be prepared that contained some more concrete elements of a multilateral sui generis system. The countries argued that these elements had already been integrated in some national legislation and had been discussed sufficiently to move the discussion toward considering what could actually be included. The fifth meeting of IGC took place July 2003 in Geneva, marking the end of the committee's initial mandate. Although delegates agreed on the importance of continuing its work for the coming years, they could not reach agreement on the nature or content of its activities. With positions ranging from the continuation of the technical work and completion of documents, to the request for a negotiation process for a legally binding instrument, member states did not reach consensus. Regarding the new mandate there was a marked difference of positions between developed and developing countries. Developed countries largely wished to prolong the current mandate,

[68] Darrell A. Posey & Graham Dutfield, Beyond Intellectual Property: Toward Traditional Resource Rights for Indigenous Peoples and Local Communities (1996).

[69] World Intellectual Property Organization, Doc. No. WO/GA/26/6 (2000), *available at* http://www.wipo.org/eng/document/govbody/wo_gb_ga/pdf/ga26_6.pdf (last visited Aug. 20, 2003).

[70] *See* http://www.wipo.int/globalissues/igc/index.html (last visited Aug. 20, 2003).

focused on technical analysis, for another two-year period or more. Developing countries mostly wanted to shift the mandate to a more action-oriented mode, aiming at "norm-setting" of some kind; in particular, they wanted the committee to do something about biopiracy and misappropriation of traditional knowledge. The WIPO General Assembly, at its meeting in September 2003, will have to take the final decision on this and other outstanding issues.

During the IGC negotiations, the African Group continued to emphasise the need for an agreed approach to genetic resources, traditional knowledge, and folklore based on principles of justice and equity, which would promote increased cooperation between rights holders and rights users on the basis of clearly established rules that ensure equitable benefit sharing. The African Group reaffirmed its position that a mandatory, international sui generis system should be established to protect traditional knowledge, using existing national experiences to identify the subject matter of the sui generis protection, the type of protection desired, and the rights to be granted. Such a system would need to be flexible in order to take into account the inherent rights, practices, and customary protocols of traditional knowledge and traditional knowledge holders, and should address both folklore and other aspects of traditional knowledge. They suggested that, in doing so, the committee should pay particular attention to the African Model Law for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources.

6.3 WIPO Patent Agenda: The Development of the International Patent System

At the 36th series of meetings of the Assemblies of the Member States of the WIPO, the Director General presented a memorandum seeking to identify salient issues relating to the future development of the international patent system. According to WIPO,

> the Director General's initiative relating to the 'WIPO Patent Agenda' was intended to prepare a coherent orientation for the future evolution of the international patent system, ensuring that the work undertaken by the International Bureau and by Member States in their cooperation with the Organization was directed towards achieving a common goal. It expressed the belief that the international patent system should become more user-friendly and accessible, and provide an appropriate balance between the rights of inventors and the general public, while at the same time taking into account the implications for the developing world.[71]

It effectively is seeking to establish a unified global patent system. Such a system would replace the current situation, in which each country has its own laws, own patent office, and own courts. The new system would take some time to complete, if indeed it pushes through, but it would revolutionise intellectual property systems.[72] Like many other processes within WIPO related to patents, there is a significant level of polarisation of opinions and positions on this proposed system, but the process portends far-reaching implications for members, especially developing countries.

This idea has been evolving for some time and, according to the nongovernmental group Genetic Resource Action International (GRAIN), the first component was put into place in June 2000, when WIPO member states adopted the Patent Law Treaty (PLT). This treaty harmonises the formalities that patent offices undertake to administer patent applications. It defines one set of rules on how to prepare, file, and manage patents in all the countries that adopt it.[73] The PLT will enter into force once 40 nations ratify it.

One of the controversies in negotiation of the PLT was whether disclosure of the country of origin of genetic material or traditional knowledge, and proof of prior informed consent in their acquisition, would be required. These issues were advanced by developing countries, which are searching for means to implement the CBD in the context of patent law. Developed countries have strongly opposed such requirements, contending that the CBD provisions should not be construed as criteria for patentability and would be an administrative burden. In the context of the PLT negotiations, the industrialised countries rejected such proposals, arguing that they pertain to the substance of patent law, not procedure.[74]

Of critical importance to issues under discussion is the Patent Cooperation Treaty (PCT), which was originally adopted in 1970. It provides a common facility to conduct international searches of prior art for patent applications. Today, all patents in the world are national documents granted under national rules and procedures.[75] The PCT allows patentees to shorten some of

---

71 World Intellectual Property Organization, Doc. No. A/37/6 (2002), *available at* http://www.wipo.int (last visited Aug. 20, 2003).

72 GRAIN, *WIPO Moves Toward "World" Patent System* (July 2002), *available at* http://www.grain.org/publications/wipo-patent-2002-en.cfm (last visited Aug. 20, 2003).

73 *Id.*

74 *Id.*

75 Sometimes countries form cooperative arrangements to issue patents among themselves, such as the African Regional Industrial Property Office.

that process, if they wish to seek protection internationally, by allowing for preliminary examination by WIPO of the application.[76] The PCT is being reformed, ostensibly to streamline the process and make it a lot simpler within the context of WIPO's overall harmonisation agenda. This might include, inter alia, the incorporation of a database of traditional knowledge for international searches.[77] The identified danger here is that it makes such knowledge easily accessible and could be prone to abuse and misappropriation.

Once the PLT was adopted in 2000, the WIPO member states agreed to move on to harmonisation of the basic rules of patenting. This will be achieved through the Substantive Patent Law Treaty (SPLT). The WIPO Standing Committee on the Law of Patents (SCP) has been meeting to consider revised provisions of the draft SPLT, which is in the first stages of drafting and negotiation. The draft SPLT covers a number of basic legal principles governing the grant and validity of patents in different countries, such as the definition of prior art, novelty, inventive step (non-obviousness), industrial applicability (utility), sufficiency of disclosure, and the structure and interpretation of claims.

According to WIPO, the present international landscape of patent law and practice is currently made up of a wide variety of legal regimes. The elimination or reduction of these divergences would expectedly ensure that applicants, in all contracting parties of the SPLT, are subject to the same substantive conditions for the grant of patents and for the invalidation of granted patents. Such harmonisation is also expected to lead to lower costs for applicants and patent offices by contributing to a future reduction in the duplication of search and examination work.[78] The work of the SCP on harmonising substantive patent law is being undertaken within the context of WIPO's Patent Agenda, which is designed to spearhead discussions on the future evolution of the international patent system.

It has been observed by some commentators that the provisions of the proposed treaty are broader and more exacting than those currently available under the TRIPs Agreement.[79] Some of the most contentious matters at this stage also include the issue of disclosure of country of origin of genetic materials, and proof of prior informed consent in their acquisition, as well as whether the system will allow developing countries to secure financial benefits from access to genetic resources as prescribed by the CBD. Some of the outstanding issues include how these processes relate to and may impact on the parallel process in the IGC.

In light of these developments, the one major concern is that not much attention is being paid by developing countries to the wider implications of these developments to ensure that their interests are fully protected. Without adequate participation and vigilance, developing countries might find themselves in a situation similar to the negotiation and adoption of the TRIPs agreement, in which the critical and substantive components were negotiated and agreed on by the developed countries in advance. Should this happen, the developing countries would find it too late to do much except perhaps win some modest concessions as a palliative for them to sign on.

7. THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD)

The quest for a legally binding international agreement on access and benefit sharing was carried beyond the CBD to The World Summit on Sustainable Development (WSSD), which was held from August 26 to September 4, 2002 in Johannesburg, South Africa. The WSSD's goal was to hold a 10-year review on the 1992 UNCED at the summit level to reinvigorate global commitment to sustainable development.[80] As major outputs, the WSSD negotiated and adopted two main documents: the Plan of Implementation and the Johannesburg Declaration on Sustainable Development.[81] The first document, the Plan of Implementation, is a framework for action to implement the commitments originally agreed to at UNCED, where the CBD and other instruments were originally adopted. The second document, the Johannesburg Declaration, outlines the paths taken from UNCED to WSSD, highlights present challenges, expresses a commitment to sustainable development, underscores the importance of multilateralism, and emphasises the need for accelerated implementation.

The significant outcome of the summit within the context of genetic resources is the call on countries to

[76] A PCT application is published as a "WO" (for WIPO) document. They are not actual patents, but they do establish some level of "patentability" of inventions, facilitating the overall process of applying for a patent. *See* http://www.wipo.org/pct/en/ (last visited Aug. 20, 2003).

[77] *See* Global Resources Action International, *WIPO's Move Toward a World Patent System: A Revolution in the Making?*, BRIDGES, Sept. 2002, at 17, *available at* http://www.ictsd.org/monthly/bridges/BRIDGES6-6.pdf (last visited Aug. 20, 2003).

[78] World Intellectual Property Organization, *Progress on Discussions to Harmonize Patent Law*, WIPO News Release (2002), *available at* http://www.wipo.int/pressroom/en/updates/2002/upd164.htm (last visited Aug. 20, 2003).

[79] *See* GRAIN, *supra* n 70.

[80] The WSSD was attended by over 21,000 participants from 191 governments (including several African governments), inter-governmental and NGOs, the private sector, civil society, academia, and the scientific and development community.

[81] The full text of the respective documents is *available at* http://www.johannesburgsummit.org/html/documents/summit_docs/plan_final1009.doc (last visited Aug. 20, 2003).

negotiate within the framework of the CBD, bearing in mind the Bonn Guidelines, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilisation of genetic resources.[82]

Although the status or nature of the regime was not stipulated, the negotiated instrument—be it a legally binding protocol or voluntary guidelines—will build upon the Bonn Guidelines adopted in April 2002. Reference was also made to the ITPGR, and countries were encouraged to ratify the treaty as soon as possible in order to set off the legal commencement of operations under the treaty.[83]

8. THE GENETIC RESOURCES POLICY INITIATIVE (GRPI)

A new initiative for strengthening national capacities in the area of genetic resources policy has been launched. Known as the Genetic Resource Policy Initiative (GRPI), this initiative is dedicated to supporting capacity building and strategic research regarding national genetic resources policy and legal frameworks. GRPI is coordinated jointly by IPGRI and the International Development Research Centre (IDRC).

The initiative seeks to support multistakeholder, multisectoral dialogue, participatory research, and capacity strengthening concerning national genetic resources-related policies. It will follow a two-phase process. In the first phase, the project will support a small team of national stakeholders to undertake a survey of "who is doing what" with respect to genetic resources policymaking, advocacy, and research within the country. At the same time, the team will seek feedback from stakeholders to identify what they believe are the most important genetic resources policy issues to be addressed in the near future and to strategically identify what research and what kinds of capacity-building activities need to be supported in the second phase of the project. The first phase, which should take approximately six months to complete, will culminate in a workshop of national stakeholders to analyse and agree upon a prioritised list of genetic resources policy issues that would benefit from support for research and capacity strengthening. In the second phase of the project, GRPI will support some of those activities through modalities proposed by national stakeholders.

In its implementation, GRPI will take both a country and a regional perspective. The selected countries and regions are seen as case study locations from where the outcomes of the project will be extended to a wider audience. Africa is well represented in these case studies. The six core countries of the project are: Egypt, Ethiopia, Nepal, Peru, Vietnam, and Zambia. The three principal locations for the regional analysis are: (1) Andean Community, (2) West and Central Africa, and (3) East Africa. In Africa, the sub-regional organisations of the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) and the Association for Strengthening Agricultural Research in Eastern and Southern Africa (ASARECA), for West/Central Africa and East Africa respectively, are expected to be involved with the project. GRPI's coordinating office is based in Nairobi, Kenya.

9. REGIONAL POLICY, INSTITUTIONS, INITIATIVES, AND PARTICIPATION IN INTERNATIONAL PROCESSES

9.1 Policy Context

Africa's economic, cultural, and social life has for decades centred around genetic resources, while historical experiences and political direction in most cases have been driven or determined by issues relating to these resources from prehistoric times through the colonial period to the post-independence era. Africa's strength lies in its natural resources, including the genetic resources that are the foundation for growth and stability in agriculture, forestry, and the environment. There is a general belief that genetic resources are assets, albeit largely unrealised, that could contribute substantially to local and national economies and sustainable development in Africa if properly managed. For example, the New Partnership for Africa's Development (NEPAD) launched at the African Union (AU) summit in Lusaka, Zambia in July 2001 makes references to the role that genetic resources have played and will continue to play in the lives of African people, as well as in the fulfilment of some of the principal elements of the development programmes under NEPAD.[84] Africa's economies, cultures, and political systems are primarily dependent, albeit precariously, on how plant genetic resources are conserved and utilised. In light of this, the continent's

82 Plan of Implementation, para. 42(o).

83 *Id.*, para. 38(q); *see also* Kwesi Atta-Krah & Kent Nnadozie, PGR Policy Information Notes - Sub-Saharan Africa, vol. 1 no. 1 (2002).

84 For example, paragraphs 9 - 10 of the NEPAD Policy Document state that: "Africa's place in the global community is defined by the fact that the continent is an indispensable resource base that has served all humanity for so many centuries ... These resources can be broken down into: The rich complex of the flora and fauna, and the wide unspoiled natural habitat, which provide the basis for mining, agriculture, tourism and industrial development; [etc.]." *See also* para. 12.

economic transformation and ability to integrate itself into the evolving global system to a large measure depends on agricultural transformation that is based on its genetic resources.[85]

There is, however, a definite sentiment that under prevailing circumstances, including systems of ownership and access to these resources, neither the countries possessing the resources nor the communities who are their custodians will receive equitable benefits, if any, from their use. Despite this new consciousness, the real benefits that the region may obtain from genetic resources depend on a number of factors such as effective legislation, trained personnel, and available infrastructure to implement the legislation.[86] Yet, in many African countries, these prerequisites are largely missing and the region has not participated effectively in the international processes that are influencing the direction of the debate and agreements concerning genetic resources.

9.2 The African Convention for the Protection of Nature and Natural Resources

The first, and to date the only, region-wide agreement addressing genetic resources was the 1968 African Convention on the Conservation of Nature and Natural Resources, which was approved by the Council of the Organisation of African Unity in Algiers, and subsequently signed by the heads of state and government. Although at the time of negotiation and adoption the convention was rather forward-looking, most of the conceptual issues as they are known and understood today were not within the contemplation of the negotiators. International environmental law and concepts have evolved and advanced significantly since its adoption,[87] but it was basically conservation-oriented and had minimal provisions covering sustainable use and none on issues relating to benefit sharing.

Innovative as it may have been, the Algiers Convention, which entered into force on June 16, 1969,[88] was basically moribund, as the institutional framework for enforcement and implementation was not set up, nor was any tangible apparatus put in place for follow up. Understandably, in light of the dilemmas facing the newly independent African states at the time, the task of reconciling the demands of economic development, social justice, and environmental protection was a challenge, and environmental issues were simply not a high priority.[89]

However, the need to adapt the text of the convention to current scientific, technical, and legal thinking and approaches, as well as make it more relevant to regional challenges, necessitated its review both to update it and to address the particular needs and current challenges of the region.[90] The review process started in the early 1980s, including a request to the World Conservation Union (IUCN) to prepare a document outlining a proposed revision and extensive consultations up to 1986. After that, the process stalled until it was restarted in 1996 with the support and cooperation of IUCN and UNEP.[91]

The revised text succeeds in making the African Convention a comprehensive and modern regional treaty on environment and natural resources conservation, and it is still the first to deal with an array of sustainable development matters. It covers a wide spectrum of issues, including land and soil, water, and biological diversity conservation and sustainable use. It also addresses processes and activities affecting the environment and natural resources, as well as the relationships between natural resources and sustainable development. It requires cooperation whenever needed to implement the convention and whenever transfrontier effects are likely to occur, and provides mechanisms to assist in its implementation, including an independent secretariat.[92] The revised text of the convention, which took into account the developments in environment and treaty law of the past 30 years, went through an extensive consultative and revision process. The revision was subsequently adopted by the Assembly of Heads of State and Governments on July 11, 2003 in Maputo, Mozambique. It will enter into force once 15 African states have ratified it.[93]

The objectives of the revised convention are:

1. to enhance environmental protection;
2. to foster the conservation and sustainable use of natural resources; and
3. to harmonise and coordinate policies in these fields with a view to achieving ecologically rational,

85 Nnadozie *et al.*, *supra* n. 10.

86 Egziabher, *supra* n. 34.

87 K. Nnadozie *et al.*, Plant Genetic Resources in Africa's Renewal: Policy, Legal and Programmatic Issues Under the New Partnership for Africa's Development (2002).

88 As of June 2003, 30 African states were parties to it.

89 *Id.*

90 The process, consisting of a joint committee of the African Union, United Nations Environment Programme (UNEP), and IUCN, undertook a review of the convention and submitted its proposals to the African Union for adoption.

91 Françoise Burhenne-Guilmin, *Revision of the 1968 African Convention for the Conservation of Nature and Natural Resources: A Summary of the Background and Process*, IUCN Environmental Law Programme Newsletter, Issue, 2003, at 33, *available at* http://iucn.org/themes/law/pdfdocuments/Newsletter1_2003_en.pdf (last visited Aug. 20, 2003).

92 IUCN, Revised African Convention Adopted (2003), *available at* http://www.iucn.org/themes/law (last visited Aug. 20, 2003).

93 Art. XXXVIII.

> economically sound, and socially acceptable development policies and programmes.[94]

Article IX.1 provides that the parties shall maintain and enhance species and genetic diversity of plants and animals whether terrestrial, fresh-water, or marine. They shall, for that purpose, establish and implement policies for the conservation and sustainable use of such resources. Particular attention shall be paid to socially, economically, and ecologically valuable species; species which are threatened; and those which are only represented in areas under the jurisdiction of one party.

The convention further obliges parties to ensure the conservation of species and their habitats within the framework of land-use planning and of sustainable development.[95] In so doing, the parties shall, among others, provide for fair and equitable access to genetic resources on terms mutually agreed upon between the providers and users of such resources.[96] They must also provide for the fair and equitable sharing of benefits arising out of biotechnologies based upon genetic resources and related traditional knowledge with the providers of such resources.[97] These provisions incorporate the objectives of the CBD and reinforce the commitment of the region to implementing its provisions.

Further, under article IX.3, parties are required to adopt legislation regulating all forms of taking, including hunting, capturing, and fishing, as well as collection of whole or parts of plants under which:

> a) the conditions and procedures for issue of permits are appropriately regulated;
> b) taking is regulated with a view to ensuring that the use of any population is sustainable. . .; and
> c) with a view to as rational use as possible of the products of hunting and fishing, the use and abandonment of such products is regulated, as well as plant collection[.]

The convention specifically requires parties to take legislative and other measures to ensure that traditional rights and IPRs of local communities, including farmers' rights, are respected.[98] It further stipulates that parties shall require that access to indigenous knowledge and its use be subject to the prior informed consent of the concerned communities and to specific regulations recognising their rights to, and appropriate economic value of, such knowledge. There is an additional requirement for parties to take measures necessary to enable active participation by the local communities in the process of planning and management of natural resources upon which such communities depend, with a view to creating local incentives for the conservation and sustainable use of such resources.

These provisions are in consonance with articles 8(j) and 15 of the CBD and thus make compliance with the African Convention consistent with the CBD. To this extent, it is expected that legislation or other measures taken to fulfill the provisions of the African Convention will also support the fulfillment of African countries' obligations under the CBD. In light of the dearth of resources and capacity within the region, as well as the already congested international obligations to be met, this approach is critical because the creation of different or additional obligations could make the implementation of the African Convention difficult.

Article XVIII provides that parties shall promote cooperation in scientific and technological research, as well as in economic and marketing systems, between themselves and with third parties in the field of environmental conservation and sustainable use of natural resources. It thus creates the framework for regional collaboration and approaches in access to genetic resources and benefit-sharing issues. This will include enforcement and coordination of research activities with a view to achieving maximum synergy and complementarity.

Since the provisions of the African Convention regarding genetic resources are in consonance with the CBD, they should reinforce awareness and commitment to the conservation and sustainable use of genetic resources at both the regional and national levels. However, there is the need to ensure that the fate that befell its predecessor does not revisit the current convention. Adequate resources, tools for its governance, and the political will to put it into operation will be necessary, not only by ratification but also by enacting or updating laws and regulations to implement the convention at the national level.

9.3 Regional Institutions and Processes

Several regional and sub-regional institutions currently exist whose activities touch upon genetic resources and can also contribute immensely to their conservation and sustainable utilisation. One of these is the African Ministerial Conference on the Environment (AMCEN), which was established in 1985 to strengthen cooperation between African governments on economic, technical, and scientific activities to halt the degradation of Africa's

[94] Art. II.
[95] Art. IX.2.
[96] Art. IX.2(j).
[97] Art. IX.2(k).
[98] Art. XVII.

environment and satisfy the food and energy needs of the continent's people. AMCEN's role includes providing continent-wide leadership by promoting awareness and consensus on global and regional environmental issues, especially those relating to international conventions on biodiversity, desertification, and climate change. These issues currently form the core of the Environment Initiative under NEPAD, and it is envisaged that AMCEN will play the leading role in the implementation of this initiative.

Other sub-regional organisations and groupings such as the Southern African Development Community (SADC), the Economic Community of West African States (ECOWAS), the East African Community (EAC), WECARD/CORAF,[99] and ASARECA also have several ongoing activities and programmes in process and can give additional impetus to genetic resources conservation and sustainable use, as envisaged by NEPAD.[100]

9.4 New Partnership for Africa's Development (NEPAD)[101]

The NEPAD policy document generally recognises that Africa's biodiversity—including its rich flora, fauna, and rain forests—is an important global resource in combating the environmental degradation posed by the depletion of the ozone layer and climate change, as well as the pollution of air and water by industrial emissions and toxic effluents.[102] In Africa, even drylands, including many areas prone to drought and desertification, are particularly important reservoirs for plant genetic resources. Since genetic resources obtained directly from natural habitats, agro-ecosystems, or ex situ genebank collections are indispensable inputs for the breeding of modern crop varieties, this part of dryland biodiversity has major regional and global significance. Also, the development and sustainability of agriculture are strongly dependent on access to plant genetic resources for food and agriculture,[103] and as a result, the urgency to address the issues surrounding access to genetic resources has increased in the last 20 years.[104]

The NEPAD is constituted as a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development, and at the same time to participate actively in the world economy and body politic. The initiative recognises, inter alia, that the urgent need to achieve food security in African countries requires that inadequate agricultural systems be addressed, so that food production can increase and nutritional standards rise.[105] It further recognises that the institutional environment for agriculture also significantly affects the sector's productivity and performance. The regulatory framework for agriculture must also be taken into account, including the encouragement of local community leadership in rural areas, and the involvement of these communities in policymaking and the provision of services. While the document contains a detailed shopping list of objectives and expectations, the process of setting up the institutional framework and relevant capacity for the realisation of these objectives is still in progress, especially with respect to genetic resources and environmental issues.

9.5 Participation in International Processes

By and large, the participation of African countries in the various international negotiations related to genetic resources has been somewhat fragmented and largely uncoordinated. The exceptions are perhaps the negotiations related to the CBD and the ITPGR, in which some African countries have fairly consistently participated, even though the results have not been always favourable to their interests. Although countries participate in international negotiations for a variety of reasons, there has been a tendency on the part of many delegations to negotiate and sign international agreements without realising or thoroughly analysing the long-term implications of their commitments. Added to this is the general lack of consistency in representation, which has led in most cases to a lack of coherence in the positions taken in other related negotiations. The major disadvantage of the lack of continuity of representation is that experience gained in previous negotiations is lost, as new negotiators have to acquaint themselves with the issues before they are able to negotiate effectively. Considering the pace at which the issues are evolving, this is a state of affairs that African delegations, or delegations from any country for that matter, can little afford.

Two points need to be made with respect to the issue of continuity of representation. In some cases, the problem of continuity of representation may depend heavily

99 In French, *Le Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles*.

100 See NEPAD Policy Document, para. 155 ("Foster regional, sub-regional, national and household food security through the development and management of increased production, transport, storage and marketing of food crops, livestock and fisheries.").

101 The analysis in this section is adapted from Nnadozie *et al.*, *supra* n. 85.

102 Para. 176.

103 Carlos Correa, *Policy Options for IPR Legislation on Plant Varieties and Impact of Patenting*, Doc. No. GFAR/00/17-04-02, Global Forum for Agricultural Research (GFAR), May 21-23, 2000, Dresden, Germany.

104 Nnadozie *et al.*, *supra* n. 85.

105 See NEPAD Policy Document, paras. 129-34.

on the type of process and the rules of procedure of the forum. For instance, in the contact group of FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA), under which the ITPGR was negotiated, the arrangement for the participation of delegates made continuity in developing-country representation possible. This is because the same developing countries were permanent members of the contact group and funded by the secretariat. Specific individuals from those countries invariably became associated with the process and consistently participated in them.

On the other hand, where there is a rotation of funded developing countries at different sessions of the same process, for instance, in the standing committees of WIPO, candidates are nominated by group coordinators at their request. This fragments continuity and the accumulation of individual delegations' expertise. In this situation, the responsibility falls on the permanent missions of the countries in Geneva. But, because there is limited communication with the capital in many cases, the result is invariably the same, especially since the issues being discussed are multifaceted and require multidisciplinary involvement: the permanent missions may not be able to negotiate effectively on all the relevant issues. This is not to say that the permanent missions do not play a vital role in these negotiations. They are crucial in providing a continuous presence and help to protect their national interests at the relevant fora, especially those that are based in Geneva, such as the WTO and WIPO. However, the missions are typically understaffed and are, as a result, over-stretched because of the numerous processes they have to cover, including those of the International Labour Organisation, UNCTAD, WIPO, and WTO. In the WTO alone, there are countless meetings (both formal and informal) of numerous committees at the same time, making it virtually impossible for small missions to keep track of or participate in all of them. In the final analysis, the sad fact is that there is a palpable lack of resources in most of the countries to either adequately staff the permanent missions or to continually send delegations to the relevant meetings, and this hampers effective and optimal participation.

One other feature common to the countries in the region, perhaps even to some developed countries, is that delegations to relevant negotiations are often composed only of officials from the focal points—ministries or departments—even when the issues are cross-sectoral or multidisciplinary. In addition, the corresponding international instruments are often implemented in isolation by different national institutions. While this situation leads to a loss of policy coherence, it can significantly weaken a country's position in the different fora. Policy consistency is critical when considered in light of the emerging global trend of increasing convergence of trade, food and agriculture, health, technology transfer, and poverty alleviation issues. This trend is attributable in part to recent advances in science and technology, as well as the role that biological resources now play in economic terms and in food and health security issues.

As a result of this trend of convergence and integration of these hitherto ostensibly discrete issues, the battle for achieving national or regional interests in the international scene is being fought on different fronts. In these circumstances, countries often strategically choose the most favourable forum to advance their interests or otherwise make up for ground lost in another forum.[106] Therefore, where there is no coordination between delegations in the different fora, grounds gained on a particular issue of concern in one forum may be lost or neutralised in another.

Consequently, for African countries to effectively participate and advance their interests at international negotiations, discussions among all relevant ministries and departments, as well as among the countries in the region, are essential in order to develop mutually acceptable and consistent negotiating positions regardless of whether it is in the CBD, WIPO, WTO, or FAO. Through this coordination, African countries will be better able to understand the linkages among, and implications of, the various international processes. Good communication among the negotiators is also essential to ensure clear understanding of positions taken by their counterparts or competent authorities in the capitals,[107] as well as in other African countries, and to facilitate the development of regional negotiating positions that can be more effective.

Africa has not maximised its potential in the development of international instruments nor taken full advantage of the opportunities that are available through them. Certain issues that are important to African countries—such as the protection of traditional knowledge, farmers' rights, and binding access and benefit-sharing terms—have yet to gain international acceptance or to be more substantively provided for in relevant instruments. Part of the problem, as already noted, is the dearth of capacity and resources to effectively prepare for and participate in negotiations. This lack of personnel is

106 This "forum shopping" is characteristic of the CBD-WTO interplay, in which a country that may not have obtained what it considers favourable terms in one may turn to the other forum to pursue the same interests, for example, on intellectual property rights and related issues.

107 MULVANY, *supra* n. 65.

compounded by the multiple processes going on simultaneously in several fora on the interrelated issues of genetic resources, traditional knowledge, trade, and IPRs. The issues are also evolving at such a fast pace and manifesting in so many different dimensions that it is difficult to keep track of all of them at once. In these circumstances, even the modest capacity that is available is over-extended. In view of the fact that representation by most of the countries is often thin, African delegations frequently find it difficult to participate fully and negotiate the various aspects of the issues under consideration at each meeting.

The field of biodiversity is complex and demands a cooperative cross-sectoral approach, involving expertise in law, local and international culture, biodiversity, ecology, chemistry, political science, business, and socio-economics.[108] As such, each delegation to a negotiating session needs to be multidisciplinary, a necessity that is rarely met in reality. It is obvious, for instance, that if during a particular meeting or negotiation a delegation consists of scientists alone, they will be hard-pressed to discuss the legal issues effectively and meaningfully, and vice-versa. This situation was, for instance, manifest during the negotiations leading to the adopting of the ITPGR, where the African participation was significant and remarkably consistent. Yet, "with the exception of two or three individuals, the delegates were scientific representatives with only limited capacity in the legal and, most importantly, political aspects of discussions. This was most glaringly obvious in the unfamiliarity of African delegations with the trade debates between the US and EU that came to the fore in negotiations in late 2000."[109]

All these factors contribute to the difficulties that African delegations experience in effectively participating in and negotiating favourable compromises on issues of concern to them in the course of the political horse-trading that is typical of negotiations. Experience has shown that in the course of multilateral transactions that shape international policy and law, nations do not necessarily get what they desire or deserve, but mostly what they negotiate. However, the rules governing the development of international law do, in fact, enable states, especially when they function as a voting block, to influence its evolution. In addition, countries may also wish to make effective links among regional blocs to improve their negotiating strength in advance.[110]

African nations are gradually appreciating these realities, and they are starting to coordinate to advance their mutual interests as a block in international negotiations. This is helping to ensure that emerging international law takes into account Africa's interests.[111] As a result, African voices are recently being heard more in international meetings and negotiations, and there is increased awareness and coordination among African negotiators at the different fora. Although there is still a long way to go, this increased coordination has achieved some measure of success. Due largely to the insistence of the African Group, in coordination with other developing countries, issues of access and benefit sharing have taken centre stage in the negotiations, particularly the implications of IPRs.[112] This particular linkage is now firmly established in the discussions on access and benefit sharing by the CBD COP.[113] Effective coordination was also instrumental to the establishment of the Panel of Experts on Access and Benefit Sharing, by Decision IV/8 of the fourth session of the CBD COP.

In addition to the greater inter-ministerial coordination, in general there appears to be greater communication between officials at the capitals and the negotiators, for instance, at the WTO meetings. This is substantiated by the number of recent meetings that have been organised in which the various officials from the different locations have come together to discuss the issues in order to better understand the implications of the various international negotiations, to agree on mutually acceptable negotiating positions for these related processes, and to seek solutions or better approaches to address existing or emerging challenges. This trend is most evident in the CBD negotiations. An apparent instance is the outcome of the Biosafety Protocol negotiations, in which the African Group showed initiative and leadership through a common position. By collaborating with developing countries from other parts of the world, the African Group had many of its issues of concern

108 Peter Johan Schei, *Foreword*, *in* HANNE SVARSTAD & SHIVCHARN S. DHILLION (EDS.), RESPONDING TO BIOPROSPECTING: FROM BIODIVERSITY IN THE SOUTH TO MEDICINES IN THE NORTH 8 (2000).

109 Robert J. L. Lettington, *A Place for Agriculture at the Trade and Environment Table?, Negotiations for a Revised International Undertaking on Plant Genetic Resources in The Context of TRIPs and the CBD,* 12 (2001), *available at* http://www.ictsd.org/dlogue/2001-07-30/Lettington.pdf (last visited Aug. 21, 2002).

110 MULVANY, *supra* n. 63.

111 Tewolde, *supra* n. 34.

112 In paragraph 8 of Decision III/17, the COP recognised that further work is required to help develop a common appreciation of the relationship between intellectual property rights and the relevant provisions of the TRIPs Agreement and the CBD, in particular on issues relating to technology transfer, conservation and sustainable use of biological diversity, and the fair and equitable sharing of benefits arising out of the use of genetic resources, including the protection of knowledge, innovations, and practices of indigenous and local communities embodying relevant traditional lifestyles.

113 Decision IV/8, para. 17 ("Requests the Executive Secretary to seek ways, including the possibility of negotiating a memorandum of understanding with the World Intellectual Property Organisation, to enhance cooperation between the Convention on Biological Diversity and the World Intellectual Property Organization on issues arising from Article 8(j) and related provisions and encourages Parties to forward information to the Executive Secretary to support such cooperation."; *see also* Decision V/26B, para. 2 (by which the COP "Invites the World Trade Organization to acknowledge relevant provisions of the Convention and to take into account the fact that the provisions of the Agreement on Trade-related Aspects of Intellectual Property Rights and the Convention on Biological Diversity are interrelated and to further explore this interrelationship.").

incorporated to the final protocol. This joint positioning also precipitated some, albeit limited, success during the negotiation of the ITPGR. It is noteworthy that individual delegates have played significant roles in developing these consensus positions, while one or two countries have consistently provided the necessary African leadership in these negotiations.[114] Because of shared problems and similar constraints, it has been relatively easy for the countries in Africa to reach consensus on many issues. It is therefore imperative that the individual countries overcome their apparent weaknesses by coming together to adopt common positions while the general capacity of individule delegations progressively enhanced and expanded.

[114] Lettington, *supra* n. 107.

CHAPTER 5
CONTEMPORARY CONCEPTS OF ACCESS IN AFRICA

This chapter seeks to provide an overview of the country studies included in this volume. The intention is to summarise existing and developing policies and practices as they pertain to the major elements of regulating access to genetic resources and benefit sharing (ABS). The emphasis here is on synthesis rather than analysis.

In section 1, the chapter examines the basic legal structures in place and then builds upon these in section 2 by considering the institutional structures, application processes, and policy rationales that have been established to implement these legal structures. Section 3 discusses some of the specific issues that have emerged as central concerns of African states, such as farmers' rights and the rights of local communities. Section 4, on intellectual property rights (IPRs), has been separated out from section 3 to allow for clearer discussion of its elements. Section 5 briefly examines the role and activities of nongovernmental actors in ABS, namely international institutions, nongovernmental organisations (NGOs), and local communities. Section 6 brings discussion up to date by considering the types of measures that countries are currently developing to address ABS concerns, most notably the significant work being done on specifically tailored ABS regimes, while section 7 closes the chapter by highlighting the main strengths and weaknesses that country study authors have identified in current ABS policy and practice.

I. LEGAL FRAMEWORKS FOR ACCESS TO GENETIC RESOURCES

The situation regarding existing legal frameworks for access to genetic resources and associated benefit sharing in Africa is at once remarkably harmonious and chaotic. Harmonious in the sense that the majority of countries have similar approaches in almost all aspects of their regimes. Chaotic in the sense that these approaches almost exclusively consist of sectoral, ad hoc responses with the occasional overlaying of broader measures that are not specific to the context of ABS.

At the constitutional level, three types of provisions recur most frequently: the right to a healthy environment, the question of the sources of law, and the right to property. The right to a healthy environment is a relatively new concept in most African constitutions,[1] and it is not clear what relevance it may come to have for ABS in the absence of specific judicial precedents or administrative or legislative actions. It would appear that this is most likely to affect the broader management of natural resources, with only incidental impacts on ABS, thereby not directly making ABS a constitutional issue.

The question of the sources of law is one of the increasing shifts of African countries toward the establishment of a system of self-executing treaties that are superior to national law. Although the key treaty in question —the Convention on Biological Diversity (CBD)—does not yet have detailed binding provisions regarding ABS,[2] it could be argued that where the CBD is self-executing the state at a minimum has a constitutional obligation to establish some form of ABS regime.

The second treaty addressing ABS issues—the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR or International Treaty)—has more profound implications in states where it is held to be self-executing. The International Treaty sets out relatively detailed mechanisms and structures for the management of a global ABS system for the plant genetic resources for food and agriculture that it specifically lists. At a minimum, this will mean that states that have ratified or acceded to the treaty, including a number of those studied for this volume, will have a constitutionally binding obligation regarding the terms of access to their germplasm collections for other parties to the treaty once the treaty enters into force. In Francophone countries, where the self-executing constitutional provisions appear to be generally subject to a condition of reciprocity among states,[3] it is possible that these obligations may only accrue on a bilateral basis.

The right to property appears to have the most significant implications for ABS in Africa, at least for

1 *See* Carl Bruch *et al.*, *Breathing Life into Fundamental Principles: Implementing Constitutional Environmental Protections in Africa*, 7 S. AFR. J. ENVTL. L. & POL'Y 21 (2000)

2 A number of countries, including most African states, have expressed their desire to see the Bonn Guidelines developed into a binding protocol.

3 As is noted in chapters 10 and 14, title IX of Senegal's Constitution and article 87 of the Constitution of Ivory Coast provide that the self-execution of a treaty is "conditional, for each agreement or treaty, upon its implementation by the other party(ies)."

Anglophone countries. There are two aspects to this issue. The first relates to the question of land, a complex and sensitive question in all African states. In a number of countries, land is inextricably bound up with the resources found on it—the "fruit of the land"—and often also with traditional resource and user rights derived from customary law. Where these issues are constitutionally recognised, for example through the right to property, ABS is undoubtedly also a constitutional issue. While the absence of a significant body of judicial precedents in this field means that its exact implications are unclear, it would seem that there is a strong case for greater individual, and in the case of customary law collective, rights than has yet been enforced. The second aspect of the right to property is the concept of genetic resources as personal or moveable property. Once again, this is not a well-defined field, but the fact that it is often the intangible qualities of a genetic resource that contain its commercial value, particularly in fields such as pharmaceuticals and chemicals, may mean that genetic resources are treated as personal property in some countries.

The most common approach to ABS regulation and policy in the countries studied for this volume consists of the adaptation of existing structures and legal frameworks on an ad hoc, sectoral basis. Several sectors are particularly important in this respect, namely protected areas, forestry, and science and technology.

Protected areas and forestry legislation, and associated regulatory provisions, do not tend to specifically address genetic resources. However, they do normally assign exclusive management authority of legally recognised areas to an individual institution. This management authority almost invariably includes the requirement that the institution authorise the removal of any material from the area under its jurisdiction and, in many cases, also includes a similarly blanket provision for the conducting of any research, or even presence, in such areas. This type of authority could be, and often is, adapted to the specific situation of ABS.

Science and technology is another sector that has been of particular importance to ABS, and in this volume it is particularly apparent in the studies of Kenya, the Seychelles, and Uganda. Science and technology mandates have been used to regulate research of any nature by both foreign and domestic researchers. The processes for obtaining authorisation are not tailored to ABS, but they do require background information about the proposed research and often the involvement or endorsement of local institutions. The key point to note about these "generic" processes is that they are not tied to particular geographic areas or technical fields; they essentially apply to anything that is not within the mandate of other regimes, such as protected areas, forestry or, in most countries, the activities of national research institutions.

National research institutions, including universities in many cases, rarely consider ABS explicitly. In Kenya, the Constitution provides for the taking of property in the interests of research institutions, which might be considered to encompass ABS, but otherwise ABS issues fall within the general mandates of the respective institutions. This roughly approximates the situation in other countries where institutions appear to interpret into their mandates authorisation (whether by constitutional or legislative measures or are simply assumed under general state authority) for access to genetic resources for themselves, and in many cases for their local or foreign partners.

In some ways, the situation of international research centres—most notably, the International Agricultural Research Centres (IARCs, whether of the CGIAR or otherwise)—is similar. They are established by intergovernmental charter, which is essentially a treaty. These charters frequently refer to the general mandate of the organisation in question: in the case of IARCs, usually to pursue their particular field of research (such as livestock, forestry, and insects) for the benefit of resource-poor farmers and developing countries.[4] While authorisation for access to genetic resources is not explicitly mentioned in these charters, it is implicit in the sense that the research in question is almost exclusively based on biological resource. An additional point to note regarding IARCs that are operating in states that have signed their charter and national research institutes that are operating within their national jurisdictions is that they are effectively agents of the government to which they must apply for access, and thus some aspects of the process are redundant.

Governments and specific government institutions have sought to adapt existing laws and procedures to the specific circumstances of ABS. When specific legislative or regulatory measures are absent, these bodies have invariably relied on contracts for access to supplement the traditional permit and fee structure. The mandate to negotiate and execute these contracts is usually justified under the broad management powers mentioned above. Institutions may or may not establish formal guidelines for these contracts. However, guidelines will often exist de facto, because in seeking to minimise expenditures of resources and risks of loopholes, model or standardised contracts are often used as the starting point for any par-

[4] The editors have reviewed the charters of several IARCs—including ICIPE, ICRAF, and ILRI—to establish this point.

ticular application. Instances of contracts developed to address the particularities of ABS are referred to in the majority of the case studies in this volume, with specific examples provided in the chapters on Kenya, the Seychelles, and South Africa, amongst others.

Cameroon and Nigeria highlight situations where the applicant has prompted the use of contracts to supplement national laws in managing ABS. The ICBG projects initiated by the United Sates (apart from the Cameroon-Nigeria project, there are several in other regions) seek to establish fair and transparent standards for ABS. The cases of the Royal Botanic Gardens at Kew (in Kenya) and the Shoals of Capricorn and Eden Project (in the Seychelles) also fit this pattern. It is notable that the projects operating under applicant-initiated contracts almost always involve either large-scale public sector or non-profit applicants. Large-scale projects usually have the resources to handle complex negotiations and to assist the countries of origin in accessing relevant expertise and undertaking some internal debate. In addition, the public sector and non-profits are usually more willing to consider lengthier processes to ensure both a reality and a perception of fairness, because they do not have the same profit and loss margins to consider and the consequences of being seen as exploitative usually rise above the level of commercial disputes, developing into diplomatic incidents.

More specific sui generis laws that either exclusively address ABS or incorporate it along with related issues, such as community rights and traditional knowledge, are generally not yet in place. However, several countries studied in this volume are developing draft sui generis legislation, regulations, or policies. These draft legal texts focus on creating or identifying a centralised authority, although this authority is often envisaged as relying on other agencies for sectoral expertise and enforcement assistance. The reason that these draft laws focus on institutional structure and processes, rather than more substantive ABS issues, is that they tend to establish frameworks that are based on the improved ad hoc processes of contracts supported by vague management legislation. The laws may outline issues to be addressed in these contracts, such as requirements for local partners or royalties, but they leave the actual details to be negotiated.

2. GENERAL POLICIES AND APPROACHES

A. Institutional Structures

The case studies illustrate several basic models of institutional structures for governing genetic resources. In many ways these models appear to form a logical, if unintentional, evolutionary process for the development of regulatory systems. The earliest stage in this process is that of a system that is fragmented along sectoral and geographical lines. Sectoral fragmentation usually follows pre-independence patterns, with institutions responsible for forestry, agriculture, marine resources, and protected areas, and more recently the environment—all having mandates that are interpreted as providing some limited authority over access to genetic resources. There is little or no formal coordination between these various sectoral authorities. Sectoral fragmentation almost invariably creates overlapping mandates and are frequently characterised by weak enforcement capacity. Instances of geographical fragmentation identified in the case studies exist only in the presence of sectoral fragmentation and depend on the nature of the particular state: the greater the federal nature of a state, the more likely it is to have a system that is both geographically and sectorially fragmented. The fragmented model is not, strictly speaking, a model at all in that it consists of the independent responses of existing structures to a new situation in the absence of coherent policies. Egypt, Nigeria, and South Africa fit this fragmented model.

The next step in the evolution of institutional structures is the introduction of a coordinating body, often from among the sectoral authorities. These coordinating bodies do not have any particular authority over the other sectoral authorities and are more focused on sharing information. As such, they seek to address problems relating to overlapping mandates and disharmony in policies. Nigeria may be moving toward this stage, with the slow de facto emergence of the Federal Ministry of the Environment in the coordinating role, but this is not yet clear. Senegal is more clearly at this stage with its dual coordinating authorities, the Department of the Environment and Protected Areas and the Committee for Natural Resources and the Environment (CONSERE).

The next stage involves the emergence of a unitary authority. At this point, access to genetic resources is still not a distinct field but is rather addressed in the context of broader fields; in all of the case studies this broader field is that of "scientific research." As a consequence, unitary authorities are not operating according to any policies or guidelines specific to ABS but, rather, are approaching individual applications on a case-by-case basis. This, combined with the fact that unitary authorities do not seem to be able to impose any coherence on the activities of sectoral authorities, precludes the development of a harmonised benefit-sharing strategy. The

lack of exclusive jurisdiction for unitary authorities may be largely due to the ambiguities of a mandate to authorise scientific research in the face of the more specific mandates of sectoral authorities. Problems of loopholes and overlaps still exist due to limitations in the cooperation among independent institutions. Kenya, the Seychelles, and Uganda all fit this model.

Ethiopia is the only country studied that has moved beyond the unitary authority phase by endowing the Institute of Biodiversity Conservation and Research (IBCR) with exclusive jurisdiction to establish policies relating to access to genetic resources that will, once in force, be implemented by regional level agencies. The key distinction between this and the initial unitary authority stage is the issue of exclusive jurisdiction and the explicit mandate of the authority to coordinate, and often provide approval for, the policies and practices of sectoral agencies.

The final step in the process does not really involve changes in institutional structures but consists of moving beyond the endowment of an institution with exclusive jurisdiction to the implementation of regimes specifically tailored for access to genetic resources that include harmonised approaches to benefit sharing. This provides a clear operating framework for an agency and the powers necessary to fulfil the objectives of that framework.

However, the fact that regulations to this effect are either pending or in the process of development in a number of these countries suggests that the majority of countries will soon be approaching this final stage. In the near future, countries such as Egypt and perhaps South Africa seem likely to leapfrog from the first to the last of the stages discussed above. This is probably due to the external stimulus of the entry into force of the CBD, which establishes a framework for the final stage in the form of article 15. Thus, while the entry into force of the CBD was a watershed in the history of access to genetic resources, it was still firmly rooted in developments that were underway in Africa prior to its negotiation.

B. Application Processes

The pattern of application processes observed in the course of preparing this volume tracks the evolution of institutional structures discussed above in section II.A. At the earliest fragmentary and sectoral stages, an application for accessing genetic resources usually consists of a direct request to the senior officer of whichever agency has jurisdiction over the particular geographic area or field in question. This request will not be required to fit a prescribed form, and its granting or denial is at the discretion of the officer handling it. Benefit sharing, and often even an administrative fee, is rarely required in these situations. Similarly, there are rarely any other conditions for access, because as the Egypt case study (chapter 8) notes, technical agencies are usually more concerned with promoting scientific activity than they are with regulation. Where terms and conditions are imposed, these are invariably ad hoc and based on the particular interests of the institution or officer involved.

If no agency has jurisdiction over the field in question, then there is no application process that could be construed as legally required. In this event, researchers seeking to work in good faith often seek to deal with local institutions such as public universities to at least establish some "colour" of official approval and a record. A key point to note is that even where a party is required to obtain permission from a technical or administrative authority, the legal basis of the granting of permission is usually vague at best. This means that the consequences for failing to obtain permission or breaching any conditions that may be imposed are unknown. In common law countries, a court might derive sanctions from the principles of equity, either derived through tort or contract, but even this is unclear.

Historically, the vague application processes for access to genetic resources under fragmentary and sectoral systems have meant that access has been virtually free, both in a bureaucratic and economic sense. However, this situation has been reversed in many countries recently as awareness of "biopiracy" has grown. Institutions and their senior officers are now often reluctant to grant permission for even the most reasonable requests for fear of criticism and that there may be something they will miss.

In situations where unitary authorities have begun to emerge, the application process is at least slightly streamlined. An applicant can usually approach this authority and expect to be asked either to complete a standard application (usually consisting of a fee, project proposal, and background information) or to be informed of the sectoral agency that should more appropriately handle the matter. The fact that such unitary authorities usually grant a form of "generic" permission for conducting a diverse range of activities means that they do not operate within particular guidelines regarding the granting of this permission beyond the sort of permit and administrative fee standards found with sectoral agencies. In some instances, unitary authorities may establish terms and conditions beyond basic administrative requirements, but this frequently depends upon the capacity and awareness of particular officers regarding

ABS issues. Authorities that are still in the process of becoming unitary rarely have any mandate to establish coherence in the approaches of sectoral agencies. These various factors largely preclude the development of any harmonised benefit-sharing strategies. It also largely precludes sufficient consistency of practice to assess what is useful and what is not regarding terms and conditions and enforcement measures.

Despite some of the negative aspects of early stage unitary authorities, there are some positive aspects. The first significant positive aspect is that unitary authorities tend to fill the biggest gaps—if there is no technical agency responsible for the particular area or field then the bioprospector must deal with the unitary authority. It is no longer acceptable to deal only with a local area administrator who is unfamiliar with the implications of access to genetic resources. Second, a unitary authority potentially allows for the development of some experience and skills in dealing with ABS matters. This can often be fundamental to an accurate assessment of a proposal and its associated applicant. Third, these authorities and the nature of their powers still allow for considerable flexibility, which gives early stage unitary authorities an advantage over both fragmentary and more developed systems. The flexibility exists with regards to who is involved with the assessment of an application and the terms and conditions imposed or negotiated, with the only major limitation being the interest and initiative of the responsible officer.

The situation with later stage unitary authorities is similar to that of early stage with a few distinctions. Primary among these is that later stage unitary authorities generally do have some ability to impose coherence on all sectors, whether through requirements that they must approve or advise on applications or whether by means of powers to promulgate guidelines or regulations for other agencies. This situation allows for faster institutional learning, as the unitary authority is more aware of and more involved in the range of activities being conducted. It also allows for better coordination of available information through the comparison of applications and applicants. Another important distinction is that later stage unitary authorities usually have a more specific mandate than early stage: rather than dealing with applications for all forms of research, they tend to focus either solely on ABS or more broadly to include ABS-related fields (such as biosafety, environmental impact assessment, and other environmental regulatory areas). This allows for greater development of general expertise as well as significantly improved enforcement capacity, whether applied directly or through the assistance of other agencies.

Although it is not yet fully clear, the emerging trend towards specific ABS legislation and regulations appears, as noted earlier, to focus on central authorities that are distinct from later stage unitary authorities in that they have exclusive powers to review, grant permission for, and monitor ABS activities. In addition, despite the maintenance of basically contractual systems, these laws frequently include detailed requirements for the information to be provided in applications and for the terms and conditions of ABS permits. Central authorities have the clear advantage of being "one-stop shops" for ABS, reducing the burden on applicants to seek and negotiate permission with a variety of agencies in a sometimes unfamiliar regulatory landscape. In terms of capacity and resources, they share the similar advantages of later stage unitary authorities but to an even greater degree. Finally, effective central authorities introduce a greater degree of consistency and predictability into regulatory systems. This has definite advantages for countries of origin, as it is easier to differentiate between legitimate and illicit activity. It can also be attractive for applicants, who are able to assess their potential costs and obligations more accurately prior to submitting an application.

C. Policy Rationales Underlying Current ABS Regulatory Regimes

1. General Policy Rationales

A range of policy rationales for ABS can be identified in the existing regulatory frameworks and the new initiatives considered in the case studies. At one end of the spectrum are countries, such as Kenya, in which there is no coherent government policy. Significantly, the absence of a coherent government policy does not necessarily mean the lack of any policy at all; frequently it may mean a cacophony of policies. Lead agencies with interests in ABS frequently base their policies on similar principles to those used by governments. At the other end of the spectrum are countries, such of Ethiopia, where government activities are informed by a relatively focused policy rationale.

All the countries examined in this volume consider poverty alleviation, development, and conservation in their policy rationales. As a policy rationale in ABS, poverty alleviation generally does not appear to be supported by significant detailed planning. In countries such as Madagascar or Senegal, it consists thus far of little more than a belief that ABS is likely to generate alternative incomes and that if these are channelled directly

to communities they will contribute to poverty alleviation and reduce vulnerability. In some countries, such as Senegal, poverty alleviation is closely linked with the agrarian base of the country, and ABS policy focuses on plant and animal genetic resources of most relevance to the rural farmers. Although the general lack of detail could be a cause for concern, it should be noted that this approach has many aspects in common with the broader field of community-based natural resource management and initiatives such as those relating to non-timber forest products. As a consequence, most countries are probably able to build poverty alleviation policy rationales on past experiences.

In the context of this chapter, "development" is used to refer to two commonly used aspects of the term. The first relates to the development of the genetic resource into a product. This process obviously also underlies, at least in part, the policies of poverty alleviation and conservation, since without the development of products there is no development of economic value and thus no benefits to share. However, in this context, the emphasis of development is more on leveraging access to genetic resources to increase the country of origin's capacity and infrastructure to increase the value added to its products. This leads to the second aspect of development: improvements in technical skills and infrastructure contribute to broader national development objectives by enhancing scientific research and development capacity. The Ethiopian Institute of Biodiversity Conservation and Research (IBCR) seems to focus on this area, at least as far as the results of capacity building activities can be made to serve broader goals of poverty alleviation and community development. In Kenya, the activities of the KWS-ICIPE partnership have largely generated capacity building and infrastructural benefits from foreign collaborations to date, promoting the independent development of local products. South Africa also appears to attach considerable importance to this rationale. However, the countries studied have not yet developed any comprehensive strategies regarding development objectives for ABS, and thus the rationale appears to be more opportunistic than proactive.

Of the three basic policy rationales for access to genetic resources identified here, conservation is, for several reasons, probably the most sophisticated and is discussed in more depth in section C.2 below.

The relative weight attached to each of the rationales varies from country to country. In several countries, including Ethiopia and Senegal, the main emphasis is placed on poverty alleviation. This is primarily seen in terms of activities directly affecting rural, agrarian communities, and some of its aspects include elements of conservation and, to a lesser degree, development. Conservation and development are identified as independent rationales, but with less importance attached. The Seychelles places the primary emphasis on conservation, although development (particularly in the agricultural sector) is also priority. South Africa states its primary objectives as relating to conservation, but in practice it seems to place stronger emphasis on development, primarily in the form of commercial activities.

The weighting of priorities seems, predictably, to be conditioned by the particular situation of a country. Ethiopia is deeply concerned about the vulnerability of its population to climatic catastrophes, largely due to poverty, and thus poverty alleviation becomes the major priority. The Seychelles is a small island state with a fragile environment and derives a significant proportion of its national income from tourism, and thus conservation is a top priority. Agricultural development in the Seychelles is also important as the limited amount of agricultural land creates a pronounced dependence on food imports. As a country with a significantly larger economy than others in sub-Saharan Africa, South Africa can afford to concentrate on longer-term development strategies and address its poverty alleviation concerns from other sources.

The significance of a pattern between policy objectives and national situation suggests that regimes governing genetic resources should be based on carefully considered strategies and incentives if they are to be relevant and to have significant impact in what are complex fields of major national importance.

2. Conservation

Perhaps because of its central role in the CBD and the consequent participation of environmental authorities in developing ABS regimes, conservation tends to be a policy rationale that features in all countries to some degree and is often developed at a more detailed level than other rationales.

The relative importance of conservation varies somewhat among the case studies, both in terms of the frameworks of policies and in their practical implementation. At one end of the spectrum is the Seychelles, where conservation is the primary motive in the development of access to genetic resources policy. In Ethiopia, conservation is also given a high priority but this is due to its perceived importance to the state's overriding goal of poverty reduction. The actual approach taken, which is still emerging, combines direct activities with marginalised communities—particularly in the context

of agricultural development—with an overall centralised direction of these activities and of the pharmaceutical and industrial potential of the field. While Madagascar has yet to develop a comprehensive regulatory system, conservation seems to be a priority in so far as it serves the prime motive of poverty reduction. Madagascar is also notable in its measures to allow for regional and local direction of access to genetic resources policy. A seeming contrast to these situations is South Africa where conservation is a stated priority but in practice is subordinate to commercial objectives. A number of case studies noted that commercial success could provide funding for conservation activities. Such an approach can be found in the some of the discussions that led to the inclusion of article 15 in the text of the CBD. These discussions reflected the trend among some environmental policymakers and analysts that effective conservation should be based on market incentives. This has both direct and indirect elements. The direct is the immediate derivation of financial benefits; if a plant, animal or area hosting genetic resources is generating profits, then there is a clear incentive to maintain it or even enhance its condition. The indirect element is the potential value of biodiversity that is yet to be identified, that is one never knows which plant or microorganism will lead to the next multi-million dollar product, so there is an incentive to conserve all biodiversity. The indirect element generally only functions where there is awareness of instances of the direct. This thinking is similar to that which has previously been applied to protected areas in some developing countries: if they pay for themselves and provide jobs and income, then people will have reasons to support them.

The first point to note from the case studies is that while article 15 is the driving force behind the development of the majority of regimes regulating genetic resources, conservation tends to be only one aspect of the policies underpinning these regimes. Where conservation is the primary element of access policies, it supports wider strategies rather than constituting a strategy in and of itself.

The importance of this consideration can be seen in the controversy over the role of access to genetic resources in South African conservation policy. One of the main reasons for this is that identifying the value of a specific resource may enhance its conservation by limiting over-harvesting, but it may just as likely have no effect or even prove detrimental. In the case of pharmaceutical, industrial, and chemical development, the interested corporations and institutions are usually looking for genetic resources that can be readily synthesised or, in some cases, resources that can be cultivated easily. The wild genetic resource is important as a lead to particular compounds or organisms, and once this purpose is served may no longer be important. Two cases illustrate the potential risks implicit in ABS serving as an independent conservation policy.

In Kenya and Cameroon, the bark of the tree *Prunus africana* was discovered to be active against prostate cancer. The European company that is the primary processor of the bark depends on the natural product, and wild populations of the tree in both countries have subsequently been decimated. This is despite attempts by forestry authorities to establish plantations to ameliorate the pressure on the wild populations. An example of the natural product not being required for processing but exploitation of the resource still posing a problem is the case of *Maytenus buchananii* in Kenya. In the 1970s, the U.S. National Cancer Institute (NCI) discovered, on the basis of information from Digo traditional healers, that the plant was active against pancreatic cancer.[5] NCI harvested large quantities of the shrub (27.2 tonnes) that were subsequently found to constitute almost the entire adult population, thus posing a grave risk to its survival.

ABS regulatory regimes have the potential to contribute to conservation objectives. However, the greatest success in Africa has been where the regime is integrated into broader conservation goals. This is important for several reasons. First, integration allows genetic resources to be managed on a sustainable basis. Second, the exploration and cataloguing of biodiversity associated with ABS can be extremely useful in conservation-related and other scientific endeavours. Finally, it allows for benefits derived as a result of access, whether financial or in-kind, to be directed to activities that are compatible with conservation strategies. This final aspect is driven by several motives. Chief among these for those seeking access, particularly the private sector, is the positive publicity associated with environmentally friendly projects. Positive publicity is also useful for states providing access, for example in attracting applicants and even donor assistance. However, it is probably more significant that compatibility with conservation strategies provides support in limited budgetary situations, enhancing the viability of longer term ABS initiatives and encouraging local research in genetic resource related fields.

3. SPECIFIC ISSUES IN ABS

A. Food, Agriculture, and Farmers' Rights

Agriculture overwhelmingly dominates the ABS policies of almost all the countries studied in this vol-

[5] The active compound is known as maytansine.

ume. Given the levels of ABS activity suggested by the country studies in this volume, it seems likely that there are hundreds, if not thousands, of instances of access to crop germplasm for every instance of access to genetic resources for pharmaceutical or chemical purposes. While this comes through clearly in the various chapters of part II, this dominance has a low profile compared to the much-publicised instances of access to genetic resources for pharmaceutical or industrial chemical purposes.[6] The potential profits in any particular pharmaceutical research project may well be far higher than those of all but a very few agricultural research initiatives, but the cumulative value of these latter initiatives is incalculable. This dominance is, then, a practical rather than political one.

As is discussed above,[7] agricultural institutions generally act independently of broader ABS frameworks, where they exist. Historically, this has allowed them to freely access and transfer material at the national level and to continue this framework of free access into the international level, whether in their relations to international genebanks and research centres or in bilateral dealings with other countries. Where intra-national access to genetic resources is concerned, agricultural research institutions operate with few limitations on accessing or distributing material. These few limitations largely consist of the requirements of seed laws and PVP laws, which are often implemented by the agricultural research institutions themselves and thus have little impact. These limitations do not really affect bilateral and IARC relationships, where phytosanitary requirements are usually the only considerations beyond an institution's own policies and practices. It should be noted that much of the material accessed from the international genebanks of the CGIAR is subject to the terms and conditions of the standard material transfer agreement (MTA) developed in cooperation with FAO, but almost the only restriction this contains is that material received under such an agreement cannot be made the subject of IPRs.

This framework of free access appears to be maintained from the fragmentary, sectoral stages through to the development of later stage unitary authorities. At this latter point, though, it begins to erode with unitary authorities seeking to at least be aware of bilateral and international relationships. The impact that the ever-greater centralisation of ABS regulation will have on the free flow of agricultural germplasm remains to be seen. However, the active participation of African countries[8] in the negotiation of, and demonstrated willingness to ratify or accede to, the ITPGR suggests a desire to maintain the free flow of germplasm to the maximum degree possible.

During the negotiations for the ITPGR, Africa as a group was probably the key constituency pushing for the inclusion of farmers' rights in the text. The reason for this is clear in a number of the case studies included in this volume: smallholder farmers make up a significant proportion of the agricultural sectors, and in many cases populations, of the large majority of African countries. In addition, smallholder farmers are often among the most vulnerable sectors of society, particularly as a result of the vagaries of markets and climate. As is discussed in chapter 4, farmers' rights are also one of the pillars of the African Model Law.

Despite this context, only one of the countries studied for this volume actually has national legal provisions recognising farmers' rights: Egypt in Book Four, "Plant Varieties," of its Law on the Protection of Intellectual Property Rights (2002). The Egyptian provisions are notable for the fact that they not only recognise rights relating to the saving and use of seed but also extend to mandatory benefit sharing and declaration of origin requirements. Nigeria, Uganda, and Zambia have drafted proposed legislation incorporating the recognition of farmers' rights that is currently under consideration, and it is possible that they might be recognised to some degree in Ethiopia as that country develops its concept of community rights. For some countries, notably the Seychelles, the lack of formal farmers' rights is not particularly significant since the absence of legal provisions restricting activities such as the use, exchange, and sale of saved seed implies the de facto existence of farmers' rights. The case of Egypt provides a suggestion of what may be the situation in a number of other countries:

> This law [the Law of Agriculture] does not touch on farmers' rights directly or indirectly, although the law makes it seem to have taken farmer's rights for granted … It is traditional in Egypt that farmers save, exchange or sell propagating material of their own production without any restrictions even if these originate from material purchased commercially and enjoy some form of protection ... So far, no Egyptian farmer has ever been sued for such action.[9]

6 While GMOs, and a number of other modern biotechnologies, are obviously an important element of modern agricultural research and practice, in some countries they are considered to fall within the scope of pharmaceutical and industrial chemical uses rather than in the more orthodox food and agriculture sector, which includes more traditional plant breeding and related techniques. Not only does the nature of the technologies often support this distinction, but the economics of the research involved almost undoubtedly does.

7 *See supra* secs. II.A & II.B.

8 All of the countries studied for this volume have either been very active participants in the negotiations, (Egypt, Ethiopia, Ivory Coast, Senegal, South Africa, and Zambia were all members of the Chairman's Contact Group) or have already ratified, or indicated their intention to ratify, the ITPGR.

9 *See* ch. 8 of this volume.

Two types of law potentially restrict the freedoms embodied in farmers' rights: seed laws and PVP legislation. Seed laws have existed in a significant number of African countries—including the majority of countries studied in this volume—for several decades, sometimes dating back to the colonial era. These rarely exempt the activities of smallholder farmers and thus the best explanation for the fact that they have not been used to restrict farmers' rights is the Egyptian situation: it has been taken "for granted" that farmers' rights are respected. In contrast, PVP legislation is relatively new in much of Africa. The large majority of countries studied in this volume have only recently implemented, or begun to consider implementing, PVP laws.[10] It may well be that the same "taken for granted" approach to farmers' rights that has been adopted under seed laws will also be adopted in relation to PVP. However, PVP laws differ from seed laws not only in the length of their history in Africa. A further fundamental difference is that seed laws primarily address domestic concerns—the quality of seed in the market—while plant variety protection is of considerable interest to external actors such as multinational seed companies. There is also a definite obligation and an external enforcement mechanism for PVP through TRIPs. Consequently, there is greater pressure on a state regarding the implementation of PVP laws. The greater pressure for strict implementation may be providing an impetus for the increased interest of African states in formally recognised farmers' rights, with the African Model Law and the ITPGR providing a convenient context.

The current situation—including the fact that a number of African countries have signed or ratified the ITPGR, or clearly indicated their intention to do so—suggests that an increasing number of countries will implement measures formally recognising farmers' rights.

B. Biological vs. Genetic Resources

The countries studied in this volume generally do not make a formal distinction between genetic and biological resources. To some degree, the recognition of a formal distinction is precluded by the absence of specific ABS regulatory frameworks. The absence of regulatory frameworks also tends to mean that there has not yet been significant conceptual or policy debate regarding the distinctions or relationships between biological resources, genetic resources, and genetic material, as discussed in chapter II above. However, even where genetic resources are specifically addressed by framework environmental legislation (as in Kenya) or in draft regulatory regimes (as in Ethiopia and several other countries studied), there does not appear to be consideration of the question.

To the degree that distinctions are made, they are made on a practical case-by-case basis that is founded on what might be described as almost "subconscious" principles, similar to the "taken for granted" approach to farmers' rights discussed above. No country studied has sought to bring products for consumption (such as grain or sugar) or manufacturing (such as cotton or timber) within the scope of ABS, while almost all have at least some minimum ad hoc measures aimed at regulating research in fields such as pharmaceuticals. However, this division—which is a simple biological vs. genetic resource distinction—is not formally recognised, whether in the definition of genetic resources or otherwise.

C. Centralisation, Devolution, and Decentralisation

In the case studies prepared for this volume, three basic types of distribution of powers can be seen. The first is authority vested in a central agency, often a government ministry or department. The second is a sharing of authority, whether for policymaking or implementation, among a number of central agencies on a technical or thematic basis. The third scenario also involves sharing of authority through devolution or decentralisation, but in this instance the division is either sectoral or geographic. For the purposes of this discussion, devolution is used to refer to the transfer of authority from central agencies to technical bodies, usually sectoral, and decentralisation is used to refer to the geographical transfer of authority, i.e. from central government to regional or local government.

As is noted in the discussion of institutional structures above, countries appear to be moving from a fragmented, sectoral approach to a more harmonised one. The starting point for most of them is a form of devolved authority involving agencies responsible for forestry, protected areas, and other relevant sectors, but the defining element is fragmentation. There is no harmonising policy or other framework coordinating ABS activities, and thus the system tends to be characterised by loopholes, overlaps, and a frequent lack of capacity for complex negotiations, particularly with regards to benefit sharing. Where countries have drafted ABS regu-

[10] The increase in activity and interest closely matches the entry into force of the TRIPs Agreement in 1995, the requirement for its full implementation by developing countries in 2000 and the original deadline for implementation by least developed countries in January 2005.

latory frameworks—such as in Ethiopia, South Africa, and Uganda—they appear to move ABS policy and regulation from this fragmentary situation into a centralised structure. This seems to be responding to problems of enforcement and capacity, as well as difficulties with developing a benefit-sharing strategy in a fragmentary situation.

Countries studied in this volume increasingly require consultation with technical committees, lead agencies, and sometimes local communities. This may be as limited as prior informed consent from directly affected or interested institutions or communities, or it may involve broader consultation on general policies and practices relating to ABS. These requirements for consultation offset to some degree the tendencies toward centralisation and maintain some elements of devolution, but also potentially add some decentralising elements.

Some African countries have gone beyond consultation to decentralisation. Ethiopia has a stated objective of involving rural communities in decisionmaking processes, although the question of whether this will be restricted to decisions directly affecting the particular communities or also include involvement in broader national policymaking could have profound implications. Similarly, Senegal's program of decentralisation of powers relating to many natural resource and environmental issues to the regional, communal, and community level may come to include ABS.

The devolutionary aspects of this trend to sharing authority over ABS, if well structured and managed, could help to address coordination problems and maximise available expertise, with institutions and their professional staff being available on a continuing basis. The decentralising aspects address current trends towards participatory mechanisms in many natural resource issues and may also be useful in enforcement: local authorities are far more likely to be aware of even low-key activity within their jurisdiction than a central agency would be.

The main lesson that is emerging with regards to centralisation, devolution, and decentralisation is that a judicious blend of the three is probably the best solution. To establish just what this blend might be requires careful consideration of the various policy and implementation powers involved.

A clear central policy on the basic modalities of ABS seems to be necessary to address the main weakness of current approaches in almost all the countries studied: lack of coherence and coordination. It may also be useful in defining some or all of the aspects of a benefit-sharing strategy, particularly where this involves in-kind benefits such as capacity building and the provision of infrastructure. Finally, a clear policy may be critical to enforcement, particularly where a country is seeking to accommodate or promote the activities of foreign researchers.

Devolution seems to be most valuable in terms of providing advisory capacity in all aspects of the ABS process. Given the limited financial and personnel resources available to most African states, it would be impossible to collect all the skills necessary to comprehensively address the myriad sectors involved in access to genetic resources into one agency, even if it were desirable.

Decentralisation could also enhance enforcement, as mentioned above, while promoting objectives such as conservation by giving local communities a greater stake in the process. Perhaps most significantly, decentralisation could also facilitate the targeting of benefits to efficiently address the poverty alleviation objectives that are the priority of the majority of countries studied.

D. Laws, Regulations, and Policies Addressing the Rights of Local Communities Regarding ABS

In the absence of established ABS regimes, none of the countries studied have legal provisions specifically addressing the rights of indigenous people or local communities regarding genetic resources. However, a number of countries are considering initiatives that would provide some articulation of such rights while others already have legal provisions that by implication may recognize them to some degree.

The Constitution of Kenya provides for the limited recognition of customary laws and rights in the context of trust land. However, in the absence of judicial decisions or interpretative statements, it is not clear whether rights to genetic resources might fall within these provisions. The manner in which Kenyan Environment Management and Coordination Act addresses customary interests are similarly ambiguous; and until action is taken on the Act's provision specifically relating to access to genetic resources, it is not necessarily certain that customary interests will be considered in this context either. The customary rights that are generally recognised with regards to genetic resources in Kenya are the same as those currently recognised in neighbouring Uganda: user rights primarily relating to consumptive purposes. Ethiopia is the closest to recognising some form of customary rights in its development of the concept of community rights. However, as Ethiopia has yet to state the exact meaning and nature of community rights, it is not

clear to what extent the concept will actually follow customary systems.

Despite the limited or ambiguous recognition of customary rights, most ongoing initiatives to develop ABS regimes recognise community rights to some extent, at least in the form of prior informed consent. These initial steps suggest that this field may well expand. The existence of the political will for greater recognition of community rights can be seen in initiatives such as Senegal's efforts to decentralise the management of environmental issues to the local level since 1996. Whether this will extend to greater recognition of customary laws is not certain, but it cannot be excluded as a possibility.

4. INTELLECTUAL PROPERTY RIGHTS

As noted throughout this volume, IPRs have become a substantial source of controversy in the field of ABS, with the issue occupying substantial quantities of time and resources in various international forums. This section is not about IPRs generally, but rather it focuses on IPR considerations in ABS regimes. In terms of TRIPs, it is primarily concerned with the implementation of article 27.3(b). In common with the rest of this chapter, this section focuses on measures that African states have taken and concerns they have registered, rather than on the broader debates.

A. WTO AND TRIPS

All but two of the countries studied for this volume are members of the WTO, and are thus obligated to varying degrees to implement minimum standards for IPRs under the TRIPs Agreement. The two non-members—Ethiopia and the Seychelles—both have observer status at the WTO, which is the first stage in applying for membership. However, while Ethiopia only recently acquired this status, the Seychelles has been an observer since 1995 without significant progress beyond the establishment of a working group to negotiate its entry. There is little, if any, domestic or international pressure for Seychelles entry, and it is thus unclear when, or if, the process may be completed.

The varying degrees of obligation undertaken by African members of the WTO are based upon their status as either developing or least developed countries. Under the provisions of article 65(2) of TRIPs, developing countries were accorded a period of five years from the date of the entry into force of the WTO Agreement before they were obliged to implement the provisions of TRIPs in full. This period expired in 2000. Under the provisions of TRIPs article 66(1), least developed countries were accorded a period of 10 years prior to full implementation, a period that expires in 2005, although they may request the TRIPs Council to accord extensions of this period. Prior to full implementation, developing countries were, and least developed countries still are, only required to implement the provisions of articles 3, 4, and 5 of TRIPs, relating to the principles of national treatment and most favoured nation status. Accordingly, least developed countries have no genetic resource related obligations prior to 2005.

In terms of implementation, the majority of countries studied are broadly complying with their obligations and several least developed countries are actually exceeding them in that they have IPR provisions applicable to genetic resources even though they are not required to do so prior to 2005. Nigeria is the most notable exception to this situation in that it probably, although not conclusively, has thus far failed to fulfil the requirement of TRIPs article 27.3(b), providing for protection for plant varieties. Legislation expressly designed to fulfil Nigeria's obligations under article 27.3(b) is, however, currently under consideration.

Of the two countries that are not WTO members, Ethiopia and the Seychelles, the former has an established an apparently effective IPR regime while the latter has a UK-dependent regime and some specific IPR policies in the field of ABS. Ethiopia's IPR regime, as discussed in chapter 9, consists of its 1995 law and associated implementing regulations from 1997, which are compatible with TRIPs in many respects. The Seychelles does not have a domestic IPR system. While it does have an arrangement to recognise patents issued by the relevant authorities in the United Kingdom, the use of this mechanism appears to be so rare that few people in the country, whether in government or otherwise, are even aware of it. As noted in chapter 15, the Seychelles does have some IPR related policies in the field of ABS, which are discussed later in this section.

B. THE AFRICAN GROUP POSITION ON TRIPS AND THE CBD

All the countries studied for this volume endorsed the African Group position set forth at the Seattle Ministerial Conference in 1999. This includes Ethiopia and the Seychelles, who have stated their support for this position, particularly in the context of discussions under the CBD. A key element of this position, as discussed in

chapter 4, is the need to harmonise the provisions and implementation of TRIPs and the CBD.

The details of the countries' positions in supporting the African Group position do vary slightly, particularly with regards to the patenting of lifeforms. The differences are not significant and tend to involve the definition of a lifeform. All countries support the position that a naturally occurring lifeform should not be patentable. However, some appear to accept patenting of lifeforms that have been altered by human intervention or the isolated components of life forms (such as DNA sequences and proteins) where there is an identification of utility.

1. Article 27.3(b)

Countries studied in this volume that are required to implement, or have voluntarily implemented, article 27.3(b) have all taken maximum advantage of its permitted exclusions from patentability. In most cases, they have actually incorporated the first sentence of the subparagraph directly into their patent laws. However, as clearly stated in the African Group position, all of these countries are unhappy with the requirement that they must allow for the patentability of microorganisms and microbiological processes. Information regarding the actual granting or rejection of patents in this area is difficult to obtain, particularly as TRIPs-compliant intellectual property legislation is a relatively new phenomenon in most of Africa. As a result, in the context of this volume it has not been possible to assess whether states are seeking to interpret the terms microorganism and microbiological process narrowly or to reject such applications on the grounds of lack of novelty or non-obviousness. Not being obligated to implement the provisions of TRIPs, Ethiopia does not allow for the patenting of microorganisms or microbiological processes.

Related to the question of the patenting of lifeforms is that of biotechnological inventions. As is implied by the paragraph above, the majority of these are patentable under the IPR legislation examined for the country studies in this volume. However, the absence of patents on express sequence tags in Kenya and genetic use restriction technologies (GURTs) in a number of countries, even though these have been applied for, suggests that there may be a low profile invoking of the public order and morality clause of TRIPs article 27.2, which all countries have maintained in their national legislation, to prevent the patenting of certain categories of biotechnological patent that have been particularly controversial in Africa.

With the possible exception of Nigeria noted earlier, all the countries studied have taken advantage of the sui generis option for the protection of plant varieties.[11] In implementing the sui generis option, Kenya and South Africa are parties to the 1978 text of the UPOV Convention. South Africa has signed but not ratified the 1991 text but has already largely amended its legislation to be 1991 compliant. Kenya has proposed draft legislation also broadly complying with the 1991 text of UPOV, but the future of this draft is not yet fully clear. As signatories to the Bangui Accord and members of OAPI, Cameroon, Ivory Coast, and Senegal are also committed to implementing UPOV-compliant PVP when the revised accord enters into force. However, it is interesting to note that PVP legislation still under consideration in the countries studied is usually based, at least in principle, on the pattern of the African Model Law, which requires greater consideration of farmers' rights than is found in UPOV.

2. Farmers' Varieties, Traditional Knowledge, and Intellectual Property Rights (IPRs)

In the countries studied for this volume, Ethiopia's recognition of community rights constitutes the only IPR legislation in place that specifically protects farmers' varieties, traditional knowledge, and similar resources. Unfortunately, this concept of community rights has yet to be developed to the degree that the nature of these rights can be discussed. Some countries have begun to experiment with the protection of traditional knowledge within the existing intellectual property framework, such as Kenya's encouragement of applications for utility model certificates, or "petty patents" to protect all forms of traditional and informal sector knowledge. However, given the stated interest of a number of countries in developing more specifically tailored systems of protection, it may simply be that their more formal development is awaiting the results of ongoing discussions in international fora, particularly TRIPs and WIPO's Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore.

Where farmers' varieties, which in many ways can be considered as a subset of traditional knowledge, are concerned more substantive measures have been put in place. For example, Egypt requires that any application for the protection of a plant variety that has, at least in part, been developed from another Egyptian variety (whether protected or not) must include a specific declaration of origin and evidence of permission to use that variety, as well as of benefit sharing. While this is not, strictly speaking, a measure for the protection of farmers' varieties, the requirement for permission and benefit sharing relating to

[11] As is noted in chapter 11, in Kenya there is a possible loophole that could allow for the patenting of plants, but the exact situation is not clear as, at the time of writing, this has not been tested in practice.

the use of such varieties does provide some of the most commonly cited elements of protection.

5. THE ROLE OF NONGOVERNMENTAL ACTORS IN GENETIC RESOURCES POLICY AND IMPLEMENTATION

A. International Institutions

International institutions are active in ABS to some degree in almost all of the countries studied. The most common context is the relatively long history of IARCs collecting agricultural germplasm and undertaking collaborative projects with national agricultural research institutions. Historically, these appear to have involved significant flows of germplasm both into and out of countries. The levels of activity vary considerably but have largely been based on free flow of genetic resources and relatively close collaboration. IARCs have also been active in training African scientists: ICIPE alone trained 140 Ph.D. students through its African Regional Postgraduate Programme in Insect Science (ARPPIS). Three of the countries studied host IARC headquarters,[12] while a fourth hosts facilities that were an independent IARC that merged with another.[13]

As the field of ABS policy has developed in recent years, IARCs have begun to work with countries on genetic resource policy issues. The most significant work in this area has been undertaken by the Rome-based International Plant Genetic Resources Institute (IPGRI) through its sub-Saharan African regional office in Kenya. In the policy field, FAO's Development Law Division has a long history of assisting developing countries with drafting legislation in the agricultural sector. It has recently begun to work on ABS issues and has provided assistance to the Seychelles in drafting a bill on ABS as it relates to plant genetic resources for food and agriculture, a document that is currently under consideration by the Government of the Seychelles.

Bilateral agencies have also supported a range of activities relating to ABS issues, from the ICBG project in Nigeria and Cameroon (sponsored by the United States) to BioEarn in East Africa (sponsored by Sweden). Both of these projects are focused on scientific activities, but they have been conducted within the framework of agreements reached with the countries of origin that include benefit-sharing measures, intellectual property considerations, and other basic components of ABS policy.

B. NGOs

NGOs have also been active in ABS issues in the majority of countries studied. In most cases, this includes both local NGOs and foreign ones with in-country offices. Primarily, NGO activities have been limited to policy questions. Both local and foreign NGOs have addressed national-level ABS issues and matters relating to the participation of local communities in decisionmaking and benefit sharing. In several cases, NGOs have been the primary facilitators of national discussions regarding the development of ABS frameworks.

NGO activity in the practical aspects of ABS is significantly more unusual than engagement in policy debate. In some cases, NGOs promote community level genetic resource-based activities. In a few instances—for example in Cameroon, Madagascar, Nigeria, and Uganda—they have actually been involved in the collection and development of genetic resources. In the Seychelles, collaboration between the government and NGOs has reached the point that the daily management of some protected areas is being transferred to them to relieve pressure on governmental resources and capacity.

C. Communities

Local community involvement in ABS issues presents a less uniform picture than that of international agencies or NGOs. In countries such as Egypt, local communities living in and around protected areas have been involved in the management of these areas to some degree, but their participation in national level debates on ABS and similar issues has been limited. In Ethiopia, the government has been seeking to involve local communities in ABS debates. However, with most communities operating on the principle of free exchange and not aware of the broader questions, this has been a difficult task. Although the full implications are not yet clear, the cases of community participation with the greatest potential significance appear to be those of the decentralisation of authority over environmental matters to the local level. This has already occurred to some degree in Ethiopia and Senegal. The basic structures have been put in place in Kenya and Uganda, with the creation of district level environment committees (although these do not yet have significant authority). And Ivory Coast has a policy, although its implementation has been disturbed

[12] These are Ivory Coast (West African Rice Development Authority, WARDA), Kenya (International Centre for Research in Agroforestry, ICRAF; International Centre for Insect Physiology and Ecology, ICIPE; and International Livestock Research Institute, ILRI), and Nigeria (International Institute for Tropical Agriculture, IITA).

[13] Ethiopia (formerly ILRAD, now merged with ILRI).

by the recent unrest in the country. Whether and how these decentralisation initiatives will affect ABS is as yet unclear, as ABS regimes are not yet in place in these countries.

6. NEW INITIATIVES

The case studies identify numerous new and recent initiatives in Africa relating to ABS law and policy. Among the most obvious of these are the ongoing development and implementation of national biodiversity strategies and action plans pursuant to the CBD. The relative speed and intensity of the implementation of these activities varies widely, with some countries still in the development phase, others having moved on to the adoption of framework environmental legislation, and still others now focused on more detailed and specific implementing legislation and regulations. More than half of the countries studied are actually considering draft legislation or regulations exclusively addressing ABS issues or specifically considering them along with related matters.

The other common type of measure under active consideration is new or amended PVP legislation, in several cases making use of some aspects of the African Model Law. The African Model Law's integration of farmers' rights and breeder's rights in to the same piece of legislation has been the major focus of interest in this area. The consideration of farmers' rights anticipates the entry into force of the ITPGR, which African countries have strongly supported. It may well be that the entry into force of the treaty will prompt a new round of legislative initiatives aimed at its effective implementation. Indeed, the draft ABS legislation in the Seychelles specifically takes the treaty into consideration.

VII. STRENGTHS AND WEAKNESSES

While they are presented in greater or lesser detail in the country studies, the strengths and weaknesses in ABS policy and practice that have been clearly identified in this volume revolve around a few key points:

- Weak or nonexistent legal frameworks and institutions,
- Lack of capacity, and
- Awareness and participation.

A. Nonexistent or Weak Legal Frameworks and Institutions

In only one country considered in this volume—Ethiopia—did the author not identify the absence or weakness of its legal framework as a major drawback to the country's existing approach to ABS. The relative importance of this drawback varied slightly from country to country, but the basic reasons for identifying it as a drawback were relatively consistent:

- absence of coordination and harmony in approaches to ABS results in opportunities for abuse and, probably more importantly, a failure to optimise the use of the capacity and resources of national institutions;
- low or non-existent enforcement capacity and ineffective sanctions; and
- absence of coordination with broader national policies.

In Madagascar, the absence of a legal framework is identified as a problem but not the primary one, since the existing inadequate framework is not effectively implemented or understood, even in government circles. Given that one of the reasons identified for this lack of effective implementation is the existing regime's complex nature, the development of a harmonised framework and specific implementing institution might mitigate this problem to some degree. However, the problem nonetheless raises the other two main drawbacks identified.

B. Lack of Capacity

Lack of capacity is an issue raised in all the countries studied. In countries such as South Africa, the problem is isolated to particular skills such as taxonomy. In Ethiopia, the primary concern is with regards to sufficiently qualified staff to build the country's ability to conduct independent research on genetic resources. However, the most common lack of capacity cited relates to administrative, legal, and policy capacity, including scientists with sufficient understanding and knowledge of ABS to be able to accurately assess applicants and their applications.

C. Awareness and Participation

The issue of awareness and participation involves several discrete elements. The most prominent concern is that without greater awareness and participation by the rural communities that are the custodians of much of

a country's genetic resource heritage, even a fully empowered and well-resourced centralised agency will find it almost impossible to effectively implement an ABS strategy. Not only must rural communities be aware of ABS issues, but efforts are needed to raise awareness of various governmental authorities and involve them in decisionmaking processes.

Recognising that poverty alleviation is one of the main policy rationales justifying most countries' interest in ABS, a lack of awareness and participation by the intended beneficiaries may inhibit the efficient targeting of any benefits received and fail to garner support for the ABS regime.

D. Strengths

The African countries examined in this volume highlight two key strengths relating to genetic resources. First, Africa is blessed with an enormous diversity of species, many of which are endemic to the continent. This heritage of biological diversity has provided a wealth of foodstuffs, medicines, chemicals, and other valuable assets to the world and promises to provide new solutions to new and old problems if it is effectively managed and investigated.

The second key strength identified is, interestingly, something that is also identified as a weakness: capacity. While Africa may be relatively weak in its capacity to implement and oversee ABS regimes, it does have a significant network of public research institutions, particularly in the agricultural sector. These could be used to take maximum advantage of the region's genetic resources to capitalise on technology, training, and infrastructure that might be provided as benefits under an ABS regime. These institutions can also advance Africa's ability to develop its own genetic resource based value added products.

CHAPTER 6
THE WAY FORWARD

Genetic resources are a major source of international debate, diplomacy, and trade at both the bilateral and multilateral levels. The manner in which issues relating to genetic resources evolve can significantly affect the economies of most African countries and the livelihoods of their peoples. Moreover, the connected issues are numerous and varied, while the multiplicity of the fora where the issues are being discussed further complicates the issues.

Against this complex backdrop, many African nations—as well as other developing nations—believe that the current global regimes are skewed against them, as they lack the capacity to compete effectively or take advantage of the opportunities these regimes provide. It is challenging to simply keep informed of all of the relevant developments in science, technology, policy, politics, shifts in popular opinion, and law in the field of genetic resources. It is even more difficult to try to make a constructive contribution. Genetic resources research and prospecting is taking place amid rapid technological change, increasing the globalisation of scientific and economic activity, and considerable legal uncertainty. Moreover, they span a wide range of ethical, legal, economic, technological, scientific, and institutional issues.[1] As the country studies highlight, the current regimes governing access to genetic resources and benefit sharing (ABS) are largely sectoral, multi-polar, and patchy. In addition, the challenges African countries face at the regional and international levels are also numerous and complex.

In a number of contexts, this volume has touched upon the question of whether national-level ABS frameworks are necessary. However, additional elements need to be addressed in the regional context. If an ABS framework is necessary, what advantages would a regional framework provide in the African context? What type of framework would be most advantageous? Is such a system feasible in the current socio-economic and political climate?[2]

This chapter is the only one in the volume that moves beyond presenting a picture of access to genetic resources frameworks in Africa and seeks to analyse them in terms of legal and policy interventions that could optimise the potential benefits of access and benefit sharing. As such, it represents the views of the editors and should be considered in this light.

Rather than moving through the chapter thematically, as has been done with most other chapters, discussion here proceeds geographically. It begins with the all-important national issues in ABS. The fundamental questions are whether to have a specific regime governing genetic resources and what form it should take, but there are also several other considerations that need to be taken into account. The sub-regional dimensions of ABS policies and regulatory structures are then considered, primarily consisting of various aspects of cooperation among states. The chapter then considers regional and international issues. These tend to involve broader questions than national and sub-regional issues, but are significant in the fact that in a globalising world they have increasing influence over national policies and practices. This chapter closes with consideration of capacity building.

1. STEPS AT THE NATIONAL LEVEL

A. To Regulate or not to Regulate?

The fundamental national question is whether to regulate or not-all else stems from that. In the case of the countries studied in this volume, the answer is relatively clear: some form of harmonising governmental intervention is required. The basis for this assertion comes in several parts:

- in all countries ABS is, to a greater or lesser degree, already an issue, i.e. there are ongoing activities;
- it seems likely that the activities that are sufficiently well-known to appear in the case studies to represent only a fraction of those that are actually occurring. For example, some of the university-based and private sector activity identified in Kenya and other countries was only stumbled upon by coincidence and thus, in a systematic activity assessment, the situation may be found to be similar to the rule of

[1] Sarah A. Laird *et al.*, *Conclusion and Recommendations*, *in* Sarah Laird (ed.), Biodiversity and Traditional Knowledge: Equitable Partnerships in Practice (2002).

[2] See Robert Lettington, *Access to Genetic Resources in East Africa: The Case for a Regional System* (2001).

thumb with African wildlife where there is usually ten times more that sees you than you see;

- sectoral institutions are, to the best of their ability, already regulating ad hoc but they do not have the appropriate expertise, resources or mandates to do this effectively; and
- increasing awareness of ABS, and in particular the risks of unregulated ABS (often amounting to "biopiracy"), create fears in technical agencies that have a high chance of limiting the levels of ABS activity, and thus scientific research, a large proportion of which may well be desirable activity.

However, just because a country wishes to regulate ABS does not necessarily determine the manner of this regulation.

The assertion that governments should regulate should not be taken to imply that they should immediately establish complex processes and bureaucracies with restrictive powers. In a number of countries, this may not be necessary or feasible and could create more problems that it solves. For example, if one considers the concern in Madagascar that numerous existing sectoral laws are either not implemented or are implemented badly because of lack of awareness and capacity, then it is clear that the addition of another layer to the same framework would not address the problem. Similarly, the Seychelles has difficulties with effective implementation primarily due to human resource limitations and a dispersed geography. At the same time, while the country is concerned with equity in benefit sharing, this is not its primary interest. Consequently, for the Seychelles to establish a restrictive regime with stringent benefit sharing requirements may simply create an incentive for applicants seeking access to genetic resources to either circumvent the law or go elsewhere. A regime that focuses more on the promotion of scientific research and the understanding of complex ecosystems rather than revenue generation may better serve the country. The same issues mentioned here in relation to Madagascar and the Seychelles recur in most, if not all, of the countries studied. The point to note is that these issues are of a varying significance and nature in the different countries and that a narrow "one size fits all" approach is unlikely to be successful. The most popular model for ABS regulation to date, based on the Philippine Executive Order No. 247 of 1995, might not be appropriate for some or all of Africa's variety of states because of the protective nature and complex administrative procedures.

Finally, the lesson to be learned is that before a country seeks to implement an ABS regime it needs to carefully assess its objectives, situation, and means before rushing to draft legislation. As is highlighted in the case studies, genetic resources play a variety of roles in different sectors and, in many cases, these sectors may need to be taken into account when developing a regulatory system. The most glaring example of this is the agricultural sector, which contains a wide variety of interests.

B. Agriculture

The backbone of agriculture—seeds—largely depends on access to genetic resources for its viability and improvement. The major repository of and facilitator of access to the genetic resources required for agriculture is the network of national and international public genebanks that have freely moved germplasm between themselves for several decades, ultimately delivering it to farmers in the form of improved varieties. A key point here is the word "public"-these genebanks are not run for profit and they rarely charge more than nominal fees for their services. If an ABS regime is introduced that requires public genebanks to enter into even relatively simple negotiations each time they wish to distribute or collect germplasm this will, at a minimum, dramatically increase costs and, at worst, may even slow or prevent access. Although it has not yet occurred in Africa, there has been concern that transfers of agricultural germplasm for traditional plant breeding activities might be subjected to some form of mandatory ABS process, possibly including negotiation of the terms and conditions of transfers. Africa has contributed significantly to international germplasm collections; with approximately one quarter of the accessions held in CGIAR genebanks have African origins. However, Africa is also a major beneficiary of these collections, particularly where improved material is concerned.

As noted in previous chapters, the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) is expressly designed to address this problem. It promotes the free flow of germplasm while also promoting equitable benefit sharing by introducing a single international framework for ABS in selected crops. In some ways, the treaty can be seen as a multilateral material transfer agreement (MTA) that establishes framework terms and conditions, including benefit sharing, to cover multiple transfers of genetic resources between multiple partners over a number of years. The CBD has also recognised, almost from its inception, that its ABS framework is not suitable for agricultural research and thus its conference of the parties (COP) has specifically requested that states party to

the CBD expressly exclude matters addressed by the ITPGR from their ABS regimes.

It appears that the majority of African states have recognised the relationship between ABS and agricultural research and development. Africa was one of the most active regional groupings during the negotiations for the adoption of the ITPGR and, as is indicated by the case studies, a large number of African countries have already signed or ratified the treaty, or indicated their intention to do so.

However, research is not the only agricultural issue that needs to be considered in the context of the development of ABS regimes. Another major element of the sector that must be considered is that of agricultural exports. If policymakers do not carefully construct the definition of genetic resources, or the scope of any regime developed, they risk, at least theoretically, subjecting agricultural commodities to bureaucracy that will inevitably increase costs and thus negatively impact on competitiveness. Of course, no policymaker would want to do this, but a failure to recognise the problem could lead to unforeseen consequences.

Still in the agricultural sector, but of an opposite nature to the issues discussed above, there are fields such as modern biotechnology, pesticides, and fertilisers. These fields present a different situation to that of seed development in that they are predominantly private sector interests and that they rely on fundamentally different dynamics. In seed development, a breeder is usually working with a large range of parental varieties that are slowly and steadily crossed to produce the desired improved variety. The relative contribution of each step and variety is hard to assess and, in most cases, minimal. On the other hand, modern biotechnologies, pesticides, and fertilisers are often developed from particular genetic resources with specific natures and impacts. They are also products that involve reasonably significant investments and profit margins. Imposing benefit-sharing requirements on these fields might increase costs but it would also achieve the objective of ensuring that all those who contribute to the development of a revenue-generating product genuinely benefit rather than just a few.

The case of agriculture highlights a sector where the dominant concern is one of ensuring that the introduction of an ABS regime does not stifle or disadvantage important activities. However, it also highlights the fact that policymakers cannot simply decide that agriculture can be excluded from the regime, as such a broad exclusion would also encompass fields that should logically be included.

C. Intellectual Property Rights

Similar to the case of agriculture, in that its national consideration in the context of ABS regulation revolves around the question of what a country wants to achieve, is the question of intellectual property rights (IPRs). The first point to note here is that all of the countries studied, whether WTO members or not, endorsed the African Group position on the patenting of life forms and related issues. Perhaps the most widely adopted element of this position in the case studies involves the development of sui generis legislation for the protection of plant varieties incorporating the concept of farmers' rights. Farmers' rights appear to be incorporated into the drafts of almost all new plant variety protection (PVP) laws with only one or two exceptions, such as Kenya. Although relatively straightforward, the adoption of farmers' rights involved a relatively simple assessment of the situation of smallholder farmers and the potential impacts that strict plant variety protection rights might have on them. This is the kind of analysis that should be involved regarding all sensitive sectors that might be impacted by an ABS regime.

A further element of the African Group position that does not make a significant appearance in the case studies is the requirement for a declaration of origin to be a condition for the granting of any biological resource based patent. However, activities to fulfil the objectives of this position are rare. For example, of the countries studied only Egypt has actually legally implemented a declaration of origin requirement. This kind of failure to implement can weaken international positions (creating questions such as why should it be included in TRIPs if the country did not deem it important enough to include in national legislation), while also creating confusion as to the direction that national legislation is taking or may take. Declaration of origin requirements are, of course, of greater significance to African countries when implemented outside the country-biopiracy is facilitated by patents in the major world markets and technologically advanced countries far more than it is by patents in Africa-but lack of national action in Africa relieves the pressure on user countries to implement them.

Declaration of origin is more of an international measure than national. This is largely the case with all types of user measures, which are essentially understood as anything that a resource consuming country might do to respect the laws and rights of a resource-providing country. However, as is also the case with declaration of

origin requirements, it may be politically useful to consider these issues at the national level. For example, a country would have every right to impose stricter conditions on countries and institutions or individuals from those countries, which do not implement user measures relative to the burden placed on those that do not. The justification would be that the absence of user measures means that the risk for the country of origin is higher, thus calling for a risk premium in the value of benefits to be shared, and that the absence of the guarantee provided by user measures increases transaction costs by calling for more thorough consideration of applications, stricter monitoring etc.

A further interesting point regarding the African Group position, and the response of African countries to it, is the fact that African countries appear to have focused on questions relating to the scope of protectable subject matter almost to the exclusion of consideration of the conditions for patentability. This is the basic issue of Africa pushing for the exclusion of lifeforms from patentability.

However, there are more nuances to the positions of some individual states endorsing the African Group position than at first appear. Some countries interpret their position on the nonpatentability of lifeforms in a manner that actually is more related to the conditions for patentability than it is to the scope of protectable subject matter. This exists in the fact that some countries do not draw the line on this issue in between organic and inorganic, they draw the line in between nature and human intervention: i.e. discovery vs. invention.

An important point to note in this context is that a country's position on the patenting of lifeforms has the potential to impact its ABS policies in fundamental ways. If a country opposes the patenting of lifeforms completely, and makes this a condition for access to genetic resources, then it is unlikely to see much legal activity. The majority of private sector applicants are interested in ABS specifically in the hope of finding something that is protectable by IPRs. As with other situations, they will either stay away or find means to circumvent the law. However, a position that relatively strictly interprets the division between discovery and invention could effectively exclude most lifeforms from patentability (including microorganisms and microbiological processes in a manner that would be TRIPs-compatible) without having such an extreme deterrent effect on potential applicants for access. Such an approach would not, in most cases, even require the amendment of any legal instruments as it could be interpreted in to the administrative discretion of intellectual property offices.

Finally, one should take note of the variety of IPR issues that have not really been raised in the country studies. These include areas such as contractual intellectual property clauses, which may often be beyond the jurisdiction of the country of origin. The law of trademarks and unfair competition has been used to considerable advantage in the fields of natural products and traditional knowledge, both to deter those who would misappropriate the knowledge and traditions of others and to promote African products. Trade secrets protection is also something that has been discussed in numerous forums as a possible means, or at least starting point for the development, of the protection of traditional knowledge. These may, or may not, be issues that will feature in an ABS regime but, at a minimum, their effective consideration at the national level will allow for a fuller and more secure regime that will better serve its intended beneficiaries.

D. Enforcement

The final issue to be considered in this section is one that appears in many of the country studies and has to be adequately addressed to avoid calling the entire feasibility of an ABS regime into question: enforcement. The basic question in this area that policymakers must ask when formulating an ABS regime is whether they have the means to actually enforce the regime they are constructing. If in a country such as Madagascar government officials are sometimes unaware of the laws they are meant to be implementing, then how can one expect there to be any enforcement? However, Madagascar should not be singled out on this issue since a number of countries appear to have problems with enforcement issues in what is a relatively technical field that is extremely difficult to oversee in even resource rich countries.

However, while this situation might appear at best daunting it should be borne in mind that although the traditional view of enforcement is as an active system of monitoring and sanctions there are alternative approaches that fit a more carrot and stick model. If an ABS regime is relatively welcoming to applicants and facilitating in its approach to research, then the incentive for a researcher to circumvent the system decreases. There are always exceptions, and these can be addressed to some degree by also having penalties for violation that are sufficiently severe to show people that its easier to cooperate. In some cases, they might also be addressed by robust policies on user measures.

Where an ABS regime is based on a centralised agency, this may facilitate enforcement to a large degree as the

agency can be reasonably certain that if there is any activity that it does not know about then this must be illegal. However, where there is no centralised agency, a similar effect can be achieved by having a centralised mechanism for information collection that would require details of all exports of genetic resources to be submitted to it.

2. SUB-REGIONAL ACTION

Sub-regional issues in ABS legislative and policy development are relatively straightforward in that they mirror issues at other levels. Three issues stand out as of particular concern: transboundary resources, technical cooperation, and enforcement.

In this context, transboundary issues largely relate to matters of competition. The introductions to the case studies in this volume they all tend to highlight the diversity and levels of endemism of species in the country in question. This is a generally true picture, in that most African countries do contain a bewildering array of biological diversity. At the same time, the lack of geographical logic in the establishment of the colonial, and subsequently modern, boundaries of African states means that numerous ecologically homogenous regions are artificially divided by political boundaries. In the context of ABS, the result of this is that many countries share at least a partially common pool of genetic resources with their neighbours. In the absence of some coordination between such countries, they risk driving the value of benefits down where they seek to facilitate access. A similar "race to the bottom" situation can occur with other terms and conditions. There is also a problem of enforcement, in that resources can be collected in one country and subsequently claimed as collected in another.

The means to avoid these problems is cooperation between states in the terms and conditions for access and approaches to benefit sharing, essentially to form a cartel. Fundamental to such cooperation is basic information sharing, including information regarding applicants and their proposed projects where these might include transboundary resources.

Cooperation at a technical level also should be explored more in African sub-regions beyond Southern Africa's SADC PGR Network. With the possible exception of South Africa, all the country studies emphasise the quality of some of their research facilities but also note the general lack of resources. In such a situation, countries need to ensure at a minimum that they are not duplicating each other's research on genetic resources and that they are not all seeking the same kinds of training and infrastructure assistance as in-kind benefits from applicants for access. It may not be practical to achieve detailed cooperation of this nature at a continental level, but it should be feasible to establish functioning frameworks in several sub-regions.

In many ways, the basic networks may already exist, at least in part, in the form of organisations such as ASARECA in East Africa and CORAF in the West. However, the limited scope of some of these may not be suitable to the degree that they can simply be nominated as regional coordinators. Equally, all universities with capacity in the biological and chemical sciences need to be brought into the picture. If countries are prepared to commit themselves to some form of sub-regional cooperation for research and development in genetic resources and to support it with adequate funding, there is no reason why the existing skills and capacities of national research institutions cannot be tapped to move Africa beyond being purely a supplier of raw materials to other technologically advanced states into the realm of developing and producing its own products for both domestic use and export.

In summary, sub-regional initiatives appear to present the best opportunities for African countries to maximise the potential of their genetic resources both at home and for export. The resources and research objectives are often common, or at least compatible, and countries are rarely if ever able to independently provide sufficient financial, technical, and other support to undertake projects targeting the development of globally relevant genetic resource-based products.

3. TOWARD A REGIONAL FRAMEWORK

Although the Convention on Biological Diversity (CBD) reaffirms national sovereignty over genetic resources and legislative approaches to regulate access are mostly a matter of national choice, national frameworks may be inadequate in certain situations. For example, for particular aspects, regional mechanisms may be required, especially where countries share genetic resources as is the case with most contiguous African countries. The frequent instances of shared genetic resources supports a regional approach to addressing ABS. To the extent that there is substantial cross-border movement and trade in genetic resources in Africa, which make national borders almost irrelevant as a practical matter, any national ABS regime must take these activities into account in order to be effective and meaningful. The major challenge, however, is developing such a regional framework.

A recurring theme of this volume—echoed in the country case studies, regional profiles, and thematic

chapter—is the urgent need to move toward a unified African approach regarding genetic resources. The newly revised African Convention on the Conservation of Nature and Natural Resources could provide a platform or framework for regional action on genetic resources.[3] While the African Model Law could help to harmonise legislation at the national level, the African Convention could facilitate the regional coordination. The convention seeks to regionalise the CBD. Thus, article XXII.1 provides that:

> Parties shall co-operate between themselves and, where appropriate and possible, with other States
> …
> (c) in order to enhance the individual and combined effectiveness of their policies and legislations, as well as measures adopted under this Convention and under other international conventions in the fields of environmental protection and natural resources conservation and use; and
> (d) in order to harmonize their policies and laws at the continental or regional levels, as appropriate.

Paragraph 2(e) goes on to stipulate that:

> whenever a natural resource or an ecosystem is transboundary, the Parties concerned shall undertake to cooperate in the conservation, development and management of such resource or ecosystem and if the need arises, set up interstate commissions for their conservation and sustainable use.

The challenge then is to establish and maintain the institutional framework necessary to implement and elaborate provisions of the convention. This will largely involve creative adaptation of the current institutional structures and the harmonisation of several disparate activities at the African Union. In addition, coordination and various forms of institutional partnerships will need to be established among national institutions engaged in research and conservation to effectively extract, share, and utilise the latent and accumulated capabilities and capacities within these institutions. This is critical due to the fragmentary and rigid institutional structures in most of Africa, which means that a large pool of scientific and technical human capacity is scattered in a considerable number of conservation- and genetic resources-related institutions in the region and is not being effectively utilised.[4]

The African Convention establishes a COP, which serves as the decisionmaking body of the convention.[5] It also establishes the secretariat and stipulates that the COP shall at its first meeting designate an organisation to carry out the secretariat's functions under the convention or appoint its own secretariat and determine its location.[6] The critical issue will be generating political will and mobilising the financial resources required to build and facilitate these institutional bases for implementing the convention.

One critical reason for regional action is bargaining power—by acting regionally, Africa can express their priorities in a stronger way. It is expected that a regional approach will improve the bargaining position of the countries which, if they are operating independently, risk being played off against each other both in the relevant international negotiations and by bioprospectors seeking access to shared resources.

Other areas of significant concern are enforcement, research, and conservation. Pooling resources can assist in these areas at the regional level. Moreover, pooling can assist national enforcement efforts, since they often suffer if not approached regionally due to the porosity of frontiers.[7] Several provisions of the revised African Convention also highlight these aspects.

There is also a need for continued dialogue among African countries to coordinate and harmonise positions during negotiations, as well as approaches for implementing relevant international agreements and policies. There is the need to create a more structured cooperation among the countries in the region to reach a better understanding of how intergovernmental processes can contribute to national development. The aim, therefore, is to provide a substantive basis for refocusing discussion and debate around the broad issue of how Africa's vast resources—genetic resources in particular—can best contribute to human development.

Good governance is an essential condition to realising meaningful advances in human development. Since independence, however, African countries have been subjected to various forms of government, which have in many cases led to the near or total breakdown of peace

[3] See ch. 4 of this volume.

[4] African Centre for Technology Studies (ACTS), *Conservation and Utilization of Plant Genetic Resources in Africa: A Profile of Policy, Legislative and Institutional Measures* (2001, unpublished manuscript on file with editors).

[5] Art. XXVI

[6] See art. XLI.

[7] See Lettington, *supra* n. 2.

and order. This instability has impoverished the citizenry, and Africa's natural wealth has been plundered and pillages. Good governance in Africa is, therefore, challenged by various issues such as the collapse of the state in countries where governance has already been weakened by strife and where governments hardly have the capacity to govern and maintain law and order. In spite of the fact that African leaders have formally adopted democracy as a key element of their agendas over the past decade, the democratic process remains challenged. Narrow political considerations, personalised power, and corruption have undermined democratic processes and responsive governance.[8] The current approach of the African Union as an advocate of democracy and good governance, whereby individual countries are encouraged and possibly compelled to adhere to the basic tenets of good governance, needs to be further strengthened.

The ultimate challenge for Africa is making its wealth of genetic resources pay, and not only in the commercial sense. Genetic resources can make a decisive contribution to sustainable development in the region by promoting the equitable integration of the countries and the poor into the global economy. The CBD provides a basic framework of international norms and obligations for access to genetic resources and benefit sharing. It has established the obligation that all parties to the convention must strive to achieve equity in biodiversity research and prospecting partnerships.[9] However, genetic resources will only provide maximum benefit when it is regulated, managed, conserved, and utilised within a sound supporting domestic and international policy framework that is pursued in tandem with sustainable human development, support sustainability of rural livelihoods, and environmental management.

4. CAPACITY BUILDING

Africa faces significant challenges due to a paucity of capacity at national and regional levels relating to genetic resources. Many African nations have limited negotiating capacity at the international level (regarding the terms and components of the international regimes) and at the bilateral level (regarding the terms of access, prior informed consent, mutually agreed terms, and benefit sharing). In order to formulate and effectively implement national ABS policies and legislation, countries require capacities drawn from a wide range of disciplines. In this context, they need at least a base level of specific expertise to engage in the knowledge-intensive processes of formulating policy and national legislation, information management and policy analyses, and developing the institutions and mechanisms to implement them.[10]

Most of Africa lacks this expertise, and without adequate capacity even the best crafted laws, plans, strategies, and policies will be mere documentation—they will neither be applied nor enforced. The creation, mobilisation, and utilisation of expertise to formulate and oversee the implementation of national genetic resources policies and laws will require considerable support to many African countries. This support is not merely in terms of providing financial and material resources, but also in identifying the best expertise and creating the appropriate institutional space in which to utilise it.[11] This is an ideal role for a regional institution, making it possible for countries within the region that do not possess specific expertise in-country to tap into such expertise from around the region.[12]

Considering the pressing legal, policy, and institutional needs regarding ABS, continued research into these aspects is imperative to analyse the ongoing and emerging issues and their implications for African countries. Such research is necessary to help African nations and citizens understand the direction of the debate and make sense of how the various interrelationships are playing out. For example, one unresolved issue is the scope and nature of "user measures,"[13] which can require the disclosure of the origin of genetic resources or traditional knowledge in patent applications. This issue has been debated for as long as the negotiations under the CBD have been taking place, and it has featured prominently in the discussions in the several other fora where the genetic resources and traditional knowledge are being debated, including WIPO and the WTO. The issue of user rights raises serious conceptual and diplomatic challenges and will require strong analytical and negotiating capacities to advocate the interests of African nations on this matter at the various these relevant fora. Research and related capacity building will be critical if

8 UNEP, Africa Environment Outlook: Past, Present and Future Perspectives (2002).

9 Laird *et al.*, *supra* n. 1 at 418.

10 African Centre for Technology Studies (ACTS), *Conservation and Utilization of Plant Genetic Resources in Africa: A Profile of Policy, Legislative and Institutional Measures* (2001, unpublished manuscript on file with editors).

11 *Id.*

12 For example, article XVIII of the revised African Convention promotes cooperation in scientific, technological, economic, and marketing systems "with a view to achieving maximum synergy and complementarity."

13 User measures are legal measures to ensure that the acquisition and use of genetic resources and associated knowledge by persons, institutions, and corporations within user-country jurisdictions are carried out in compliance with laws of the source country and the provisions of the CBD. Laird, *supra* n. 1. The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation recognise and provide for a number of user measures.

African interests are to be effectively advanced on this topic, as with other unresolved ABS issues.

Beyond the legal/policy expertise, there is also lack of scientific and technical capacity to add value to genetic resources. Indeed, most African countries are essentially positioned at the low-value end of the technological innovation chain, largely limited to providing raw materials. This issue has been discussed in chapter 2, and supranational or regional approaches can facilitate capacity building through greater cooperation and sharing of expertise and experience among countries in the region.[14]

[14] See ACHIM SEILER & GRAHAM DUTFIELD, REGULATING ACCESS AND BENEFIT SHARING: BASIC ISSUES, LEGAL INSTRUMENTS, POLICY PROPOSALS 63 (2001).

PART II
COUNTRY PROFILES

CHAPTER 7
ACCESS TO GENETIC RESOURCES IN CAMEROON

*Samuel Nguiffo**

1. BACKGROUND

With regards to genetic resources and biodiversity, the horn of plenty poured out on Cameroon with unequalled generosity such that this country harbours an extraordinary diversity of ecosystems on nearly 500,000 km^2. In fact, within this territory there is a succession of near-desert and sahelian ecosystems in the northern part, forest ecosystems in the southern part, and mountainous ecosystems in the centre and west, with Mount Cameroon reaching a height of 4,070 m. Added to these areas are the fragile coastal zone with its unique ecosystems, such as mangrove forests. The consequence of this great diversity is an abundance of biological, plant, and animal resources in the territory. According to the World Conservation Union (IUCN), Cameroon is among the countries with the richest biodiversity in Africa. Cameroon harbours many endemic species and areas where no forestry exploitation or intensive agricultural activities have taken place. These are the forest reserves of Dja, Boumba Bek, Nki, Lake Lobeké, the Korup National Park, and the Campo reserve, covering approximately one and a half million hectares and forming a large reservoir of biodiversity.

Cameroon's cultural and human diversity, and its long history of using traditional pharmacopoeia have helped to improve the country's biodiversity. Despite erosion of oral traditions, this knowledge has remained relatively intact as it has been handed down to different generations. The importance of this traditional knowledge increases the attractions of the biodiversity resource industry in Cameroon. The pharmaceutical industry quickly understood this and set up research and development facilities in Cameroon in the early 1960s, immediately after independence. As early as 1966, the Laboratoires Débat (France) obtained a patent for genetic material from the bark of *Prunus africana*, which is active in the treatment of minor prostate afflictions.[1] A recent study by GTZ showed about 30 such firms operating in Cameroon or obtaining raw material for development of biodiversity-based products, such as medicines and dietary supplements.[2]

With the rapid development of technological knowledge, the economic potential of genetic resources has experienced a boom, which stimulates trade and other dealings. The economic challenges in this area are dizzying. By some estimates, "the sale of pharmaceuticals based on traditional medicines alone amount to at least US$32 billion annually. The top 15 crops in the United States—with annual sales of US$50 billion—originated in developing countries."[3]

Paradoxically, despite its abundant biodiversity, Cameroon seems to pay little attention to genetic resources, as shown by the limited consideration given to this issue in domestic laws and policies. In Cameroon, only forest-based natural resources are regulated.

The conservative approach of the state with regards to forest resources explains this lack of interest in genetic resources, sacrificed to the exploitation of timber resources, which are considered more profitable. The weakness in the legal framework makes genetic resource activities more attractive for industry, which can thus operate with less oversight and greater discretion. Extraction of genetic resources quickly accelerated as multinational firms, accustomed since the colonial period to free harvesting in Cameroon, sought further control of resources and the financial benefits they generate.

A party to the Convention on Biological Diversity (CBD) since Oct. 19, 1994, Cameroon has embarked on a process to incorporate the CBD's provisions on genetic resources into its domestic legal system. The process of negotiating the CBD coincided in Cameroon with the beginning of profound reforms in the forestry sector, carried out under pressure from the International Monetary Fund and the World Bank within the frame-

* ***Director, Center for Environment and Development*** **(Centre pour l'Environnement et le Developpement)**

1 Tobias Mbenkum, *Contribution to the Study on Biodiversity*, Plan National de Gestion de l'Environnement (1995), at 80.

2 See GTZ Cameroon, Étude sur les Marches des Plantes Médicinales (Yaounde, no date).

3 See John Mugabe *et al.* (eds.), Managing Access to Genetic Resources: Towards Strategies for Sharing Benefits (1996).

work of a structural adjustment programme. These reforms led to the establishment of a forestry policy, which guided the creation of new institutions and adoption of a legal framework presented by its advocates as innovative and adapted to problems and new challenges of sustainability.

This chapter seeks to assess critically the laws, policies, standards, and institutions that govern genetic resources in Cameroon. This analysis reveals the Cameroonian paradox: the abundance of resources and the importance of their economic potential are inversely proportional to the legal, political, and institutional interest shown by the state. This problem will be analysed under the double aspects of conservation and protection of the rights and interests of the state and local communities as specified by the CBD.

Until 1993, there was no general policy document in Cameroon on forestry resources, biodiversity, or genetic resources. Subsequent analysis of the government's policies in these domains enabled the elaboration of various documents, the main ones being :

- The Forestry Policy of Cameroon;
- The National Environment Management Plan, with components addressing forestry and the environment;
- The Biodiversity Status Strategy and Action Plan for Cameroon (2003); and
- Cameroonian's Tropical Forest Action Plan.

However, analysis of these documents indicates that the government has shown only limited interest in genetic resources, enabling one to identify the determinants and main guidelines of the national policy in this domain.

1.1 The Hypertrophy of Economics in Determining State Policies

The policy of the state with regards to genetic resources is, as it is the case with other biodiversity resources, dominated by economic factors. This essentially economic perception of the resources has undoubtedly placed a heavy burden on the definition of the government's priorities. In fact, the management of timber resources, presented as a "deposit for progress,"[4] constitutes the main concern of the state's policy on forestry and management of biodiversity. The proven capacity of timber to fill the public treasury with currency, indispensable within the context of a structural adjustment, contributed enormously to marginalizing other aspects of the national biodiversity. Presenting Cameroon's vision for its natural resources, the 2003 Biodiversity Status Strategy and Action Plan (2003) emphasizes economics and it exhorts Cameroon to be

> A country that exploits or rationally utilises her natural biological resources in a sustainable way to meet the development needs and the well-being of her population . . . [5]

Shaken since the mid-1980s by a severe financial crisis, Cameroon was able to rebound by concluding a structural adjustment programme with the Bretton Woods institutions in 1988. While the 50 percent devaluation of the CFA Franc[6] in 1994 aggravated the poverty of the population highly dependent on imports, it increased the competitiveness of Cameroon's exports. Timber and other forest products contribute approximately 25 percent to export earnings, second only to oil. This economic interest is reflected in the state's forestry policy, which asserts that forestry activities are the foundation of "the national strategy for the promotion of economic activities in the rural milieu."[7]

The requirements of the structural adjustment programme limit long-term economic planning, imposing on the state an emergency management system based on commitments to the financial donors. The multiplicity of financial partners and the sometimes contradictory nature of their priorities is likely to erode the remaining credibility of the state and its policy. In this context, the conditionalities to the structural adjustment constitute a potential pressure instrument to ensure the preeminence of choices of international financial institutions over those of the state. Accordingly, less attention is paid to a national policy on genetic resources than to national adaptation to the World Bank policy.

To the extent that economic priorities do not override conservation, Cameroon's national policy on genetic resources management is guided by respect for international commitments by the state and decisions based on an international consensus. Consequently, the con-

4 Letter from President Paul Biya of Cameroon to the Minister in Charge of Forests, providing guidelines for the design of a new forestry policy (Mar. 1990).

5 Ministry for Environment and Forestry (MINEF), Biodiversity Status Strategy and Action Plan 105 (Yaoundé, 2003).

6 "The CFA franc is the common currency of 14 countries in West and Central Africa, 12 of which are former French colonies. These 14 countries comprise the African Financial Community, which in turn is comprised of two regional economic and monetary groupings. The CFA franc has been pegged to the French franc since 1948*. Only one devaluation has occurred during the history of the currency peg – from CFA50 to CFA100 = FF1 in January 1994." http://www.un.org/ecosocdev/geninfo/afrec/subjindx/124euro3.htm As of Aug. 13, 2003, the fixed rate between the CFA and the Euro is 1Euro = 656 CFA Francs.

7 See MINEF, The Forestry Policy of Cameroon at 7.

cepts of conservation, public participation, and benefit sharing constitute the cardinal principles of the state's policy in this domain. These principles are mentioned in the laws and policies, and should be taken into account in all decisionmaking processes regarding the use of genetic resources and biodiversity. Nevertheless, it is important to note that reference to these principles in the laws and policies of Cameroon can largely be interpreted less as the expression of a government's will to implement them than a mere marketing tool, seeking to comply with the "the green air of the moment," without undermining the capability of the forest and its resources to provide cash for industry and local politicians.[8]

2. INSTITUTIONS

2.1 Government Institutions

As stipulated by the 1995 Decree establishing the forestry regulations, "the management of forest genetic resources shall be under the responsibility of the services in charge of forestry, wildlife and the environment, with the assistance of the services in charge of scientific research."[9] This article confers the main—but not exclusive—responsibility of the management of natural resources upon the Ministry of the Environment and Forestry (MINEF), which seems to be the only government authority to have, until now, included formally the management of genetic resources into its functions.

Pursuant to the signing of Decree No. 98/345 of 1998, MINEF was given the formal responsibility over these issues with the creation of two organs. These are the Permanent Secretariat of the Environment, whose Protection Unit and the Biodiversity Conservation Unit are responsible for the development and execution of plans of action relating to the protection and conservation of biodiversity. This function can be understood as including protection and conservation of genetic resources. The Department of Forestry within MINEF through its Sub-Department of Promotion and Processing of Non-Timber Products regulates the economic exploitation of genetic resources. It is responsible, among other functions, for:

- Examining applications and granting approval for the processing and exportation of non-timber forest products; and
- Promoting non-timber products within a commercial perspective. This includes providing information to business operators on the markets for non-timber forest products.

Apart from the MINEF, the law assigns functions relevant to genetic resources to at least two other ministries: the Ministry of Scientific and Technical Research, and the Ministry of Finance. The Ministry of Scientific and Technical Research appears to be the intermediary between MINEF and those seeking access to genetic resources for scientific or cultural purposes. It makes recommendations concerning the authorisation of applications for access and receives research findings from the researchers on genetic material obtained in Cameroon. Nevertheless, due to a lack of adequate research structures in Cameroon, the ministry is not very efficient in playing its interface role between foreign firms and Cameroon. There is no institutional structure capable of benefiting from the research by foreign institutions, as mandated by article 14 of the 1995 Decree on Forests. This article requires:

- Scientific results from samples of genetic resources gathered in Cameroon shall be at the disposal of the ministries concerned; and
- When relevant, bio-ethnological studies should be carried out by the ministries concerned.

The Ministry of Finance is the third state institution that participates in the management of genetic resources. It is responsible for defining the amount of royalties owed to the state for the exploitation of its genetic resources. Similarly, through its Department of Customs, it regulates the exportation and importation of genetic material, a task made difficult by both the absence of training for customs officers and by the fact that genetic resources can be easily concealed.

2.2 International Institutions

For the last decade, logging has been the major focus of donors active in the forestry sector in Cameroon. In this context, there are few donor initiatives in the domain of genetic resource management. Nevertheless, there have been some attempts from the German Technical Cooperation (GTZ) and the British Department for International Development (DFID) to improve regulations governing on forest-based natural resources in Cameroon, as well as to specifically address the management of *Prunus africana*. Since the beginning

8 A few studies indicate that the government in Cameroon has not yet implemented these principles. *See, e.g.,* Samuel Nguiffo & Rose-Nicole Sime, Environmental Procedural Rights in Cameroon (2000); Samuel Nguiffo & Robinson Djeukam, Le Droit pour ou contre la Foresterie Communautaire au Cameroun (2000).

9 1995 Decree on Forests, art. 13(1).

of the 1990s, both agencies were involved in the Mount Cameroon Project, which sought to improve the management of this fragile ecosystem with the involvement of local communities. In quest for creating income generating activities for the communities, the project developed the use of non-timber forest products. The main product in the area was the *Prunus africana*. PLANTECAM had an authorisation from MINEF to exploit this product. The threats to the *Prunus africana* quickly became obvious, due to the overexploitation of the tree bark by PLANTECAM. Through the activities of this company, 63 percent of the world production of *Prunus africana* came from Cameroon. GTZ and DFID were instrumental in finding solutions for the regeneration of this species. In addition, the two institutions contributed to the awareness raising of the ministry regarding issues related to non-timber forest products and genetic resources. Their action resulted in the creation of a subdepartment in charge of non-timber forest products within MINEF.

To conclude, the management of genetic resources in Cameroon suffers from the focus of all the actors on timber resources. This focus has produced a weak legal and institutional framework that does not permit Cameroon to benefit significantly from the abundant genetic resources that the nation harbours. The mechanisms set out by the CBD are far from being fully introduced into the domestic legal and institutional systems. This Cameroonian paradox of the neglected management of abundant resources gives the impression that the prey (genetic potential) had been abandoned for the shadow (industrial timber).

3. LAWS AND POLICIES

3.1 Specific Laws and Policies on Access to Genetic Resources

Although Cameroon had signed and ratified the CBD, it has not yet focused on making the required legislative and statutory adjustments. Cameroon's legal and institutional framework concerning the environment was adopted for the most part by the Government after the Rio Summit and after the CBD entered into force. However, the management of genetic resources is not subject to any special text and is absent from national environmental policies. To the extent there are relevant standards or requirements, these are found in a variety of laws, regulations, and other legal texts that bear on one aspect or another, but have yet to be harmonised.

Started at the end of the 1980s, when the international community was preparing for the Rio Conference, the reform of the Forestry Law in Cameroon approved the legal recognition of genetic resources in domestic law. The 1994 Law and its Decree of Implementation are in fact the first texts that make mention of these resources and organise the ownership system, access to, and use of these resources.

The preamble of the 1996 Constitution of Cameroon states: "Resolved to harness our natural resources in order to improve the well-being of every citizen without discrimination." Despite its lack of precision, this provision seems to include all of the genetic resources found in the national territory. By tackling the problem of ownership of these resources through increased protection against appropriation, the Constitution creates another problem: it confirms the dispossession of local communities of the ownership over resources on which they claim their secular rights, by extending them to the system of public land in force in Cameroon with regard to the land and resources of the soil and sub-soil.

3.1.1 National Policy Guidelines on Genetic Resources

The National Biodiversity Management Strategy prepared by MINEF, as part of the National Environmental Management Plan, grants a high importance to wood products and gives little attention to genetic resources, which are treated in the category of "other forest products."

The Biodiversity Management Strategy is grounded on the observation of an unsustainable exploitation of certain resources, without knowledge of their potential or conditions of their regeneration. Moreover, the increased demand for these products increases these threats. The Government of Cameroon is proposing to tackle these challenges through a two-point strategy aimed at improving the knowledge of the potential of resources considered and creating better access to markets.[10]

3.1.1.1 Improving Knowledge Regarding Biological Resources

The first step of the government policy aims to improve the knowledge of biological resources. This involves identifying the natural potential with a view toward putting in place a system for the protective management of genetic resources. It is based on the following actions:

- Taking into consideration the economic potential of these products in the multi-resource forestry inventories;

10 MINEF, *supra* n. 7 at 25.

- Identification of real and potential users of these resources, especially through investigation in industry and population research centres;
- Planning sustainable use of these resources based on the inventory results; and
- Development of ex situ farms and support for research on new uses of genetic resources.

There is still a long way to go to improve knowledge regarding these resources, particularly in light of a recent inventory carried out by the National Forestry Development Board (ONADEF) on behalf of PLANTECAM, a user of medicinal plants on the flanks of Mount Cameroon.[11] Two studies were carried out in the Mount Cameroon area on the *Prunus africana*. The studies were inventories of *Prunus africana* in the area, with characteristics of the trees. Using the same parameters in the same area for the same product, the researchers reached very different conclusions on many different issues. Their work suggests the following conclusions:

- The existence of various differences in the results reveals the methodological difficulties in the task of improving knowledge about biodiversity and genetic resources. For example, the studies found significant differences in the average number of trees per hectare (0.76 for ONADEF, and 1.4 for the Control Mission), the percentage of dead or felled trees (22 against 10 percent), and the percentage of trees seriously damaged as a result of un-adapted methods of harvesting (33 against 20 percent).
- According to the ONADEF study, more than 50 percent of trees are dead, or are seriously threatened by unsustainable harvesting practices. This figure is testimony to the grave threats facing biodiversity in Cameroon.

3.1.1.2 Promotion of Commercialisation

The promotion of commercialisation is the second pillar of the government position on the management of biodiversity and genetic resources. The promotion of the use of genetic resources for commercial purposes could be encouraged by the state, especially through market surveys in Cameroon and abroad, and by supporting business operators to have access to markets. Within this context, product certification constitutes an important aspect of the state's strategy.[12] By granting to resources from the national biodiversity a credible and independent certificate testifying their origin and the legality and sustainability of their harvesting, the government expects to improve their access to markets in developed nations.

3.1.2 Ownership of Genetic Resources

Whether by prudence or negligence, Cameroon's legislature has not provided details regarding governance of genetic resources. The Law of 19 January 1994 established rules for managing forests, wildlife, and fisheries and focused on reiterating the procedures for determining the ownership of these resources in article 12(1), which states: "The genetic resources of the national heritage shall belong to the State of Cameroon . . . " Although it apparently borrows the provisions of the Preamble of the 1996 Constitution, this article introduces a significant nuance into the system of ownership of natural resources. It extends the ownership of the state only to genetic resources "of the national territory," giving rise to two conclusions.

First, as with the CBD, the law seems to consider genetic resources as closely linked to forests. This is why genetic resources were covered, until the adoption of the April 2003 law on biotechnologies, only by forestry legislation and policy. The only definition likely to cover genetic resources was then found in article 9(1) of the 1994 Law on Forests, which states: "Forest products shall comprise mainly wood and non-timber products as well as wildlife and fishery resources derived from the forest." This wide definition of the forests products can also encompass the forest-based genetic resources.

The second conclusion to be drawn from the 1999 law is that genetic resources fall within state's property, regardless of the nature of the forests in which they are located. Thus, genetic resources in state-owned forests, community forests, and private forests are all property of the state.

Despite the diversity of ownership and use rights over forests, which result from the transfer of rights from the state to municipalities, communities, or individuals, the state maintains ownership over genetic resources.

While the diversity in systems of ownership of natural resources gives the impression of a fair division of these resources between the state and communities, the state retains ownership of the largest areas likely to harbour genetic resources, thus confirming the legislative prerogative of maintaining them as public property.

There is no legal provision regulating access to genetic resources that is not forest based. In the context of forests, Cameroonian law distinguishes between the

11 See J. Link, *Information Note on Mount Cameroon Project on Prunus Africana* 7 (Aug. 18, 1998).

12 See Programme of Action of the Sub-Department of Non-Timber Forestry Products, 2000-2001.

rules relating to access and those relating to the use of genetic resources.

3.1.3 Accessing Genetic Resources

As a general rule, access to resources is subject to the prior approval of the state. The law nevertheless lays down conditions to be fulfilled by the applicant. These are: 1) governmental authorisation, 2) authorisation from the owner, 3) an exploitation (for special forest products), and 4) use rights of local communities.

3.1.3.1 Authorisation, a Precondition for Access to Genetic Resources

Article 12(1) of the 1994 Law on Forests provides that "No one shall exploit genetic resources for scientific, commercial or cultural purposes without authorization." Prior authorisation for carrying out commercial activities is a general principle in the 1994 Law, as well as in the 2003 law on biotechnologies. According to the 1995 Decree on Forests, the administrations in charge of forests and scientific research are competent authorities for issues relating to the management of genetic resources.[13]

The conditions for obtaining an authorisation to gather genetic resources in a forest for cultural or scientific purposes are set forth in the 1995 Decree on Forests. The applicant must agree to provide samples of the stock of the concerned resource to the National Herbarium. The party must then submit an application to the minister in charge of scientific research.

According to the 1995 Decree on Forests, gathering genetic resources for commercial purposes is subject to an "authorisation for the exploitation of special forest products," which is granted by the minister in charge of forests.[14] Article 35 of the 1995 Decree provides that "any natural person or corporate body wishing to carry out forest exploitation for gain or commercial purpose" must receive approval from the ministry.[15] Nevertheless, there are some exceptions to this rule, the most prominent being the exception allowing owners of private and community forests to exercise their user's rights.[16]

The approval to use forest resources, including genetic resources, is granted by an order of the minister in charge of forestry, acting on behalf of the Prime Minister, and subject to the recommendation of a technical committee that reviews the applications.[17] In reviewing an application, particular attention is paid to the applicant's technical knowledge. The application must contain evidence of nationality, a curriculum vitae showing professional qualifications and experience, and, for companies, evidence of the existence of a company, activity report, and tax receipt. Once obtained, the approval is "strictly personal" and "may not be leased," "transferred," or "ceded."[18]

The approval process ascertains the professional skills of the applicant and does not in any case oblige the administration to grant access to the resource.[19] Access to resources is subjected to different formalities. In the end, there are two distinct steps: approval by which the ministry recognises an applicant's capacity to exploit the resource, and approval by which the applicant receives authorisation to exploit a specific resource in a specific portion of the forest.

3.1.3.2 Authorisation Issued by the Owner of the Resources

After reading the provisions of the 1994 Law and the 1995 Decree, it appears that the law authorises councils, communities, and private individuals holders of rights over forests and/or resources to grant use rights and set the conditions these institutions have laid down for the exercise of such rights.[20] The only restriction in choosing a third party to carry out the use is the requirement of approval to utilise forest resources. While this requirement is only formally expressed for communal forests, article 35 of the decree—which requires any lucrative and commercial forest activity to obtain approval—may also apply to community forests and private forests. So, a person seeking access to genetic resources in forests on community lands may need to obtain prior approval to use forest resources (from the Ministry of Forests), as well as approval from the community that owns the resource.

With regard to communities and private individuals, the law and decree authorise use by the beneficiary, without the requirement of an approval.

3.1.3.3 The Exploitation Permit for Special Forest Products

On state-owned lands, the authorisation of the state consists of the grant of a use permit for forest products, issued by the minister in charge of forests.[21] This permit provides information on the species to be exploited, the quantities to be harvested, the exploitation area, and the conditions for local use or possibly for exportation of the

13 1995 Decree on Forests, art. 13(1).

14 Currently, the mininster in charge of forests is the Minister of MINEF.

15 The French word is "agrément." The "agrément" is a requirement for applying for exploitation rights.

16 1995 Decree on Forests, art. 35(3).

17 *Id.* at art. 36.

18 *See id.* at art. 37.

19 *Id.* at arts. 37(2), (3).

20 *Id.* at arts. 79(2), 95(2), 97(1).

21 *Id.* at art. 87.

products.[22] The application file contains the following elements: name of applicant, copy of the approval by the Ministry of Forests, evidence of availability of funds, list of planned investments, tax and social security receipts, and technical specification of the resources to be harvested. The minister in charge of forests makes the decision. A specification sheet sets forth the conditions for renewal of the resources, conditions for exploitation and transportation of the products and modalities for paying taxes and dues.[23]

Communities and private individuals acting in conformity with management plans approved by the Ministry of Forests are exempted from the formal requirement of obtaining a permit. The management plans for community, communal, and private forests are prepared by the beneficiary of the forests (i.e. the particular community or private property), with the technical assistance of the ministry. This plan contains the management objectives of the forest, and harvesting or other use must comply with the plan's specifications, once the plan is accepted by the Ministry of Forests.

3.1.3.4 Use Rights and Access of Local Communities to Genetic Resources

According to the 1994 Law, the use right authorises the bordering populations of all types of forests to harvest all forest, wildlife, and fishery products, excluding protected species, for personal use.[24] Use rights must be exercised outside protected areas and community forests[25] and have several restrictions.

The use right is a precarious right to access and essentially revocable. The law authorises the minister in charge of forestry to temporarily or permanently suspend the exercise of this right, on the grounds of public utility, "when the need arises."[26] There is no provision in the forestry law requiring the payment of compensation in this situation, however, communities may be entitled to fair compensation under the specific decree suspending use rights for public utility. The law provides for consultations with communities, but this procedure has not yet been followed with regard to the creation of protected areas. In the case of the Campo Reserve, for instance, the communities did not receive any compensation for the loss of their use rights, which has led to frustration that continues to this day.

Use rights are limited in space, namely outside protected areas. While use rights are complete access rights in the sense that they are intended to satisfy individual consumption, this excludes any form of commercialisation. Finally, use rights are in that they do not involve products referred to as "special;" to the extent other special products are involved, a special authorisation is required.

3.1.4 Utilising Genetic Resources

In assessing and utilising natural resources, it is necessary to distinguish between exploitation for gain or scientific purposes. In case of harvesting for scientific and cultural purposes, the 1995 Decree establishing the forestry regulation spelled out three cumulative conditions.[27] These are:

- The harvesting of samples is subject to obtaining an authorisation issued by the minister in charge of forestry, upon the recommendation of the minister in charge of scientific and technical research;
- The applicant must, as a precondition, supply the National Herbarium with a reference stock of the resources; and
- The access of the administration to research results must be assured. On this last point, the decree states: "Scientific research findings made on samples of genetic resources harvested . . . shall permanently be placed at the disposal of the services concerned."[28]

In the case of harvesting for commercial purposes, the exploiter is required to respect the social, fiscal, and ecological requirements for exploitation, which are detailed in each contract granted to users by the Ministry of Forests. Use must be carried out in a sustainable way and with strict regard to the conditions set by the ministry. The product must be transported in packages bearing the initials of the party utilising the resources, as well as the name and quantity of the product. The products must be accompanied by a statutory consignment note issued by the service in charge of forestry, quoted and initialed by the local official.

As an illustration, the specifications proposed to the company PLANTECAM by MINEF in the South West Province on Nov. 12 1999, provides information on the type of ecological, social and legal clauses applicable to commercial users.

Ecological clauses. The ministry authorises PLANTECAM to peel 300 tonnes of fresh barks of

22 *Id.* at art. 88(1).

23 *Id.* at art. 88(2).

24 See 1994 Law, art. 8.

25 Community forests are considered a community area, in which management activities should comply with the management plan. All the activities falling under the use right may not be mentioned in the management plan.

26 See 1994 Law, art. 8.

27 See 1995 Decree, arts. 13-14.

28 *Id.* at art. 14(1).

Prunus africana in the South West Province and establishes the procedures for stripping the trunks and roots and harvesting leaves of special species, harvesting grains, and regeneration and conservation of products.

Social clauses. PLANTECAM is required to grant a part of their quota (100 tonnes) to the village communities of Mount Cameroon and to sign a sub-contract with the villages that wish to participate. One condition of the sub-contract is that local people be recruited as employees in harvesting these resources. Similarly, the commercial user is required to abide by the use rights of the bordering communities.

Legal standards. The legal commitments of PLANTECAM are spelled out in the specifications as well as the procedures for marking products for transportation and for verification of use: the company is subject to the forestry law and tax laws. The quantities of products harvested are required to be registered, and the local representative of the Ministry of Forests needs to be informed and needs to provide a stamp on the products for transportation. Officials from the local office of the Ministry of Forests will have the right to carry out control missions in the area, without prior authorisation from PLANETCAM.

3.1.5 Exporting Genetic Resources

The exportation of genetic resources is subject to presentation of two key documents.[29] A certificate of origin is required for all special products intended for exportation. This certificate shows the country of origin, conformity with local requirements, and destination of products. The MINEF issues the certificate. There is no legal provision indicating procedures for obtaining the certificate, or criteria for its approval. The 1995 Decree indicates that an exploitation permit is required only for genetic resources harvested for cultural or scientific purposes. The certificate is issued by the MINEF upon the recommendation of the minister in charge of scientific research. According to the 1994 Law and the 1995 Decree, export authorisation may be required for certain products. The list of products subject to this provision, to be drawn up by the minister in charge of forests, has yet to be finalized. Similarly, the conditions and requirements for granting the export authorisation have not yet been specified by legislation.

3.1.5 Sanctions

The 1994 Law provides for two potential violations of the provisions relating to genetic resources: the "unauthorized importation or exportation of genetic material for personal use,"[30] and "the unauthorized importation or exportation of genetic material for a lucrative purpose."[31] The following penalties, which are the same in both cases are provided for:

- A fine of 5,000 to 50,000 CFA Francs (which is between US$7 and $70) and/or imprisonment for up to 10 days for the first offence; and
- A fine of 50,000 to 200,000 CFA Francs (which is between US$70 and $280) and/or imprisonment for up to 20 days to two months for the second offence.

Additionally, the 1994 Law also provides sanctions for the extraction of resources without a permit in two specific situations:

- A company exploits genetic resources without a permit.
- A company exploits genetic resources, but operates with a permit belonging to another company.

In each of these situations, the company can be fined 50,000 to 200,000 CFA (which is between US$60 and $280).[32]

Aggravating circumstances have the effect of doubling the penal sanctions provided for by the law.[33] These circumstances include: subsequent offences, and offences in which the violators or accomplices sworn officials of the administration or judicial police officers.

Sentences remain extremely low in comparison with the potential profits that infringements are likely to generate. Considering the limited capacity of the administration to undertake inspections, these seemingly symbolic penalties are in reality an incentive to fraud.

4. CONCLUSIONS

Compared with the provisions of the CBD (and especially article 15 on access to genetic resources) the Cameroonian law has many loopholes. Without being exhaustive, a few of the loopholes that limit the capacity of the state and communities to enjoy the benefits provided for by international law will be pointed out.

29 See *id.* at arts. 13(3), 15.

30 1994 Law, art. 154.

31 *Id.*, art. 155.

32 *Id.*

33 *Id.*, art. 162.

4.1 Preponderance of State Ownership

As a general principle of Cameroonian law, the state owns genetic resources. However, communities bordering the forests are challenging the administration to recognise their customary rights over forest lands and resources.

4.2 Rules Relating to Benefit Sharing are Weak

According to the CBD, each state party shall take all measures "with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilizations of genetic resources with the contracting party providing such resources."[34] In Cameroon, the benefit sharing raises two distinct problems.

First, there is the issue of sharing of financial benefits between the state and private firms. The law suggests one mechanism:

> the economic or financial gains resulting from the use (of genetic resources) shall be subject to the payment to the State of royalties, the rate and conditions of which shall be laid down, as a proportion of their value, by an order of the Minister in charge of finance upon the proposal of the competent Ministers.[35]

The law, however, fails to define the principles and rules applicable to benefit sharing, leaving a gap with regard to case-by-case negotiations that may be harmful to the state because of the flexibility it gives decision-makers. In the context of corruption, the absence of explicit provisions in this area is not the best incentive for promoting of the interests of the state.[36] An analysis of the political system in Cameroon has shown that those in charge of public affairs tend to use their positions as a way to serve their private financial interests.[37] Without specific guidance for benefit sharing, the significant economic potential of genetic resource constitutes an incentive to corruption in their management.

Second, the access of communities to the financial benefits of the exploitation of genetic resources is limited. No mechanism is provided for by the laws in force to ensure that communities share in the financial benefits obtained from commercial exploitation of resources within their customary jurisdiction or to which they have use rights. For example, in the case of commercial exploitation of timber, a portion of corporate logging taxes is intended to support local development. In the case of genetic resources, the sole financial gains consist of payments for the labor of members of the community or the purchase of harvested products. The law is also silent on the conditions of sharing benefits between the state and communities, both of which claim the rights of ownership of the lands and resources. Community claims are grounded on the customary law, while the state's property claims are grounded on statutory law, which in the Cameroonian legal system supersede custom

Third, there is no legal provision requiring the prior informed consent of communities. Such consent should exist in all transactions between the private sector and the state or communities.

To date, there is no data on the financial benefits resulting from the exploitation of genetic resources by the state in Cameroon. Yet, observers talk of the presence of many "bioprospectors" in Cameroon's forests for many years. This absence of data suggests either the absence of research results or a privatisation of these results to the exclusive benefit of the firms concerned.

4.3 Lack of Legal and Administrative Capacity

Despite the lack of specific data, it is easy to realise that the current sanctions stipulated by law are not effective and are have not dissuaded illegal bioprospectors. Furthermore, the state does not yet have the means to investigate the activities of commercial users and researchers. Customs officers do not have the technical skills to adequately check exportation of genetic resources. These administrative and legal loopholes are likely to facilitate the looting of genetic resources in Cameroon. Similarly, the law gives a preeminent role to the ministry in charge of forests in settling disputes involving genetic resources, limiting claims by communities and associations against persons guilty of infringement of the legislation on genetic resources.[38]

34 CBD, art. 15(1).

35 1994 Law, art. 12(2).

36 See Samuel Nguiffo, *La Chèvre Broute où Elle est Attachée, Remarks on the Neo-Heritage Management of the Forest sector in Cameroon, in* La Forêt Prise en Otage (2001).

37 See Jean-François Médard, *L'Etat Néo-Patrimonial en Afrique, in* Jean-François Médard (ed.), L'Etat en Afrique (1997).

38 Nguiffo & Sime, *supra* n. 8.

CHAPTER 8
ACCESS TO GENETIC RESOURCES IN EGYPT

*Ossama M. El-Tayeb**

1. BACKGROUND

Egypt is located at the northeastern corner of Africa and the western extension of Asia (the Sinai Peninsula). It is also part of the Mediterranean Basin (about 1200 km of coastal front), and embraces two bio-geographical corridors that link the tropics in the south with the pale-arctic in the north: the Red Sea connects the tropical seas of the Indian Ocean with the temperate Mediterranean, and the River Nile links equatorial Africa with the Mediterranean Basin. The Red Sea and the Nile Basin are two principal highways along the migratory routes of the pale-arctic-tropics journey of birds, and the Mediterranean wetlands of Egypt (northern lakes) are vital resting stations.

This geographical position of Egypt has made an indelible impression on the ethnology of inhabitants and on the geographical affinities of its biota. Alternating periods of rain and drought influenced the distribution of living organisms, and the complex history of the River Nile. Egypt comprises a principal riverine oasis associated with the Nile Valley and the Delta. The inhabited area, which includes irrigated farmlands, is about 4 percent of the total area of Egypt. The climate of Egypt is that of the Arid Mediterranean region, with notable differences between the coastal and inland parts of the country and four recognized bioclimatic provinces.[1]

Natural vegetation, though often thin and widely dispersed, provides the desert inhabitants with resources of considerable importance: fuel for their consumption and charcoal and medicinal herbs as cash crops. Excessive collection is a cause of deterioration of the vegetation and the loss of species.[2]

During the last two centuries, Egypt introduced a number of crop plants which now form the backbone of agriculture. Almost all the trees and shrubs grown in city streets, country roads, and in public and private gardens are introduced. The last three decades have also witnessed the introduction of numerous cultivars of fruit and vegetable crops and animal races, including fish and chicken. Production of these new introductions has been increasing steadily, with negative implications for the neglected local landraces and breeds, some of which have been badly degraded while others have disappeared.

Some 70 years ago, Vavilov identified areas which were believed to be the "primacy centres of origin" with rich biodiversity for each of the common crops, and from which it is believed migration has created "secondary centres of diversity," which could show even greater diversity.[3] Egypt closely borders several Vavilov centres of genetic diversity not only in terms of being the centre of origin and diversity for certain crops, wild plants, and animals, and associated microbial diversity but also as a site of a wealth of landraces of plants and strains of domesticated animals.[4] The genetic diversity of Egypt's flora and fauna is thus unique, being not only the product of natural evolution under bio-climatic stresses, but also being products of human intervention in its quest to satisfy basic needs. The major Vavilov centres related to Egypt are the Mediterranean and the Asia Minor/West Asia centres where the relevant crops include: alfalfa, barley, flax, oats, rye, wheat, asparagus, beet, broccoli, carrot, cauliflower, garlic, lettuce, parsnip, pea, turnip, cherry, date palm, fig, grape, olive, pear, chicory, carob, rhubarb, pomegranate, and almond. The current regional priorities include: wheat, barley, oats, rye, chickpea, *Pisum spp.*, *Vicia faba*, *Brassicas spp.*, olive, safflower, and sugar beet. These crops show considerable genetic diversity in Egypt and constituted a target for bioprospecting. The ones with major international market significance have been subjected to systematic collection especially during the second half of the 20th Century, but such collection emphasized "farmer's vari-

* ***Professor Emeritus of Microbiology and Director of the Microbial Biotechnology Center at the Faculty of Pharmacy, Cairo University.***

[1] This classification of Egypt's climate is pursuant to the system applied in the UNESCO map of the world distribution of arid regions, (which takes into consideration the degree of aridity, the mean temperature of the coldest and the hottest months of the year and the time of the rainy period relative to the temperature regime).

[2] Although the population in these areas tend to manage their resources in an ecologically sustainable pattern, essentially for subsistence, rising expectations resulting from the communication revolution and pressures from collectors of medicinal plants recently produced a wave of excessive collection for cash.

[3] IUCN/UNEP/WWF/FAO/UNESCO, World Conservation Strategy: Living Resource Conservation for Sustainable Development (1980).

[4] The Near Eastern Mediterranean region is either the primary or the secondary centre of origin of diversity for 16 cereals and legumes, 11 forage plants, 7 oil seeds, 2 fruit trees, 30 vegetables, and 15 spices or essential oil plants.

eties" much more so than wild relatives because these were simpler to collect, were already available within the national breeding programs, or were simply available in large quantities in agriculture. Collection of wild relatives was less extensive since fewer samples were available for collection, these having been integrated into farmer's varieties over the millennia. Collection has recently tapered off for major crops because of greater local awareness of the potential value of collected material, due to the scarcity of material yet to be collected and to the extinction of the most part of such diversity in the hands of farmers.

1.1 Assessment of Country's Potential for Bioprospecting

There has been no serious and reliable assessment of Egypt's potential value as a centre of bioprospecting. The level of biological diversity and endemism have been studied in an ad hoc manner by several biologists and is occasionally assembled and published by the Egyptian Environmental Affairs Agency (EEAA). Hundreds of Masters' and Ph.D. theses are available as individual efforts in universities, however people rarely refer to these theses.

2. INSTITUTIONS

2.1 Lead Agencies

There is no single agency regarded as "the" lead agency, which contributes to multiplicity of laws and even policies. The Ministries of the (State for) Environment, Higher Education, Scientific Research, Agriculture and Land Reclamation, Foreign Affairs, and Foreign Trade (six Ministries in all) are all charged with various responsibilities.

More control is exercised within protected areas where admission (regardless of nationality) requires a one-day permit from EEAA,[5] which may be obtained at the gate for a small fee; collection is prohibited by law unless a permit is obtained from the EEAA. This is governed by Law No. 102 of 1983 (relating to protected areas) and its Executive Directive Regulations. In applying for a permit, the applicant files a form with the Nature Conservation Section of the EEAA. The application must describe what is to be collected, the purpose of collection, and the fate of the collected material. Permits are granted strictly on scientific grounds and for scientific investigation only. The prospect of commercial exploitation will be looked at as a negative element in deciding on the application. In practice, collection takes place with a scientifically experienced ranger accompanying the collectors, as a requirement by the permit, and usually with a collaborating Egyptian scientific institution. Permits are granted on a case-by-case basis, and the relevant governmental agency is consulted—this being the government body most closely related to the technical nature of the material to be collected. Endangered species cannot be collected. There must be scientific grounds for the expedition. Although protected areas are national structures, both the local authorities and the local community are involved in managing the area, and accordingly in any actual collection exercise. However, only the national authorities are involved in granting permits.

The National Strategy and Action Plan for Biodiversity Conservation (NSAPBC) lists many activities needing urgent funding, including the following that relate to access and benefit sharing:

- Establishing a National Gene Bank.
- Establishing a national program for research and monitoring of biodiversity with 5 main sectors, (including, inter alia, a survey of species diversity, research and monitoring of chemical content of species, and socio-economic studies of biodiversity).
- National programs for human resources capacity building and public awareness. [6]

No formal prioritisation of government policies has been established within these initiatives. Considering the current economic context in Egypt, however, expanding export opportunities, poverty eradication, and environmental improvements are certainly high priorities.

Egypt started plant breeding programs in the beginning of the nineteenth century through the various crop specialised bodies of the Ministry of Agriculture, in collaboration with universities. This was coupled with the establishment of several research and testing stations in many locations. Accordingly, these structures collected and utilised genetic resources of local and imported origins. Maintenance facilities for the germplasm were, however, not well developed. Attempts to formulate an integrated national crop plant genetic resources program began in the 1980s.

In 1995, the EEAA formulated a plan for a "National Gene Bank", which was included in the 1998 NSAPBC. The Ministry of Agriculture took the initia-

[5] For a description of the EEAA, see *infra* section 3.2.

[6] For further discussion of the NSAPBC, see *infra* section 3.2.

tive of establishing the National Program for Plant Genetic Resources (NPPGR) by Ministerial Decree No. 165 of 1999, which was followed by Decree No. 1463 for 1999 establishing a technical committee for the NPPGR. The program calls for establishing a central, long-term storage unit in Cairo, capable of preserving 45,000 accessions linked to a number of crops or location-specific stations. These stations will be responsible for the collection, evaluation, documentation, propagation, and distribution of the genetic material. Twelve such stations have so far been designated. Perhaps the most extensive such station is the Bahteem station, north of Cairo. An electronic network for documentation will be established within the system. The program should be complete by 2005. It has been reported that the Minister agreed that the program includes animal and possibly microbial genetic resources as well. The program does not tackle the question of access and benefit sharing; but there will be specialized crop committees, and it is expected that these committees will look into applications for collection and possible material transfer agreements.

2.2 Role of International Institutions

No international or foreign funding agency is involved with managing protected areas, although many are involved in funding activities of one type or the other. Such activities do not include systematic collection and are focused on scientific surveying, research, monitoring, and evaluation of ecosystem integrity and genetic diversity, any collection being incidental and complementary to the above activities. They are often related to the international efforts in the area of conservation of genetic resources (such as the International Taxonomy Initiative and studies on migratory birds). All such activities must fall within the NSAPBC.

Since funding agencies are not directly involved in implementation of activities within protected areas, they are not involved in possible collection activities. The activities are covered by bilateral agreements between the funding agency and the EEAA and are implemented by the EEAA through the Nature Conservation Sector. Involvement of the funding agency is limited to technical support in addition to financial auditing. An Egyptian scientist is employed as project manager with responsibility for implementation of an agreed workplan according to a set timetable. The workplan will always include involvement of the local community drawing on their traditional experience and passing some benefits to the community as a whole and to individual collaborators. Such activities will show sensitivity to answering the needs of the community but not changing its living style. Many such projects also aim at building human capacity of junior scientists and providing them with insight into current issues related to biodiversity conservation.

2.3 Bioprospecting Initiatives

In practice, there are no national rules or procedures specifically governing access and benefit sharing in Egypt or collection of genetic resources by Egyptians or foreigners. Traditionally, genetic resources were regarded as a "common" heritage, which could not be withheld and must be exchanged freely.[7] Even now, this tradition is still difficult to change, and alternative procedures are difficult to understand. It is only within the circle of scientists and decisionmakers that issues of access and benefit sharing are being discussed, and sympathy for implementation of any law relating to "restrictive access" is likely to be extremely weak even among the lower-level implementation personnel. Even the official position of the Ministry of Agriculture has been to promote the free exchange of genetic resources, except for a few crops regarded as strategic for Egyptian agriculture. For these crops, the Ministers' approval is required for export. Thus, as a practical matter, foreign institutions enjoyed free access with no benefits accruing to the country.[8]

Except for border and remote areas the process is not regulated by a central or a local authority. In border and remote areas, bioprospecting becomes a question of national security, anti-smuggling, combat of narcotics, etc.

Scientific and research establishments will usually approach local authorities informing them and requesting their assistance and cooperation. Staff of local authorities, being mostly unaware of the implications of issues related to collection of genetic resources and wishing to appear supportive of science would go out of their way to render assistance. Collectors rarely are seriously questioned about what and why they are collecting or the use to which they will put the collected material. Accordingly, researchers and bioprospectors have broad access to farmers' varieties, landraces, wild relatives, wild species, traditional knowledge, and herbal medicines. Researchers from overseas usually collaborate with Egyptian scientists or more often, scientific institutions to identify potential genetic resources. The amount of

[7] Notwithstanding regulations relating to foreign-funded research which is governed by Law No. 48 of 1982, certain requirements were enforced not because of relevance to genetic diversity but due to national security concerns.

[8] Book 4 of Law No. 82 of 2002 introduced a material change in the official position by recognizing plant variety registration.

foreign funding of research activities in Egypt far exceeds national funding, especially when it involves major sophisticated equipment or transport facilities. However, few Egyptian scientists are fully aware of potential implications of foreign collection of genetic diversity, particularly with regards to commercial exploitation that does not recognize the financial rights of the country of origin. Even fewer are adequately trained in drafting or reviewing material transfer agreements.

There has been greater awareness on the part of decisionmakers of the risks involved in collecting "information" or in conducting foreign-funded research. Although there has been a law since 1982 requiring all foreign-funded research to be reviewed by specified bodies (including ones involved with national security),[9] not all such activities follow the law since the Egyptian collaborating institution often is not aware of the law. Perhaps the greatest scrutiny is applied to activities involving collection of data on social structures, habits, behaviour, inclinations, perceptions, and attitudes that may be used to undermine national security and political stability. It is also applied to areas such as human genetic diversity, which partly explains why Egypt did not participate in the global human genome project. In collecting genetic material, agreements usually stipulate that collected material (although not necessarily the proceeds from commercialisation of the genetic material) is split between the Egyptian and the foreign partners. Currently there is no law which requires or regulates such agreements, but a common practice by the Ministry of Agriculture has prevailed since the early 1920s. These agreements have no standard recommended format and are handled and approved on a case-by-case basis. However, the fate of the Egyptian share is doubtful considering lack of continued funding, appropriate storage facilities, institutional commitment, and expertise in evaluation and documentation.

It is often said that this unfortunately confused system has allowed foreign collectors to collect all there is to collect. Egyptian farmers' varieties are now stored for the most part only at foreign gene banks at Bari, Fort Collins, Baunchweig, Wageningen, Washington, and elsewhere. Nevertheless, direct and indirect efforts by foreign interests to collect Egyptian genetic resources continue and indeed are still extensive, especially in lesser travelled locations (the Red Sea and Sinai), in extreme environments, and for products with potential pharmaceutical value.

Apart from the practice described above, there are no known bio-prospecting initiatives by the government, local, or international NGOs or the private sector.

[9] Law No. 48 of 1982, relating to foreign-funded scientific research conducted in Egypt.

3. LAWS AND POLICIES

3.1 Specific Access and Benefit-Sharing Legislation and Policies

For historical reasons, Egypt is traditionally a centrally administered country. It has an ancient central government. Local authorities are called "local administration" rather than "local government" and do not levy taxes but obtain most of its funding from the central government. In this context, one would expect an access and benefit sharing system to be centralized through permit granting with local involvement in implementation.

The current discussions on benefit sharing in Egypt are very preliminary. The only issue which has been settled is that "heritage" is basically national and not individual. Thus, genetic resources belong to the "community" as a whole, be that local or national. No debate has been conducted on the division of the national share of possible benefits. Even patent proceeds are not legally defined in terms of who gets what when a scientist obtains a patent on work conducted in an institution (which may be a private enterprise), although this has been seriously discussed with no final formula arrived at yet. Current thinking is focused on how to protect Egyptian rights when collection or research is conducted jointly with a foreign scientist or institution. The measures most often proposed are:

- To ascertain joint scientific publication before exploitation potential is fully investigated and to indicate in the publication the Egyptian origin of the material.
- To not allow the genetic material to leave the country unless an Egyptian scientist is assured participation in the further research overseas.
- To allow extracts to leave the country in quantities sufficient for only preliminary investigation.
- To negotiate an appropriate Material Transfer Agreement with specialized legal counselling.
- To stimulate specialized patent law legal expertise.

Most of these discussions have been conducted through the Academy of Scientific Research and Technology (ASRT).

3.1.1 Laws, Regulations, and Policies Specifically Governing Access and Benefit Sharing

There are no laws that specifically address the question of access to, and benefit sharing of, genetic resources in Egypt.

The tradition in Egypt is that farmers are provided by the Ministry of Agriculture with recommended varieties of propagating material, usually at a preferential price. The purpose of this government policy is to further their efforts for appropriate agricultural production. Such material is usually recommended, for specified agricultural locations, after being assessed by the ministry for productivity, genetic stability, adaptation and distinguishable characteristics after being approved by the Committee on Registration of Agricultural Crop Varieties (CRACV) of the ministry. This practice applies to varieties of crops regarded as strategic in Egyptian agriculture and to those marketed by foreign enterprises that aim to capture a share of the seed market in Egypt. The committee regulates the right to commercialise—i.e., to distribute, handle, and/or sell—varieties, but it does not directly address ownership. The application form for registration of a crop variety needs to be approved for technical worthiness by specified institutes for plant protection and by the appropriate crop institute of the Agricultural Research Centre (ARC). Requirement for fingerprinting is now being considered. It is however fairly common for varieties to appear in Egyptian agriculture with no record of its being assessed by the CRACV, and this is especially true of fruit trees. Until recently, breeding activities in Egypt were restricted to the organs of the Ministry of Agriculture, especially the institutes of ARC with some collaboration from the universities and other government research establishments, and an effective breeding program was practically restricted to crops regarded as "strategic to Egyptian agriculture." Only recently has an emerging private sector been active in the breeding and commercialisation of propagating material.

3.1.2 Status of International Treaties

Egypt signed the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) in August 2002. The lead agency which carried out the negotiations was the Ministry of Agriculture and Land Reclamation along with, as is usually the case in Egypt, the Foreign Ministry. Limited consultations were conducted with other ministries, including those for Higher Education, (State for) Scientific Research, Foreign Trade, Health, and (State for) the Environment. No public debate was conducted. The main negotiator was the officer responsible for the plant genetic resources undertaking (which ultimately led to the treaty) of the ministry and focus was on technical issues. Ratification will require involvement of more stakeholders and political debate, which has not yet been started.

As discussed in the thematic chapters in this volume, the ITPGR recognizes farmers' rights quite explicitly in the preamble and devotes part III (article 9) to the issue, delegating the responsibility of adopting measures "to protect and promote farmers' rights" (including protection of traditional knowledge and benefit sharing) to national legislation. Again, it directs that nothing in the article shall be interpreted "to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate." No country may directly use the treaty as national legislation in this respect, and specific national legislation is required to implement the commitment. This is significant in countries such as Egypt, which hold that ratified international legal instruments are automatically recognized as national law and take precedence over any national law with which it conflicts.

The Treaty is restricted to plant genetic resources for food and agriculture; and in Egypt, these issues come under the Law of Agriculture (Law No. 50). This law does not touch on farmers' rights directly or indirectly, although the lawmakers seem to have taken farmers' rights for granted. In Egypt, "traditions" prevail in the courts. It is traditional in Egypt that farmers save, exchange, or sell propagating material of their own production without any restrictions even if these originate from material purchased commercially and enjoy some form of protection. It remains to be seen how the community will respond to Law No. 82 of 2002 in practice, once its executive directive regulations become law. So far, no Egyptian farmer has ever been sued for such action. In fact, there are incidents where commercial enterprises obtained propagating material registered overseas through un-documented channels, propagated the materials, and sold it to farmers at a low cost. A problem arose only when some farmers attempted to export the produce obtained under the original variety name to a country that refused the shipment because this activity violated their own trade-mark laws.

Ratification of the ITPGR rests with the Ministry of Foreign Affairs, but the lead agency will be the Ministry of Agriculture and Land Reclamation. Close consultation with the Ministries of Agriculture, Scientific Research, Foreign Trade, Environment, and Health is taking place. Within the Ministry of Agriculture, the ARC is heavily involved and coordination is through the Office of Management and Marketing of Technology. Private breeders and farmers organizations are consulted by the said office. Coordination with international negotiations taking place with respect to article 15 of the

Convention on Biological Diversity (CBD) are also taking place.

Egypt signed the CBD in 1992 and ratified it in 1994. The provisions of the convention require parties to create frameworks for conservation of habitat and species diversity. For example, article 6 of the convention required parties to formulate national strategies setting a framework for the conservation of biodiversity.

The Egyptian National Strategy and Action Plan for Biodiversity Conservation (NSAPBC) of 1998 (see above), as stipulated by article 6 of the CBD, covers the following components:

- Species diversity, covering all hierarchical taxonomic levels of plants, animals, and microorganisms;
- Habitat diversity; and
- Genetic diversity in species of plants, animals; and microorganisms.

With regard to habitat diversity, the NSAPBC establishes that conservation programs should concentrate, inter alia, on the selection of habitats with relatively high richness in biodiversity and those harboring species of plants and animals with special interest (endemics, rare, endangered, or extinct). In programs of conservation of species diversity, priority is given to:

- endemic and near endemic species,
- rare and endangered species,
- species with critical taxonomic or evolutionary significance,
- close relatives of domesticated plants and animals, and
- those species with high industrial value (e.g., medicinal plants) and sources of special products.

Conservation programs also give priority to species with a wide range of morphological and physiological plasticity (i.e., a relatively large number of biotypes), to species with a wide range of ecological plasticity (i.e., a relatively large number of ecotypes), and to those with other features that might suggest the presence of special genes or genomes in them. This also includes the conservation of cultivars and races that had a significant role to play in agriculture and animal production and still store a useful genetic make-up but have been replaced by other varieties and races in the wake of the green revolution. Conservation of such cultivars and races is the work of the gene bank. In this connection, special mention should be made of the multitude of cultivars and races of some crops (e.g., cotton, wheat, rice, and dates) and farm animals (cattle, chicken, goats, and sheep), which have already been collected and are kept in gene banks either overseas or locally.

Although the provisions of the CBD are legally binding as a national law in Egypt, Egyptian efforts in this regard have been limited to the drafting and approval of the NSAPBC in January 1998. This was further expanded and articulated in the 2002-2017 National Environmental Action Plan (NEAP) in December 2000. In addition, Law No. 82 of 2002 on "Protection of Intellectual Property Rights" was gazetted on June 2, 2002. Finally, the Heads of States Summit for the Africa Union, in its 2001 meeting, approved an African Union Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders and for the Regulation of Access to Biological Resources, and recommended that member states adopt the model law as appropriate for national legislation.

The national strategy was drafted by the National Biodiversity Unit (NBU) of the Department of Nature Protection of the EEAA. The NBU was entrusted with undertaking surveys and inventories of biodiversity, which form the basis for setting the strategy. This strategy is part of Egypt's national commitments under the CBD and the EEAA's responsibilities to future generations. The document is set in four parts.

- The first part is the introduction.
- Part 2 defines the principal goals, including (relevant to access and benefit sharing):
  - Mobilizing national capacities and resources to conserve biodiversity to ensure its sustainability and rational use;
  - Set programs of action that ensures public participation in the implementation and sharing of benefits of biodiversity conservation programs, and in enjoying their equitable shares of benefits of these endeavours;
  - Establishing legal, economic, and social approaches that support sustainable use of natural resources; and
  - National actions should complement international actions to promote biodiversity conservation, including genetic resources.
- Part 3 sets forth the elements of a national plan of action, which comprises programs of supporting measures, programs of implementable projects and their management, and programs of research, inventories, monitoring, and assessment.

- Part 4 translates the National Strategy into programs of action that can be developed into implementable projects. This part includes, inter alia:
  - National biodiversity and natural heritage inventory and monitoring,
  - Protected area identification and management program, and
  - Institutional development and capacity building.

3.2 Legislation and Policies with Relevance to Access and Benefit Sharing

The list of laws, regulations and policies that in one way or another touch on access and benefit sharing is quite extensive. These requirements are in fact not necessarily uniform and are often dynamic.

The Law on Environmental Protection[10] provides that the lead agency for environmental matters is the EEAA. It replaced a similar agency established by Presidential Decree No. 631 of 1982 and is under the Ministry of State for the Environment. The EEAA is entrusted, inter alia, with the following responsibilities:

- "developing policies related to environmental protection and following its implementation;"
- "drafting Bills and regulations" related to the environment; and
- "administration of protected areas."[11]

The Law on Environmental Protection contains no direct reference to the issue of access and benefit sharing. However, it includes articles that affect access to genetic resources. For example, there are articles that regulate hunting and destruction of ecosystems, and hence indirectly regulate access. Article 28 (Book 2) bans "hunting, killing or capturing wild birds and animals" and prohibits the destruction of their natural habitats while article 84 sets forth the penal code for illegal hunting. Article 48 includes the aim of "protecting natural resources within the exclusive marine economic zone."

The regulations to the law also contain relevant provisions.[12] Article 8 of the regulations covers expenditures from the Environmental Fund, which includes the "establishment and administration of protected areas in order to safeguard natural resources and wealth," while articles 23 and 24 elaborate on article 28 of the Law on Environmental Protection and specify that it applies to protected areas "as well as locations where endangered animals and birds specified by decrees issued by the Minister of Agriculture or Governors in coordination with the EEAA occur."

A review of Law No. 4 gives the impression of a law dealing basically with pollution in so far as it impacts human health and the physical environment. Except for articles from Law No. 102 on protected areas reflected in Law No. 4, reference to genetic resources is absent or at best incidental. Even when it comes to protected areas and wildlife, the law makes only brief mention. The possible reason is that laws and regulations relating to these issues were already in effect.

While Egyptian courts have established that destruction of marine life and of terrestrial vegetation in urban and farming environments comes under Law No. 4, damage to genetic diversity has not been tested in the courts. Issues of access and benefit sharing are totally absent in the law.

Egypt took an active interest in the conservation of biodiversity and the preservation of natural resources and heritage at an early stage. In 1936, Egypt became party to the 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State. This was later followed by signing and ratifying conventions and agreements pertaining to the various aspects of biodiversity conservation. In the Egyptian legal system, when Egypt ratifies an international legal instrument, it is automatically recognized as law and takes precedence on any national law with which there may be a conflict. In the field of environmental legislation, Egypt also introduced a number of national laws concerning the conservation of plant and animal life, and the Ministry of Agriculture was empowered to put these laws into effect and to follow up their implementation. To achieve this objective, the Ministry of Agriculture set up the Egyptian Wildlife Service (an authority for the protection of nature). In 1983, Law No. 102 on protected areas replaced prior laws related to wildlife and set up the legal framework for the declaration and management of protected areas, responsibility for which was simply transferred to the EEAA by Law No. 631 of 1982 thence to Law No. 4 of 1994. This explains relevant judicial rulings in this regard, despite the limited reference to these issues in Law No. 4. To secure a suitable source of funding for the protected areas, Law No. 101 of 1985 was enacted; it levied an additional tax on air travel tickets issued locally in order to provide funding for programs for developing tourism and environmental protection (the Environmental Fund).

[10] Law No. 4 of 1994.

[11] Law No. 102 of 1983, as referred to in art. 5 of Law No. 4 of 1994.

[12] The executive directive regulations for Law No. 4 were gazetted by the Prime Minister's Decree No. 338 of 1995.

These various laws are significant to access and benefit sharing because they establish a framework for conserving biological—and genetic—resources. Thus, laws governing conservation are pre-requisites to regulation of access. Benefit sharing is an issue which may or may not follow regulation of access, depending on whether access focuses on commercial exploitation or simply scientific research. Issues of access were in fact discussed, in a global setting only in terms of exchange of scientific information and material, and restrictions on free exchange were unthinkable until the late 1960s or even the early 1970s when the term "biobusiness" was coined. It took many scientists a long time to comprehend that they may possess biological material that could have monetary value and be an item of trade.

Law No. 82 on the Protection of Intellectual Property Rights was gazetted on June 2, 2002 to replace Laws No. 57 of 1939 (Trade Marks), 132 of 1949 (Patents), and 354 of 1954 (Authorship). Its Executive Directive Regulations are under preparation. It was drafted by the Ministry of Higher Education and (State for) Scientific Research, essentially in response to Egypt's obligations under the TRIPs agreement of the WTO. Book 4 focuses on plant varieties while Book 1 includes articles on patents. Book 4 in principle does not provide for patenting of life forms but represents an effective sui generis system as an alternative to patenting of plant varieties. In this respect, it more or less reflects requirements of article 27 of TRIPs, which states that "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application."[13] Members may, however, sometimes exclude inventions from patentability, for example when it is necessary to protect "ordre public" or morality, including to protect human, animal, or plant life or health, or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law. Members may also exclude from patentability plants and animals other than microorganisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, members must provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof.

Law No. 82 provides a TRIPs-required sui generis system of plant variety registration.[14] Plant varieties are protected regardless of their origin (local and/or international) and whether they were developed by biological or non-biological means.[15] This protection applies once they have been registered in the plant varieties register that gives protection rights. To qualify for protection the variety must be new; show distinguishable characteristics, uniformity, and stability; and possess its own individual name. The propagative material must not have been sold or publicly released or otherwise used with the consent of its original and genuine owner in Egypt for more than one year before the date of application for registration. Varieties of field and horticultural crops are considered new if they were released and traded outside Egypt for no more than four and six years, respectively, from the date of applying for registration.[16] Those who obtain a certificate of breeders' rights shall have the authority to use the protected variety and to conduct all possible commercial activities with the variety. This includes licensing other parties in writing to use the variety. However, the production, multiplication, release, sale, marketing, and the import and/or export of the multiplication material would still require a written approval by the breeder of the protected variety.[17]

Article 195 provides for farmers', researchers', and breeders' rights by stipulating that the protection of the individual property rights of a plant variety does not prohibit the following activities from being conducted by other parties:

- Production of the basic or interim materials or the final products that are being manufactured or extracted from the crop directly or indirectly as long as this production takes place for the purpose of personal consumption and not trade.
- Non-commercial activities performed on a personal and private level and without any commercial purpose.
- Activities related to scientific research.
- Activities of breeding, crossing, and selecting aimed at producing new varieties different than the protected variety (i.e., breeders' privilege).
- Activities related to educational and training issues.

Article 195 in the official copy of the law in Arabic is limited to the above. However, one unofficial English translation that is being circulated expands on the same article.

The Minister of Agriculture has the right to limit the breeders' rights in three specific cases.[18]

13 *See generally* chapter 4 of this volume.

14 Law No. 82, arts. 189-206.

15 *Id.* at art. 189.

16 *Id.* at art. 193.

17 *Id.* at art. 194.

18 *Id.* at art. 199.

The first instance is when the protected plant variety proves to be hazardous in any way to the natural environment, the safety of biological diversity in Egypt, the agricultural system, or the lives or health of human beings or animals.

A second, and related, situation where breeders' rights are constrained is when the protected plant variety proves to have a hazardous impact of a social or economic nature or is a hindrance to the local agricultural activities and practices. These instances are similar to the concerns expressed in association with biosafety.

The third basis for limiting breeder's rights is when the protected plant variety could be used in a way that does not conform, or runs counter to, the values, beliefs, and basic principles of Egyptian society.

One important provision of Law No. 82 is article 200, which obliges the applicant to reveal the plant genetic resource relied on in developing the new plant variety through legitimate means according to Egyptian laws. The applicant must also provide sufficient proof that the country of origin of these resources permits the applicant to conduct the activities that led to the development of the variety. This obligation also includes disclosing genetic information and the related experiences and traditional knowledge of the local communities that were of use to the breeder's efforts in developing the new plant variety. Breeders who utilise Egyptian genetic resources in their programs are obliged to obtain Egyptian permission, and to recognize and declare the Egyptian origin of the variety as well as any relevant traditional or community knowledge and share the benefits with its owner through the relevant administrative authority. The law does not define these authorities or define mechanisms for such benefit sharing. It is likely that the executive directive regulations for the law will tackle these issues. This article directly conflicts with the UPOV Convention but partly responds to article 15 of the CBD. Article 196 authorizes the Minister of Agriculture on the recommendation of a committee constituted by the Prime Minister to give the rights of use of a protected plant variety without prior approval by the breeder in specified cases for a specified period where this proves in the public interest, or where the holder or the right abstains from making the variety available, refuses to provide a licence offered "under reasonable conditions" or exercises anti-competitive practices. In such cases, the holder of the right will be "fairly compensated" for this compulsory licensing with appropriate compensation. The Minister of Agriculture is charged with issuing a decree for the establishment of a "Plant Varieties Protection Committee" (and a register for protected plant varieties). The committee shall be responsible for deciding upon applications made to obtain variety protection according to the rules and regulations as set in the decree of establishment itself.[19] In summary, Law No. 82 does not allow for the patenting of plant varieties but provides a sui generis system of variety registration. The law does not allow the patenting of plants and animals but allows the patenting of microorganisms and of biological processes for production of plants and animals. Patents are also not granted for organs, tissues, cells, DNA, and genes. The law allows the granting of patents for processes that involve biological plant or animal material or traditional herbal or medicinal or agricultural knowledge or cultural or environmental heritage, provided these are obtained by legitimate means according to Egyptian Laws. If the application involves a microorganism, a living culture must be deposited with the specified depository. The current law is not totally in conformity with UPOV Convention and the matter is under discussion between the European Union (EU) and the Ministry of Foreign Trade. Possible conflict with the TRIPs is being discussed as part of the review process for article 27.3(b). Law No. 82 does not allow protection to farmers' varieties, landraces, or crop wild relatives, since these do not qualify as "new" as defined in article 192. However, article 200 stipulates that a special register shall be established within the Ministry of Agriculture for Egyptian genetic resources that are landraces or wild relatives.

Law No. 82 seems to be a diluted form of the UPOV 1991 Convention and does not directly touch on access and benefit sharing. When the Economic Partnership Agreement between Egypt and the EU was to be implemented, the EU referred Law No. 82 to UPOV, which found it to deviate sufficiently from the Convention (1991 amendment) in several respects, most notably some elements of farmers' and researchers' rights (article 195), and all of article 200. The EU requested explanations (possibly amendments) before activating the agricultural section (which is linked to the important textile section) of the Agreement. This issue is currently under discussion between the EU and Egypt, with no clear way forward in sight. The Agreement builds on the rules of the WTO, taking account of the results of the Doha Development Agenda.

While Law No. 82 was drafted by the Ministry of Higher Education and (State for) Scientific Research through the Academy of Scientific Research and Technology (ASRT), in consultation with all concerned ministries, the agreement (as well as the TRIPs) negotia-

19 *Id.* at art. 190.

tions are in the hands of the Ministry of Foreign Trade. The ASRT is of the opinion that Egypt should not join the UPOV in its 1991 form, which is the only form available for new members (the last chance for developing countries to join under the less restrictive 1978 amendment expired on December 31, 1995) and that the matter should be addressed through Law No. 82. In fact, article 34 of the UPOV 1991 Convention requires that members must have national legislation in place that conforms to the UPOV level of protection for plant varieties before joining.

The 1991 amendment considerably reduced breeders' exemptions and farmers' privileges. The ASRT also has expressed concern with the definition of "essentially driven" and "degree of similarity" of the UPOV. Part of the concern probably stems from limited technical, administrative, and legal capacity in Egypt, and the fact that the vast majority of agricultural land in Egypt is in the hands of small farmers with limited land holdings (very few acres or even fractions of an acre) who can ill afford an expensive production system. It is those farmers who provide the bulk of agricultural production in Egypt. The Executive Directive Regulations for Law No. 82, still being drafted, have stalled partly on account of this position, but also due to debate on the important implications of TRIPs on health and pharmaceuticals, genetically modified organisms, traditional knowledge, cultural heritage, and obligations under article 15 of the CBD. Law No. 82 also does not recognize that a foreign patent could be recognized a priori: application for an Egyptian patent is necessary.

Law 82 basically mirrors the TRIPs agreement with respect to patents, except for the sui generis system available for certain life forms and some possibly significant difference in language. For example, while article 27.2 of the TRIPs agreement provides that members may exclude from patentability certain items, Law No. 82 prohibits the granting of patents on the same items. Again, Law No. 82 allows a patent to be granted for modified patented products and processes with certain conditions[20] and further elaborates on the rights of holders of related patents,[21] which the TRIPs Agreement does not directly address. Law No. 82 also more extensively spells out cases that a process or product is not new and hence is not patentable[22] and cases which are not regarded as infringement on the patent.[23] Many of these elements will be more clearly defined as cases are brought in a court of law.

While Law No. 82 allows the patenting of microorganisms (without defining if these include viruses and other "non-cellular" microorganisms and other biological entities) and "biological and microbiological processes for production of plants and animals," it does not allow the patenting of plants, animals, organs, tissues, living cells, "natural biological material," nucleic acids, and genes, as well as methods for diagnosis, treatment, and surgery for humans and animals. Patents are not allowed if they conflict with "morals of the society" which will probably include ethical and religious norms. Based on past experience, patents dealing with modification of humans will most probably be rejected. Apart from the above, the law does not directly exclude biotechnological inventions.

Despite the complicated debate, Egypt signed the WIPO Patent Cooperation Treaty (PCT) in November 2002, which is currently being reformed. The dilemma of choosing between UPOV 1991 and a patent system for life forms has been extremely challenging for decisionmakers in Egypt, and no single authority will be able to settle all the complicated questions satisfactorily. The fact that extensive collection of genetic diversity in Egypt has already taken place over the past 30-40 years along with delays in establishing reliable national gene banks adds to the problems facing decisionmakers. Finally, there are ethical and spiritual questions raised by the public on the questions of patentability of lifeforms of all kinds and on the acceptability of the definition of "invention" to lifeforms, which have yet to be addressed. This may even be amplified by the general impression that Egypt is unlikely to gain from restrictive variety legislation (RVL) as an "inventor" in the near future but will be a market for others with serious negative socioeconomic impacts on smaller farmers and on the equitable distribution of wealth.

These facts bring to focus other modalities for the sui generis system sought. Egypt strongly supported the position of the African group on the issue during the TRIPs General Council negotiations in Seattle in August 1999 and again in September 2000. It is also examining various modalities for the sui generis system, including the Indian Protection of Plant Varieties and Farmer` Rights of 2000 and the Philippine Executive Order No. 247 of 1995. Egypt also participated in drafting the African Access and Benefit Sharing Model Law (AABSML) as a comprehensive document covering access to genetic resources and traditional knowledge as well as the rights of local communities, farmers' and breeders' rights.

20 *Id.* at art. 1.

21 *Id.* at arts. 23.3(6), 29.

22 *Id.* at art. 3.

23 *Id.* at art. 10.

Egypt is a member of the WTO and is to observe the provisions of the TRIPs agreement by 2005. During the Seattle inter-ministerial conference of December 1999, Egypt participated in formulation of and supported the African position on the need to review article 27.3(b) of the TRIPs agreement to make it compatible with the obligations under the CBD. Continuing into the Doha Round, Egypt supported the view that the article and not its implementation are to be reviewed. Egypt noted that foreign direct investment and technology transfer were not positively influenced by the TRIPs agreement, and that almost two-thirds of all patented products are never produced since they simply seek to keep rival enterprises away.

There are currently no laws, regulations, or policies specifically addressing the rights of local communities to control access, ownership, utilisation and benefit sharing with respect to biodiversity generally in Egypt. In protected areas, however, participation of local communities in managing the areas and sharing benefits of activities, including eco-tourism, are recognized by Law No. 102 of 1983, as discussed above, governing these areas. Farmers' rights and privileges are recognized fully in traditional practice and also in Law No. 82 on intellectual property protection (articles 195-200).

3.2.1 The Constitution

The current Constitution of the Arab Republic of Egypt was formally adopted in 1971,[24] and article 189 was amended in 1980.[25] The main purpose of drafting a new Constitution in 1971 was to allow for greater freedom of expression and to allow for transition to a free economy. None of the 211 articles of the Constitution refer directly or indirectly to genetic resources or national heritage. Article 12, however, calls for "caring" for the "historical heritage of the People" and "scientific facts." This was relied upon by courts in a historical ruling banning the building of a road and a development project through the ancient pharoic Giza mausoleum in 1978 and the commercialised development of a less ancient (about 1,100 AD) historical site in Cairo in 2002.[26] Article 49 relates to the right of citizens to "scientific research" and to "creative literary, artistic and cultural innovation." While this may not initially appear to relatate to genetic resources, a colourable argument may be made that genetic diversity could be judged as part of Egypt's "historical heritage" since it is the result of interaction between the total environment and a people who continuously occupied that same land over millennia. The closest the Constitution gets to genetic resources is article 123, which specifies the "rules and procedures for granting concessions on exploitation of natural resources." The interpretation of such articles as reflected on genetic resources has not yet been tested in the courts.

Accordingly, there is no specific but only implied constitutional reference to ownership, access to, utilization of, and benefit sharing regarding genetic resources. The applicability of the possibly relevant articles has not been tested at the Constitutional Court. The State Council, which reviews all laws and decrees for conformity with the Constitution and with other laws before these are gazetted, has not made any reservations on several laws and decrees which touch upon issues of genetic resources access and benefit sharing, including the ratification of the CBD. This does not necessarily mean that such instruments are constitutional, but that in the opinion of the State Council, no serious reservations needed to be raised. It will remain to be seen if the State Council courts will find it necessary to refer any of these instruments to the Constitutional Court if and when a case is brought to its attention by a party as a challenge to the application of one such instrument.

3.3 New Initiatives

The only draft on access and benefit sharing being considered in Egypt at this time is the African Union Model Law on access and benefit sharing. The ASRT is preparing a bill that criminalizes collaboration in collections taking place without an explicit permit granted by the ASRT. This will be part of a comprehensive bill on access and benefit sharing along the lines of the African Union Model Law, which the ASRT is contemplating, in consultation with the EEAA and the National Specialized Council on Education, Scientific Research and Technology (NSCESRT), but has yet to start drafting. The EEAA is also preparing for active participation in the forthcoming international negotiations for an instrument regulating access and benefit sharing within the CBD, as approved by the UN General Assembly in November 2002 and is interacting with the ASRT to ascertain compliance with the CBD requirement for an efficient permitting system. Both the CBD's 2002 Bonn Guidelines on Access to Genetic Resources and Fair and

[24] It was approved upon approval by a public referendum, conducted on Sept.11, 1971.

[25] Approved through a public referendum, conducted on May 22, 1980.

[26] Both cases were heard by the State Council Courts and challenged government decisions. In both cases, the ruling was based on the constitutional right of private citizens to defend the "historical heritage of the people" and access to "scientific facts," as stipulated by article 12. The rulings made reference to the collective ownership of the "national heritage" by all citizens and were based on several laws limiting government actions with respect to the same, including Law No. 520 of 1940, Law No. 124 of 1958, and Law No. 81 of 1976.

Equitable Sharing of the Benefits Arising out of their Utilisation and the 1993 FAO International Code of Conduct for Plant Germplasm Collecting and Transfer are also taken into consideration in the ASRT effort.

The EEAA is preparing for the possible negotiations of implementation of article 15 of the CBD. The Ministry of Higher Education and (State for) Scientific Research is drafting the executive directive regulations for Law No. 82, in consultation with the Ministries of Health, Industry, Agriculture, Culture, Environment, Foreign Trade, Foreign Affairs and Justice. As of June 2003, though, the regulations have yet to be drafted. The Ministry of Foreign Affairs is considering the ratification of the ITPGRFA and the Cartagena Protocol on Biosafety and urging the drafting of national legislation along the lines of the African Access and Benefit Sharing Model Law (AABSML) and the African Union Model Law on Biosafety. Finally, the Ministry of Foreign Trade is looking into possible conflicts between TRIPs, UPOV, and Law No. 82.

There are a number of driving forces behind these efforts. Egypt is seeking to implement its national obligations, the CBD and the WTO. The EU-Egypt Economic Partnership Agreement (EPA) is compelling a review of Egyptian legislation, especially with respect to agriculture. Public concern about the future of the Egyptian pharmaceutical industry and about Egyptian agriculture falling at the mercy of foreign economic concerns who possess competitive advantages which could negatively affect the cost of living, the availability of medical treatment, and work opportunities—as well as a general anti-globalisation sentiment—affect the public dialogue. Similarly, there is a popular sentiment that Egypt is a target for bio-prospecting and bio-piracy by foreign interests, which has been further fuelled by rumours of the patenting of age-old genetic resources and traditional processes. The government is also concerned with establishing an export market for Egyptian products to address the chronic balance of payment deficit. Finally, biologists have indicated that they now face greater difficulty obtaining genetic resources for research from foreign gene banks, including the CGIAR-sponsored ones, under various reasons, including anti-terrorist measures.

4. CONCLUSIONS

The main drawback of the current system is the lack of national legislation regulating and enforcing access and benefit sharing. The main reason for the lack of a sui generis system is perhaps the lack of a defined lead agency. It is hoped that the ASRT's current effort will produce the required legislation and would criminalize unauthorized collection. It is also hoped that the NPPGR will be transformed into a national program on genetic resources, as proposed in the NSAPBC and NEAP. The National Specialized Council on Education, Scientific Research and Technology (NSCESRT), which is attached to the president's office, has recently recommended instituting a national program on genetic resources to be funded only nationally, in the interest of national security. The program proposed is to also regulate access and benefit sharing along the lines of the African Union Model Law.

Perhaps the major strength in Egypt with respect to access to genetic resources is availability of an extensive number of specialists in various technical fields, some of whom very highly trained, a huge body of relevant research on various aspects of Egyptian genetic resources accumulated over the past century, and availability of a small elite who fully comprehend component issues as well as the total picture. At the same time, the major weaknesses are the lack of an effective integrated system to mobilize expertise into a mission, scarcity of funds and the tendency towards scattered individual "islands" of expertise rather than concerted organized effort. It is difficult to determine relative priorities of the government in the current context of access and benefit sharing discussions in the absence of an integrated focused action-oriented policy. Economic development, combating unemployment, rectifying a chronic balance of payment deficit, and maintaining social justice and equity under conditions of paucity of funding and investment are overriding concerns. NGOs in Egypt are of rather limited impact. Again, except for concerns of a very local nature, local communities are rarely directly involved in the debate. The exceptions are local communities within protected areas who are directly involved in management and planning activities within the area.

CHAPTER 9
ACCESS TO GENETIC RESOURCES IN ETHIOPIA

*Worku Damena Yifru**

1. BACKGROUND

Ethiopia's biological resources base is said to be the result of its wide-ranging agro-climatic conditions. The rugged highlands created and maintained the evolution of different plant/crop species under isolated primitive agricultural settings. With its enormous endemism and diversity, Ethiopia is identified as one of the major Vavilovian centers[1] of origin and diversity for a number of domesticated plants, and their wild and weedy relatives. Crop plants such as coffee, teff, *noog*, and *anchote* are known to have their origin in Ethiopia. Local cultivars (farmers' varieties) of several major crops—namely wheat, barely, sorghum, field pea, and fava bean, which are relatives of some of the world's important crops—are claimed to be widely found in Ethiopia.

Bioprospecting Initiatives

In recent times, there have been a couple of attempts to conduct bioprospecting missions in Ethiopia by Centre for Legumes in Mediterranean Agriculture (CLIMA), an Australian agency that came through the International Centre for Agricultural Research in Dryland Areas (ICARDA). CLIMA is a research alliance, which studies the role of grain and annual pasture legumes in sustainable agriculture in the Mediterranean climate of southwestern Western Australia. The first mission to Ethiopia was successful in collecting materials, whereas the second one was suspended. The Institute of Biodiversity Conservation and Research (IBCR), as the national agency for overseeing bio-prospecting activities, is of the view that the first mission was governed under the relevant provisions of the Convention on Biological Diversity (CBD) and the International Undertaking on Plant Genetic Resources for Food and Agriculture. This means that the first mission, which resulted in the collection of some materials (genetic resources of legumes) and their repatriation, was conducted in line with the general provisions of access to genetic resources of the CBD (to which Ethiopia is a party). Thus, consent was provided and some benefit-sharing arrangements, in the form of participation of Ethiopian counterparts in the research activities, were made. Nevertheless, IBCR later preferred to suspend the second mission until the domestic access legislation, which is under development, is officially put in place.

The Plant Genetic Resources Centre of Ethiopia (PGRC), the gene bank that is now incorporated into the IBCR, was established in 1976 to collect, evaluate, conserve, document, and promote utilisation of crop plant germplasm. The centre holds about 60,000 accessions of more than 100 crop and other plant species that it either collected over the years, or obtained through donation or repatriation. A great portion of these accessions has already been evaluated for various characteristics at appropriate agro-ecological sites. Ethiopia's draft biodiversity conservation and development strategy and action plan admit that despite the existence of a quarter century-old gene bank, the present knowledge of the country's plant biological diversity is far from satisfactory. Genetic erosion continues to be a serious problem. The scope and depth of genetic resources development and utilisation is still far from adequate. Taking into account this low level of development and conservation activities, the draft strategy and action plan aim to design and implement comprehensive exploration, inventory, collection, and conservation programmes accompanied with the enactment of appropriate regulations that provide for access to genetic resources, incentives, and benefit-sharing schemes.

* ***Legal Affairs Officer, Secretariat of the Convention on Biological Diversity.***

[1] Nikolai Vavilov (1887-1943) was a Soviet plant geneticist. Through his extensive botanical expeditions, he identified 12 different geographical areas of the world, which he believed to be significant plant genetic origin and represent enormous diversity.

Assessment of Country's Potential Value as a Centre for Bioprospecting

Apparently, no assessment of Ethiopia's potential for bioprospecting has been done. However, the Ethiopian Flora Project which was launched in 1980 and recently phased out has made a botanical assessment of the Ethiopian flora and strengthened the herbarium by increasing the number of specimen collected in the National Herbarium of Ethiopia from 17,000 to 70,000.

2. INSTITUTIONS

2.1 Lead Agencies

IBCR is the lead agency for the conservation of biological resources and the regulation of access to genetic resources in Ethiopia. IBCR has the authority to grant permission for the collection of biological resources.

Without prejudice to the ultimate authority of IBCR to grant permission for the collection of biological resources, the Ethiopian Wildlife Conservation Organization (EWCO) also has a stake and plays a leading role in providing scientific and technical advise on the development, use, and conservation of biological resources in protected areas, including access to those resources. EWCO is a government agency responsible for implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Therefore, it takes inventories of wildlife, determines quotas for restricted hunting or collection, and controls, in cooperation with the Customs Authority, the movement of specimen at different ports.

The Environmental Protection Authority (EPA) also plays an important role in advising the IBCR and EWCO on environmental policy matters in light of the broad range of national as well as international interests involved. It purports to play an integrating role among the various sectoral policies and interests. For instance, EWCO is involved in the conservation and utilisation of specific species of wildlife perspective within the boundaries of protected areas. IBCR tends to promote the conservation and sustainable utilisation of biological diversity of the country through research and ex situ conservation facilities. As far as access is concerned, although EWCO primarily implements CITES, it is required to adopt in its programme of work the conditions of access promoted by IBCR in line with the provisions of the CBD. EPA looks at such approaches for harmonization between and among relevant institutions. EPA represents the country in the meetings of the Conference of the Parties to the Convention on Biological Biodiversity, whereas IBCR participates in the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) of the CBD. EWCO is the technical arm of the government in the CITES process.

As indicated earlier, IBCR is the lead agency in matters relating to the management of biological resources. The former gene bank known as the Plant Genetic Resources Centre (PGRC) has been incorporated into the Institute. The centre's mandate has been expanded to address not only plant genetic resources but also animal and microbial genetic resources. IBCR is not involved in actual operational activities for biological resources management, although it does establish the management methods based on study and research and forwards these to regional offices dealing with natural resources and agriculture for implementation. IBCR carries out these functions in close collaboration with two federal agencies, namely the Ministry of Agriculture and the EPA, which also carry out their responsibilities in integrating biological resources with agricultural and environmental policies, respectively.

The Institute of Biodiversity Conservation and Research Establishment Proclamation No. 120 of 1998 specifically empowers the institute "to give permit[s] to those who need to collect, dispatch, import or export any biological specimen/sample."[2] The proclamation establishes the general permit requirement for accessing biological materials. According to article 12, "any person that needs to collect, dispatch, import or export any biological specimen/sample shall secure permission from the Institute." Furthermore, any person who collects, dispatches, imports, or exports any biological specimen or sample without a permit from the institute will be punished. The penalties include imprisonment for five years to 10 years and a fine of 15,000 to 20,000 Ethiopian birr, or approximately US$1,800-2,400.[3]

To obtain a permit, a collector must submit an application in writing to the institute, describing the type of genetic material that the collector intends to collect; the purpose for which access is requested; the local organization or academic institution with which the collection is planned to be conducted, if applicable; and any other information that may be required by the institute. The institute is currently using a Material Transfer Agreement (MTA) mainly designed in line with the FAO Code of Conduct for Collectors and incorporates the basic principles of prior informed consent and bene-

[2] Art. 6(20).

[3] Art. 13.

fit sharing stipulated in the CBD. The parties to a MTA are IBCR and the foreign institution applying for bioprospecting and collection of materials.

MTAs are being signed and genetic material is being taken abroad by various national public research and academic institutions (such as EARO and universities), and some international research institutions (such as ILRI) for research purposes. The MTA is signed between IBCR and the institutions mentioned above. It appears that no MTA has been signed with private individuals for private economic purposes. This is partly due to a lack of detailed guidelines and experiences to deal with bioprospecting by private persons for private economic ends and partly due to a lack of expressed interest on the part of private individuals to negotiate benefit-sharing issues and terms before they arrive at the desired research results.

There are model MTAs that IBCR uses, with some modification, for requests of a particular genetic material. There are basically three types of model material transfer agreements: those with public research and academic institutions that want to take or send abroad genetic materials for their institutional research purposes; those with post-graduate students taking genetic material abroad for their post-graduate research purposes; and those for the introduction of material into Ethiopia. The procedure for signing an MTA is described in detail in an IBCR brochure.

This is a transitional arrangement until the law on access to genetic resources, referred to in section 3.3 below, and the accompanying detailed regulations are adopted. Addis Ababa University also has started using administrative guidelines and a standard MTA. The university (coordinated by the Research and Publication Officer) developed the MTA with the assistance of legal experts from the EPA, and the institute endorsed the MTA, in order to continue with its exchange of genetic materials for research purposes. Again this MTA and guidelines, though crafted in line with the guidelines or documents used by the institute, are still for use for the interim period.

2.2 International Institutions

Over the past few years, the World Bank has been working with IBCR to formulate a strategy and action plan on the conservation and sustainable utilisation of medicinal plants. IBCR launched a project on the "Conservation and Sustainable Use of Medicinal Plants" with the assistance of the World Bank. One of the objectives of this project was to develop guidelines on intellectual property rights for medicinal plants. With regards to intellectual property guidelines pertaining to medicinal plants, the Science and Technology Commission has taken the initiative, although it is still early, in the drafting process.

IBCR also has a long-standing, close relationship with the International Plant Genetic Resources Institute (IPGRI), one of 16 centres of the Consultative Group on Agricultural Research (CGIAR). CGIAR and its centres play a vital role in providing information, documents, and scientific and technical guidance relevant to the conservation and use of plant genetic resources. IPGRI supports IBCR in human resources development through convening workshops and other training programmes. It has also facilitated the establishment of links with relevant international institutions, in particular with other CGIAR centres.

IBCR is working intimately with the Traditional Medicinal Practitioners Association, a non-governmental organization, which aims at conserving medicinal plants and protecting the rights of traditional healers to their knowledge and practices that its members feel complement modern medicine. In several different workshops, a number of relevant issues have been deliberated, but no clear results have emerged as of yet. The association has a liaison office at IBCR. There is also an attempt to get the knowledge of the traditional practitioners registered with the IBCR and the Ministry of Health, but there is still a long way to go in terms of building mutual trust and confidence.

Institutions such as U.S. Agency for International Development (USAID) and the United Nations (with the exception of specialized agencies or programmes such as UNEP) do not play a visible role in this area. Nevertheless, it is always possible that the activities, budget, and programmes or measures of these organisations might in one way or the other influence the policy and programmes of Ethiopia with regards to access to, control or utilisation of, and benefit sharing with respect to genetic resources.

2.3 NGOs and Community Involvement

There are some NGOs involved in the policy debate concerning access to genetic resources and benefit sharing. Although they do not have offices in Ethiopia, the GAIA Foundation of the United Kingdom, Third World Network (TWN) of Malaysia, and Genetic Resources Action International (GRAIN) of Spain, all international NGOs, have been working closely with the EPA of Ethiopia and IBCR, and were involved in the relevant

discussions. Action Aid Ethiopia, a UK-based NGO, is involved in this issue through its International Food Rights Campaign. The main focus of Action Aid is on the implications of intellectual property rights on food security. In general, these organizations are advocating what the CBD provides for relating to access to genetic resources and benefit sharing and oppose patenting of any life forms.

There are not as many local NGOs involved in debating the policy issues accompanying access to genetic resources. The Institute of Sustainable Development (ISD) is prominent in this area. It is, in fact, the gateway for the collaborative arrangements that international NGOs such as GAIA, TWN, and GRAIN have with the relevant governmental organisations. Forum for the Environment is also active in creating awareness regarding the value of genetic resources and documenting good traditional practices in agro-biodiversity. The Ethiopian Wildlife and Natural History Society (EWNHS) is also involved in the discussions to some extent.

There has been limited involvement of local communities in the policy debate on access. Communities do not really appreciate the need for regulation of access to genetic resources. The system that they are used to historically is based on free exchange and open access to genetic materials. There were some attempts to make consultations with farmers in areas covered by the GEF project, which is further discussed in section 4 below, and with communities inhabiting the vicinity of some protected areas. Farmers and grass-root communities are always amused to learn about cases where collectors of their local varieties are claiming to have exclusive rights to these varieties because they have improved them to some extent.

In order to increase understanding of the issue by communities, some practical cases have been used. For example, in one case a plant breeder right was obtained over one of the varieties of teff, an important and endemic cereal crop of Ethiopia that is the major staple food for Ethiopians. A certain American collected and exported one of the varieties of teff from Wollo, an administrative region in Northeast Ethiopia, and claiming to have made improvements on it, submitted an application for plant variety protection to the U.S. Department of Agriculture in November 1988 in the name of "Teff Company." The USDA granted a certificate in 1996 which entitles the company to exclude others, presumably including farmers from Wollo area, from "selling or producing it or exploiting it for propagation or making it for any of the above purposes or using it in producing a hybrid or different variety … to the extent provided by the plant variety protection act" (extracted from the certificate). This and similar stories have served as illustrations to get the ordinary person involved in the policy debate in a more meaningful manner.

3. LAWS AND POLICIES

3.1 Specific Access and Benefit-Sharing Legislation and Policies

The National Policy on Biodiversity Conservation and Research (1998) states that the policy was formulated or adopted "based on the rationale that the conservation of biodiversity is one of the conditions of the overall socio-economic development and sustainable environmental management goals."[4] In this case, there is no specific legal instrument other than the Proclamation establishing the IBCR. This policy (and every policy in Ethiopia for that matter) is non-binding, at least with respect to individual citizens. The policy does represent perhaps the strongest guidance that Ethiopia has on this respect, but not the only guidance. The Environmental Policy and the Conservation Strategy of Ethiopia both have more or less the same understanding regarding the value of biological diversity. Usually, the policy rationale underlying regulatory regimes can be found in the preamble to the specific legal instrument.

In the Preamble of Proclamation 120 of 1998 (establishing IBCR), the immense contribution of biological resources to the development of the country's agriculture, industry, and health sectors is expressed to be one of the rationales for establishing the IBCR.

In its preamble, the draft Proclamation to "Regulate Access to Genetic Resources and Associated Traditional Knowledge" states the reasons underlying the need to regulate access to genetic resources. These include: recognition of the contribution of local communities to the conservation, development, and sustainable use of genetic resources; the need to protect and encourage customary uses of genetic resources; the need to bring about economic and social development of communities by promoting their participation in making decisions regarding matters that affect the basis of their livelihoods; and the sharing with them of benefits arising from the utilisation of genetic resources.[5]

Poverty reduction is of top priority in Ethiopia. This is clearly underscored by the government in its economic policy as well as its development strategy, namely

[4] National Policy on Biodiversity Conservation and Research (1998), pmbl., para. 1.3.

[5] Proclamation (Draft) to Regulate Access to Genetic Resources and Associated Traditional Knowledge, pmbl.

Agricultural Development-Led Industrialization (ADLI). The government has, in fact, prepared a Poverty Reduction Strategy Programme (PRSP) primarily for submission to the major international financial institutions as well as bilateral donors.

Like many other specific sectors, the policy, the evolving strategy, action plan, programme, and the regulations in the area of biological diversity also advance poverty reduction as their priority. It is also believed that the protection of the biological resources base of the country by way of regulating access to genetic resources, among other things, serves not only environmental values, but also social and economic interests. The country needs to maximize its revenue; but it is believed that this should not be pursued at the expense of adversely affecting the resource base and the foundation of the livelihood of the population depending on such resources. Conservation of biological diversity is seen as one of the ways and means to reduce poverty in the short-term, and eradicate it in the long-term. The draft Biodiversity Conservation and Development Strategy and Action Plan that IBCR is developing, identifies capacity building in scientific personnel, research facilities, information, and community participation as priorities that should serve the overall and top priority of poverty reduction. The Ministry of Economic Development and Cooperation is responsible for identifying, elaborating, and coordinating national priorities.

Relative Priority

In accordance with what has transpired in the discussions regarding genetic resources so far and what has been stipulated in the evolving biodiversity conservation and research strategy, action plan, and programme, the first priority is to enhance conservation, followed by community empowerment, development, and equity. Commercialisation of genetic resources, or deriving direct monetary benefits that might accrue from the use of genetic resources at a commercial scale, is the lowest priority.

Conservation is believed to be important for crop improvement and development. IBCR reported that several national crop improvement programmes have shown increasing interest in utilising local germplasm collections since the last decade. Every year about 2,000 germplasm accessions were being distributed to research, academic, and development institutions. Since the establishment of the institute, over 30,000 accessions of about 25 crop species have been distributed. Improved varieties of various crop species containing local genes, in particular the genes of those species originating in the country and with high genetic diversity such as teff, noog, sorghum, durum wheat, and barley are increasingly preferred to other varieties and released for various agro-ecological zones of the country.

Centralized or Decentralized Authority

To the extent that the informed consent of the concerned local communities is required prior to any decision by the competent authority on access applications, according to the draft access proclamation, the system is decentralized. But the fact that land is a public property, which the state can allocate or reallocate to its subjects at any time it deems appropriate, might provide the government more latitude and allow it to exercise ultimate authority with regard to determining access. In this sense, and so long as the competent authority, according to the draft, will have the final say, the system could be seen as centralizing the exercise of government authority.

The Nature of Benefit-Sharing Discussions

Benefit sharing, according to discussions in the Ethiopian context, is more of a question of equity. The argument is that modern knowledge concerning agricultural plant improvement and development has its roots in the practices and knowledge of traditional communities who identified and domesticated the biological resources millennia ago for use as the source of food, clothing, medicine, power, and energy. Benefit sharing is thus the acknowledgment of this decisive contribution, and rewarding it. It is not necessarily a demand for sharing monetary benefits arising from the use of genetic resources for commercial purposes.

As mentioned in section 3.3 below, the draft access proclamation identifies different types of benefits that need to be shared as a result of access to genetic resources. At the institutional level, the focus is on obtaining capacity-building opportunities in return for the genetic resources accessed. These opportunities range from training of personnel, including members of local communities, as appropriate, in fields and techniques relevant to the conservation and sustainable use of biological diversity; to access to relevant technologies, equipment, and similar institutional infrastructure. The benefits that need to go to the concerned communities take the form of projects or programmes designed to improve the social and economic conditions at the local level. As far as monetary benefits are concerned, the intention is to direct the larger share of these benefits to communities.

To a large extent, benefit-sharing parameters are supposed to be defined by the government in consulta-

tion with the concerned communities and inputs from NGOs.

3.1.1 Laws, Regulations, and Policies Specifically Governing Access to Genetic Resources and Benefit Sharing

Ethiopia does not have a law intended for the specific purpose of implementing the CBD. However, it did adopt a National Policy on Biodiversity Conservation and Research in 1998. In its preamble, the policy recognizes that the lack of clear guidelines, as well as lack of awareness of the value of and access to genetic resources, has resulted in the unregulated and uncoordinated import and export or exchange of materials. One of the objectives of the policy is to assert national sovereignty over genetic resources. It also aims to promote regional and international cooperation in the development, conservation, and sustainable use of biological diversity.

The National Policy on Biodiversity Conservation and Research also puts, as one of its objectives, the enhancement of local communities' participation in biological diversity conservation, development, and utilisation, as well as the sharing of benefits arising from the use of their knowledge and genetic materials. On the basis of this objective, one of the policy directives requires federal and regional entities (the units of the federation are known as "regions") to distribute revenues accrued from the use of biological diversity to communities who participated in the conservation, development, and management of the resources. The lead agency in the implementation of this policy is the IBCR. The institute is currently developing, on the basis of the National Policy, a draft strategy and action plan, as well as a program for biodiversity conservation and research.[6]

The 1997 Environmental Policy has a section on "genetic, species and ecosystem biodiversity." One of the policy elements included in that section refers to ensuring the regulation of the importation, export, and exchange of genetic resources with a view to safeguarding communities and national interests, and fulfilling international obligations. As far as benefit sharing is concerned, the Environmental Policy establishes some broad principles. Under the same section mentioned above, the government commits itself to ensure that park, forest, and wildlife conservation and management programmes, which purport to conserve biological diversity on behalf of the country, allow for a major part of any resulting economic benefits to be channeled to local communities affected by such programmes. This was also reflected in the draft Wildlife Policy that the Ethiopian Wildlife Conservation Organization (EWCO) developed and submitted to the government for approval a few years ago.

The only existing biological resources-related law that broadly addresses issues relating to access to, control, or utilisation of genetic resources is the Forestry Conservation, Development and Utilization Proclamation No. 94 of 1994. Unlike its predecessors, this proclamation aims at ensuring the participation of local communities in forest conservation and lays down some general rules that demand the implementation of benefit-sharing schemes. Under the proclamation, peasants are entitled to be consulted, give their consent, and be assured of their benefits before any eviction measure that is likely to happen as a result of the designation and demarcation of certain forest land as state forest or protected forest is implemented.[7] The Ministry of Agriculture or the Region, as appropriate, is required, under article 5(2)(e), to facilitate conditions that ensure the well-being of the inhabitants of the forest area in such a way that they would benefit from the development and hence do not obstruct or hinder forest development. There is also a possibility, in accordance with article 10 of the proclamation, that local people in the vicinity may be allowed to harvest forest products, grass, and fruit and keep beehives in protected forests.

Section 3.3 of the 1997 Environmental Policy clearly distinguishes between genetic resources and other biological resources, such as species and ecosystem biodiversity. However, it might be difficult to distinguish which of the policy elements apply exclusively to genetic resources and to the other biological resources.

For example, one of the powers and duties of IBCR is to issue permits for accessing a "biological specimen/sample."[8] Whether the terms "biological specimen" and "sample" are meant to refer to genetic material per se or whether they also include any part or derivative of a biological resource or an organism is not clear. However, the draft proclamation to regulate access to genetic resources and associated traditional knowledge seems to address genetic resources exclusively. The scope of the draft proclamation excludes access to biological resources intended for specific uses such as for food or feed. Arguably, the draft proclamation would also exclude biological resources intended for import or export for the purpose of processing.

While some crops (such as teff and coffee) have priority in research and ex situ collection depending on

[6] For more information on the mandates of the Institute, see sec. 2.1 above.

[7] Art. 4(5).

[8] Institute of Biodiversity Conservation and Research Establishment Proclamation, Proclamation No. 120 of 1998.

their economic value, such priority does not necessarily reflect a special treatment for the purpose of access to genetic resources. The draft access proclamation, however, sets some criteria for the competent authority to use in determining whether or not to deny access to genetic resources. These criteria are: (i) endangered taxa, (ii) rarity, (iii) adverse effects on human health or cultural values of local communities, (iv) environmental impacts which are undesirable, (v) danger of loss of ecosystem, (vi) use of genetic resources for purposes contrary to national laws or relevant international agreements to which Ethiopia is a party, and (vii) frequent violation of access conditions and access agreements by the applicant.

3.1.2 Draft Laws, Regulations, and Policies

The draft proclamation on access to genetic resources, discussed in more detail in section 3.3 below, seeks to provide a policy that protects local communities' rights related to access and benefit sharing of genetic and biological resources. The draft proclamation addresses many issues related to genetic and biological resources, ranging from ownership, access, use, and benefit sharing.

3.1.3 International Treaty on Plant Genetic Resources for Food and Agriculture

The lead agency for the negotiations and future implementation is the IBCR. Ethiopia ratified the International Treaty on Plant Genetic Resources for Food and Agriculture on June 18, 2003.

3.2 Laws and Policies with Relevance to Access and Benefit Sharing

3.2.1 The Constitution

The Constitution of the Federal Democratic Republic of Ethiopia, Proclamation No. 1 of 1995, provides for, under article 40, the right to property. Paragraph 1 of this provision stipulates the right of each citizen to the ownership of private property. Private property is defined, in paragraph 2, to mean "any tangible or intangible product that has value and is produced by the labour, creativity, enterprise or capital of an individual citizen, associations which enjoy juridical personality under the law, or in appropriate circumstances, by communities specifically empowered by law to own property in common."

On the other hand, paragraph 3 of the same article provides for the exclusive ownership of land and all natural resources by the state and the peoples of Ethiopia. In other words, land and other natural resources fall under the public property regime. There is no explicit and legally defined trust relationship. Although ownership is vested in the state and the peoples, the state acts as the sole owner and plays no visible trustee role. The state grants, for example, to peasants the right to land without payment and to pastoralists the right to free land for grazing and the protection against eviction. This being the constitutional framework, however, the forestry and wildlife laws provide for benefit sharing, thereby implying trust relationship.

These constitutional provisions have implications for the right of access to genetic resources, and ownership and utilisation of genetic resources. In light of the definition of "private property" in the Constitution, genetic resources that have value and are the "product of labour, creativity, enterprise or capital" input of individuals or group of individuals or associations recognized by law might be taken as objects that could be owned by such individuals, group of individuals, or associations. But the question is whether genetic resources are capable of being created by human labour and hence subject to private ownership. The CBD defines "genetic resources" as any genetic material of plant, animal, microbial or other origin containing functional units of heredity, and of actual or potential value. The courts in Ethiopia have yet to address whether the functional units of heredity are products of nature, nurture, or both.

The more pragmatic view of the issue of ownership or control of genetic resources in the Ethiopian context would be that genetic resources of plant, animal, microbial, or other origin that are found on lands or in water bodies where no person has acquired any usufructuary right fall under government ownership or the public domain. There are no "private lands" in Ethiopia. Land is "not subject to sale or to other means of exchange."[9] Strictly speaking, genetic resources in naturally occurring resources on lands where a use right has been established may not be owned by the individual user of that land. But in practice, no person is prevented from accessing and alienating naturally occurring resources such as trees and other biological resources and their derivatives from lands where he or she has obtained a use right.

Genetic resources are not yet seen as being separate from the biological resources regardless of where they are found. They are subject to the same legal principles applicable to biological resources (biomass). The draft proclamation on access to genetic resources, when adopted, would be the first Ethiopian law to treat genetic resources separately and to confer a property right to these resources with the state, which would be in conformity with their nature. Theoretically, the government

[9] Consitution of Ethiopia, art. 40, para. 3.

has the right of ownership over these genetic resources, and has the right to determine access to, control of, and/or utilisation of such resources. All ex situ collections other than those held by farmers or communities as farm-saved seeds are also under the public domain, and the Government always controls access to these collections. This is simply because there are no individually or privately held collections. The only ex situ collection that exists in the country is that of the government's gene bank which was established in 1976 and is now under the IBCR. Since the introduction of the federal system of government, some regions, which are the units of the federation are trying to maintain their own collections, though they are still initiatives of government agencies.

3.2.2 Laws and Policies

The National Policy on Biodiversity Conservation and Research mentioned in section 3.1.1 above addresses biological resources generally. The policy makes specific reference to genetic resources and emphasizes the need for regulating access to genetic resources. One of the objectives of the policy is to assert national sovereignty over genetic resources and develop a mechanism for the fair exchange, safe movement, and proper management of these resources. Other stated objectives are to encourage the participation and support of local communities in biodiversity, and to ensure that they share the benefits accrued as a result of using indigenous knowledge or germ plasm. Under the policy directives section, it is stated that any exploration, inventory, collection, movement, exchange, repatriation, and use of genetic resources will be governed by the laws and regulations of the country as well as by bilateral and/or multilateral agreements. It is further stated that the community participatory approach in the decisionmaking process and the creation of community-based systems that recognize resource rights of the local people and enable them to derive economic benefits from jointly and sustainably managed natural resources will be ensured. It is also stated that the federal and regional governments shall receive and distribute revenues generated from biodiversity exclusively for the benefit of communities associated with or participating in the conservation of biological resources, and the costs of administering, developing, and managing biodiversity.

As indicated earlier, the Forestry Conservation, Development and Utilization Proclamation No. 94 of 1994 addresses biological resources in general and also affects ownership of, access to, and utilisation of genetic resources. This proclamation changed the forms of forest ownership. It reinstated the right of private individuals and groups of individuals to own, develop, and use forests that had been abolished by the 1975 revolutionary proclamations that nationalized land and determined the size of land that each person or family should get in rural as well as urban areas. Before the enactment of the Forestry Proclamation (No. 94 of 1994), the Forest and Wildlife Conservation and Development Proclamation No.192 of 1980 provided the legal framework to regulate forests. Proclamation No. 192 of 1980 is still effective as far as the conservation and development of wildlife resources are concerned, and Proclamation No. 94 of 1994 replaces its provisions with respect to forestry.

The Seed Proclamation No. 206/2000 is also relevant. The main purpose of this proclamation is to establish a system of seed registration and certification for both locally produced and imported seeds. Any person who intends to engage in seed production, processing, import, export, wholesale, or retail operation is required to obtain a competence assurance certificate from the National Seed Industry Agency. Like any other business that requires expertise or special skills, commercial seed production and marketing is a trade that may be undertaken only if certain professional or logistic requirements are fulfilled. Paragraph 2 of article 6 specifies the requirements as follows:

> A person who requires competence assurance certificate shall have:
>
> (a) qualified professional personnel who are directly engaged in production, have the necessary farm equipment, land and …;
>
> (b) qualified personnel, who are directly engaged in seed processing, have the necessary equipment for cleaning, grading, treating, bagging and labeling, and appropriate stores …; [and]
>
> (c) personnel who have basic knowledge of seed and an appropriate storage, where he is a seed exporter, importer, wholesale or retailer.

Article 7 describes the procedure to be followed in submitting an application for the certificate on the one hand and in decisionmaking by the agency on the other. The conditions for refusal of certificate of competence are described under article 8 of the proclamation. These include (a) conviction prior to the issuance of the proclamation, of an offense under other laws concerned with seed; (b) failure to fulfill the requirements under article 6 (see above); (c) cancellation of previous certificate and

the period between the cancellation and the new application is less than one year. A certificate of competence is valid for a period of three years.[10] There is a possibility of renewal for the certificate.

Any seed produced and processed locally, or imported, or intended to be sold or distributed in the country, or to be exported, shall be a variety registered by the agency on the basis of its conformity to the requirements and seed standards of Ethiopia. According to the proclamation, both public and private research organizations may import or export varieties for research purposes only after obtaining a permit from the agency and meeting the requirements of the Plant Quarantine Regulations. Paragraph 1 of article 25 generally prohibits import to or export from Ethiopia for sale of any prescribed seed without a competence assurance certificate and seed import export permit. The conditions of the permit include that the seed should not be a restricted seed, conforms to Ethiopian seed standards requirements, is labeled and packed, complies with quarantine regulations, and the country of origin is specified, where known. The simplified form of these criteria applies to obtain permit for importing or exporting seed for research purpose. The law appears to be clear regarding the requirement to fulfill plant quarantine regulations even if the seed is intended for research purpose.

The proclamation imposes a specific restriction on genetically modified seeds and requires that they conform with relevant laws as confirmed by the competent body before they are imported into the country. As Ethiopia is considering ratification of the Cartagena Protocol on Biosafety, the procedure and other rules that may apply to the transboundary movement of genetically modified organisms, including seeds, may be developed in conformity with the protocol's provisions. There would be a competent national authority that would perform the functions specified in the advance informed agreement procedure of the protocol, namely which receives notification, acknowledges receipt of notification, and makes decisions on whether to import the genetically modified organism. According to the proposal submitted to the government, the EPA is expected to be the competent national authority. In the meantime, the Ministry of Agriculture in cooperation with the Ministry of Health and the EPA are trying to advise the National Seed Industry Agency on this particular matter. However, no practical cases seem to have arisen so far. There is also the question of what might be entering the country through food aid. The importation of seeds that could not produce a second generation as a result of using a terminator gene technology, or a seed that does not germinate for the next harvest unless treated in a specific manner, is prohibited.

[10] Art. 10.

WTO Membership

Ethiopia is not a member of the WTO. It has an observer status, and is now seeking membership following a positive recommendation by an internal review process established by the government to look into the implications of joining the WTO. The implications of the provisions and requirements of TRIPs was one of the issues that had been seriously considered by one of the 10 national committees established by the government for the purpose of studying the various agreements of the WTO and developing recommendations for its consideration.

TRIPs vs. CBD

Although Ethiopia is not yet a member of the WTO, and hence, not formally bound by the TRIPs agreement, it has been active in uncovering the alleged adverse implications of article 27(3)(b) of TRIPs, which imposes the obligation to provide some form of IPR protection for plant varieties. It has submitted an agenda item and a paper on the relationship between the TRIPs agreement and the CBD with recommendations to the fourth meeting of the Conference of the Parties to the CBD. The submission caused tense negotiations and resulted in decision IV/15, which dealt with a number of related issues under the title "The Relationship of the Convention on Biological Diversity with the Commission on Sustainable Development and Biodiversity-Related Conventions, Other International Agreements, Institutions and Processes of Relevance." Preambular paragraph 8 of the decision notes that some parties to the convention, particularly many developing countries, are not members of the WTO, and are, therefore, limited in their abilities to present their concerns regarding biological diversity at the WTO. Preambular paragraph 9 stresses the need to ensure consistency in implementing the CBD and the WTO, including the agreement on TRIPs with a view to promoting increased mutual supportiveness and integration of biological diversity concerns and the protection of intellectual property rights. Paragraph 10 emphasizes that further work is required to help develop a common understanding of the relationship between intellectual property rights and the relevant provisions of the agreement on TRIPs and the CBD, in particular on issues relating to technology transfer and conservation and sustainable use

of biological diversity and the fair and equitable sharing of benefits arising out of the use of genetic resources, including the protection of knowledge, innovations and practices of indigenous and local communities.

Ethiopia has expressed the belief that there is a conflict between the CBD and TRIPs, and the matter should be addressed by the CBD. It advocates the deletion of article 27(3)(b), thereby leaving the question of protecting or not protecting plant varieties to individual member states as the same would be consistent with articles 8(1) and 27(2) of the TRIPs agreement. Ethiopia fully supports the African Group position as presented at the Seattle inter-ministerial conference in December 1999. In fact, Ethiopia has been playing a major role in bringing Africa together at different fora to take a common position against the patenting of life forms and in favour of the promotion of the recognition and protection of achievements by local communities, including farmers' rights.

Rights of Local Communities

The Environmental Policy of Ethiopia acknowledges community intellectual property rights and states the need to create a system to protect them. It further provides for making environmental information available to any interested parties, without compromising community intellectual property rights. Although the law does not yet define such rights and a system of protection has not yet been developed, one can see the trend in the protection of "inventions" and "innovations" in Ethiopia. As an agricultural country, much of the innovation or the basic knowledge that enables "invention," to the extent there is any with respect to biological resources, is believed to come from the collective efforts of farmers and other traditional communities whose activities support the farming system.

Attempts to further develop the concept of community rights are fraught with difficulties. The question of identifying the subject matter of protection and the holders of the rights and understanding the concept of "property" in the sense of communal achievements have been found to be some of the gray areas that have posed serious difficulty in translating the policy into a law or administrative action. Ongoing efforts continue to seek a clear and detailed policy on this matter and to provide for legislation that gives some protection to the rights of local communities to control access, ownership, utilisation, and benefit sharing with respect to genetic and biological resources. The draft proclamation on access to genetic resources tries to address the matter to a certain extent. The National Committee, which is involved in drafting the access legislation, is also expected to develop the concept of "community intellectual rights" as well as study the implications and possible policy options with respect to plant variety protection.

The 1992 National Seed Industry Policy envisages the preparation of legislation that regulates seed trade; controls seed quality standards; and protects users, plant breeders' rights, and farmers' rights. However, for various reasons, the Seed Proclamation No. 206 was enacted in 2000 with a limited scope, dealing with seed quality standards and control only. Another law that defines plant breeders' and farmers' rights is still required. Such legislation is expected to maintain some kind of balance between the rights of plant breeders on the one hand, and farmers on the other, as regards plant varieties that they develop.

Conformity with Article 27(3)(b) of TRIPs

No legislation has been adopted to conform to article 27(3)(b) of TRIPs or UPOV. There was no patent legislation in Ethiopia before 1995. The first law in this area, known as the Proclamation Concerning Inventions, Minor Inventions and Industrial Designs, was enacted in 1995. The implementing regulations were also issued in 1997. Article 4 of the proclamation excludes from patentability inventions related to plants or animals or plant varieties or animal varieties. Accordingly, no patent protection system for botanical genera exists in Ethiopia.

Accession to UPOV

Ethiopia has not acceded to or ratified any of the acts of the International Convention for the Protection of New Varieties of Plants (UPOV).[11]

Patent Protection System for Product Inventions

As mentioned earlier, Ethiopia adopted its patent legislation in 1995. Like many other similar national laws, the Proclamation Concerning Inventions, Minor Inventions and Industrial Designs of 1995 provides for the protection of product inventions so long as the standard criteria for establishing the fact of "invention" is met. But as indicated earlier, plants, animals, and essentially biological processes for the production of plants or animals are not patentable under the proclamation. Unlike TRIPs, no distinction exists between plants and animals on the one hand and microorganisms on the other, or between biological processes and microbiological processes.

[11] The acronym derives from the French version of the title, "*Union pour la Protection des Obtentions Vegetales*."

Ethiopia joined the World Intellectual Property Organization (WIPO) in 1997. The Ethiopian Science and Technology Commission is the national agency responsible for liaising with WIPO, receiving patent applications and registering and publicising them according to the law. Under Ethiopian law, no distinction is made on the basis of the source of the genetic information.

In accordance with the 1995 Proclamation Concerning Inventions, Minor Inventions and Industrial Designs, inventions may be excluded from patentability on the basis of public order and moral considerations. In practice, however, there have been no particular cases to describe the specific aspects of exclusions. In other words, no patent application has been turned down so far on the grounds of public order or moral considerations. This makes it difficult to practically test the exclusion and develop a body of jurisprudence regarding the types of inventions for which patenting may face concerns about public order or morals.

3.3 New Initiatives

Like in several other parts of the world, two of the major biological diversity-related issues—namely access to genetic resources and the fair and equitable sharing of the benefits derived from the use of genetic resources—have been widely discussed in Ethiopia since the ratification of the CBD in 1994. These discussions have culminated in the establishment of a national committee under the auspices of the Institute of Biodiversity Conservation and Research in 1998 to prepare and submit to the government a draft proclamation on access to genetic resources. The drafting process has gone through a number of stages, including the convening of a couple of stakeholders workshops to discuss the elements and contents of the draft legislation as proposed by the national committee. The institute is now finalizing the first draft that will eventually be forwarded to the Council of Ministers.

The draft Proclamation to Regulate Access to Genetic Resources and Associated Traditional Knowledge, as it stands now, has 10 different sections dealing with: general provisions, conditions of access, procedures for access, access agreements, benefit sharing, follow-up and compliance measures, exploration of genetic resources, importation of genetic resources, administration, and miscellaneous provisions. The proclamation is supposed to apply to access to genetic resources of the country found in situ or ex situ conditions and traditional knowledge associated to the genetic resources. The draft law explicitly excludes: a) the customary exploration and access to genetic resources and traditional knowledge by and among Ethiopian local communities; and b) access to biological resources for specific uses, such as for direct uses as food, feed, or source of energy that do not involve using the genetic resources for their genetic characteristics. It is not intended to apply to human genes; customary use and exchange of genetic resources and traditional knowledge by and among local communities in the country; and to access to biological resources for direct use as for food, feed, or other specific purposes that do not involve use of the genetic materials thereof for improvement or propagation purposes.

According to the draft proclamation, ownership of genetic resources is vested in the state and the concerned local communities. For the draft proclamation, "local community" means a human population living in a distinct geographical area and identified by the competent authority as a custodian of a certain genetic resource or a creator and custodian of a certain traditional knowledge associated with the conservation and use of the genetic resource. Exploration, export, import, or general access to genetic resources without a permit from the competent authority is prohibited and subject to penalties. National public research and higher learning institutions may, however, be granted leave from the permit requirement by the competent authority once they enter into a standing agreement with the competent authority and undertake an obligation to use the genetic resources they access, from time to time, for domestic research purposes only, and to not repatriate any genetic material abroad without permission from the competent authority.

The draft access proclamation requires that the competent authority (i.e., the IBCR) and the concerned local communities grant prior informed consent. The consent of the concerned local community is required to be obtained through consultation facilitated by local authorities and relevant institutions in the area using local customary practices. "Relevant institutions" means (as defined in the draft) public institutions responsible for administering or having special expertise on the genetic resources or traditional knowledge intended to be accessed. These could be the Ministry of Agriculture or regional agricultural bureaus, information and cultural bureaus, etc. The ultimate authority to enter into an access agreement and to issue a permit rests with the competent authority, the IBCR. An access agreement is an agreement that would be entered into by and between the competent authority (IBCR) and the person that submits an application for a permit to access genetic

resources. The access agreement is concluded after prior informed consent has been obtained and before the access permit is issued. As part of the conditions of access, expatriate applicants must submit a letter of guarantee that they should obtain from their respective competent authorities (the institution sponsoring and/or hosting the bio-prospecting or the research), ensuring their compliance with the terms and conditions of the access agreement.

Equitable sharing of benefits arising from access to, and utilisation of, genetic resources and associated traditional knowledge are also basic requirements included in the draft. The benefits that need to be shared with the state and the concerned local communities are identified. These include: (i) upfront payments; (ii) royalty, (iii) employment opportunities; (iv) participation in relevant research; (v) priority in the supply chain of the genetic materials for development and manufacturing; (vi) preferential access to the products and technologies derived; (vii) relevant training involving members of local communities as well; (viii) infrastructure, equipment, and technological support; and (ix) any other benefits deemed appropriate.

As mentioned earlier, the EWCO prepared a draft National Wildlife Policy that includes elements relating to the sharing of benefits accrued from the use of wildlife resources with local communities. The draft was submitted to the Council of Ministers about five years ago, and it is still before it. One of the difficult issues that impedes the early adoption of this policy is the determination of whether national parks should continue to be under the jurisdiction of the federal government or be transferred to regional governments. EWCO supports the former view, whereas many key politicians are in favour of decentralisation of the administration of national parks among and between regions.

Sui Generis Protection of Plant Varieties

Ethiopia, in collaboration with some other African countries, has initiated an Africa-wide process of discussion and consultation with regard to sui generis legislation that recognizes and protects the rights of local communities, farmers, and breeders, including the regulation of access to biological resources. The issue was tabled for the first time by the Ethiopian Government to the 68th Session of the OAU Council of Ministers held in Ouagadougou, Burkina Faso, from 4 to 7 June 1998, with a view to meeting the challenges arising from the implementation of TRIPs and the CBD (particularly articles 8(j), 10(c), 15, and 16 of the CBD dealing with the rights of local and indigenous communities, access to genetic resources, and access to and transfer of technology).

The OAU Council of Ministers recommended[12] that governments of member states:

> 1. Give due attention, as a matter of priority, to the need for regulating access to biological resources, community knowledge and technologies, and their implication for intellectual property rights as entrenched in the international trade regime of the TRIPs Agreement;
> 2. Adopt the draft model law on access to biological resources and call on Member States to initiate a process at the national level involving all stakeholders in accordance with national interests and enacted into law;
> 3. Initiate a process of negotiation among African countries to formulate and adopt an African Convention on Biological Diversity with emphasis on conditions for access to biological resources and protection of community rights; [and]
> 4. Develop a common African position to safeguard the sovereign rights of Member States and the vital interests of our local communities and forge alliance with other countries of the South on the revision of TRIPs in 1999.

The Scientific, Technical and Research Commission (STRC) of the OAU was designated as the focal point for the implementation of the recommendation. Following presentation of the recommendation, a number of sub-regional workshops were organized to develop the OAU model law on the Protection of the Rights of Local Communities, Farmers and Breeders, and the Regulation of Access to Biological Resources.[13] Ethiopia, like many other African countries, is considering the model law with a view to incorporating the rules and principles contained in the model law, as appropriate, and provide a sui generis legislation that protects new plant varieties without compromising the rights of local communities to their traditional knowledge associated with biological resources and to the equitable share of benefits arising from the use of such resources and knowledge.

4. CONCLUSIONS

The regulatory system for access and benefit sharing has not yet taken its full shape and is still under develop-

[12] By its decision CM/DEC. 402-432 (LXVIII).

[13] See Chapter 19 in this volume on the model law.

ment. It has not yet been put fully in place and tested. To date, except with some stringency in requiring applicants to enter into a formal contractual agreement with IBCR or with the local research or academic institutions, such as the Addis Ababa University, no drastically new parameters have been introduced yet.

The system as it is currently evolving appears, however, to bring in a lengthy bureaucratic process in effecting access to genetic resources. The transaction costs alone may be high and could undermine the benefits obtained by introducing a new regulatory system. But the system should come out in full and be tested, before it is judged to have particular drawbacks.

The high level of endemism and genetic diversity may be the country's most notable strengths. The genetic diversity of landraces in Ethiopia has been demonstrated to be valuable in saving some crop varieties from extinction. One example is the Ethiopian barley with a yellow dwarf virus-resistant gene, which saved a barley variety in the United States (California) that happened to be vulnerable to the virus. IBCR claims that Ethiopian sorghum represents a useful variety, as witnessed by the U.S. sorghum improvement program, and found to be cold weather tolerant, high in lysine content, good grain quality, and drought- and disease-resistant. The durum wheat germplasm of Ethiopia is also known for its high protein, high lysine, and other basic amino acid contents.

The second strength worth mentioning is the commitment to promote community-based conservation programmes. In 1994, IBCR initiated a project funded by the Global Environment Facility (GEF). The project, entitled "A Dynamic Farmer Based Approach to the Conservation of Ethiopia's Plant Genetic Resources," tries to address a commonly neglected aspect of plant diversity, namely indigenous crop varieties maintained by farmers in dynamic agro-ecosystems. The project is a community-based landrace in situ conservation project that is designed to link farming communities and their varieties with the existing formal genetic resources conservation efforts by means of establishing community gene banks. Major achievements made so far include:

i) The establishment of 12 on-farm in situ conservation sites for farmers' varieties in six agro-ecological regions;
ii) The in situ conservation of about 316 farmers' varieties comprising 22 crops on rotations at 49 sites;
iii) The establishment of eight community gene banks in all sites where there is in situ conservation with more than 10,000 kg annual turnover of seeds of farmers' varieties comprising 334 accessions;
iv) The formation of crop conservation associations involving 193 farmers at different in situ conservation sites;
v) The undertaking of ethnobotanical studies on some crop species;
vi) The surveying and documentation of indigenous knowledge of the farmers regarding the methods of selection, cultivation, and use of their crops and cultivars, including women's knowledge and role in seed preservation, exchange, and movement; and
vii) The restoration of crop germplasm samples originally collected in situ and maintained in the Gene Bank.

Another strength is the collaborative relationships that the former PGRC has had, and the present IBCR is having, with various relevant national and international organizations. IBCR believes that its relationship with IPIGRI, as mentioned in section 2.2 above, has been particularly effective over the years.

The major weaknesses are the lack of expertise, conservation facilities, and above all financial resources. Knowledge of existing plant genetic diversity is still far from adequate. Evaluation and characterisation of the genetic resources are low. The number of qualified scientific personnel is limited. However, IBCR feels that the country is well advanced, by African standards, in terms of its achievements and efforts relating to access to genetic resources, conservation, and utilisation. This has also been confirmed by the staff of some counterpart institutions from other African countries, who have paid visits to the institute to share experiences.

ANNEX:
IBCR BROCHURE ON CONDITIONS AND PROCEDURES FOR THE ISSUANCE OF A PERMIT TO ACQUIRE, EXPORT OR IMPORT GENETIC RESOURCES

Article 12 of the proclamation to establish the Institute of Biodiversity Conservation and Research (proclamation No. 120/1998) provides that the collection, dispatching, importing and exporting of [a] specimen of biological resources requires [a] permit from the Institute of Biodiversity Conservation and Research and doing so without having [a] permit constitutes a criminal offence punishable with five to ten years of imprisonment and a fine of fifteen to twenty thousand birr [approximately US$ 1,750 – US$2,330] fine. Pending the enactment of a detailed legislation on access to genetic resources, the Institute issues permit to acquire, export or import biological resources subject to and in accordance with the following conditions and procedure.

1. Export permit

Conditions for giving [an] export permit

[An] export permit may be issued if:

1. The intended research could not be undertaken in the country owing to inadequate research facilities, equipment…etc
2. The person applying for [a] permit (hereinafter referred to as "applicant") needs to be sponsored by a national research or academic institution.
3. The person who is not an Ethiopian national should bring letter of guarantee from the competent authority of his national state, and his host and sponsoring institution.

Export permit may be denied in cases of

1. endangered taxa;
2. rarity;
3. adverse effect on human health or the cultural values of local communities;
4. danger of loss of ecosystem;
5. uses of genetic resources for purposes contrary to national laws and international treaty to which the country is a party;
6. the applicant has violated hitherto obligations of access permit;

Procedure for issuing export permit

1. The applicant who wants to take genetic material abroad should first bring letter of request to this end from his national host institution.

   * The letter of request must indicate the name of the applicant, the affiliation he has with the sponsoring institution, the title of the research intended to be undertaken, the type and quantity of the biological resource required and the foreign institution where the research is to be conducted.

2. If the institute is satisfied that the permit can be issued, the applicant and the sponsoring national institution will sign Material Transfer Agreement (MTA) designed by the Institute. The sponsoring institution signs the (MTA) to guarantee that the applicant respects and discharges his obligation under the material transfer agreement. The obligations that the applicant must respect will be specified in the (MTA).
3. The export permit will be issued upon signing of the (MTA) by the applicant and the sponsoring institution.

2. Import permit

Conditions for import permit

[A] permit may be issued to import samples of biological resources if the biological resource in question is not banned by a relevant law from entering the country, and if the introduction of said resource does not endanger the biodiversity of the country.

Procedure for issuing import permit

1. A person (hereinafter referred to as "applicant") who wants to import [a] sample of biological resources from abroad should first bring a letter of request to this end from his national sponsoring institution.

   * The request letter must indicate the name of the applicant the affiliation he has with the sponsoring institution, the title of the research intended to be undertaking, the type and quantity of the biological resource wanted to be imposed and the foreign institution where the biological resource is to be obtained.

2. The applicant and his sponsoring national institution shall sign material introduction agreement (MTA) to be developed by the Institute. The sponsoring institution shall sign the agreement to guarantee that the applicant respects his obligation under the material introduction agreement. The obligations the applicant must observe will be specified in the material introduction agreement to be signed.
3. Import permit will be issued upon signing of the material introduction agreement by the applicant and the sponsoring institution.

3. Export permit for commercial purposes

Conditions for issuance of commercial export permit

[A] permit to export genetic resources for commercial uses may be issued if:

1. The research could not be carried out in the country.
2. A benefit sharing arrangement is concluded between the Institute and the applicant.

Export permit may be denied in cases of

1. endangered taxa;
2. rarity;
3. adverse effect on human health or the cultural values of local communities;
4. danger of loss of ecosystem;
5. uses of genetic resources to purposes contrary to national laws and international treaties to which the country is a party.

Procedure for issuing export permit for commercial purposes

1. The applicant who wants to take genetic material abroad for commercial purposes shall first bring an application to this end.

   * The application must indicate the name of the applicant, the type and quantity of the biological resource wanted, the kind of the research intended to be undertaken, the foreign institution where the research is to be conducted and a detailed proposal on the benefit to be derived and shared between the applicant and Ethiopia.

2. The applicant, and the sponsoring and host national institutions of the applicant shall sign material transfer agreement. The sponsoring and host institution of the applicant sign the material transfer agreement guarantying that the applicant respects his obligation under the agreement. The obligations that the applicant must observe shall be specified in the material transfer agreement signed.

3. Export permit will be issued upon signing of the material transfer agreement by the applicant and the host and sponsoring institution of the applicant.

4. Permit to obtain genetic resources from the gene bank for local uses

Genetic resources conserved in a genebank may be obtained for use within the country.

Conditions for acquiring genetic material from the national genebank

1. A person or a national research or academic institution who wants to acquire genetic material from the genebank shall present written request to the Institute.

   * The application must indicate the name of the applicant, the type and quantity of the biological resource wanted, the kind of the research intended to be undertaken or the kind of use, which the material is to be put.

1. The applicant will sign material transfer agreement (MTA). The sponsoring institution of the applicant will sign the material transfer agreement guarantying that the applicant respects his obligation under the agreement. The obligations that the applicant must observe shall be specified in the material transfer agreement.
2. Permit will be issued and the material will be dispensed upon signing of the material transfer agreement by the applicant and the sponsoring institution of the applicant.

N.B.

The material will be issued within day upon signing of the MTA by the applicant & sponsoring Institution.

CHAPTER 10
ACCESS TO GENETIC RESOURCES IN IVORY COAST

*Abraham Gadji**

1. BACKGROUND

1.1 GEO-PHYSICAL

Ivory Coast is a West African country, with a land area of 322,500 km^2, situated between 4°30' and 10°30' latitude North and 2°30' and 8°30' longitude West. Ivory Coast is bordered to the north by Mali and Burkina Faso, to the east by Ghana, to the west by Liberia, and to the south by the Atlantic Ocean.

In general terms, a monotonous relief characterizes Ivory Coast, although the altitude rises slightly from the southeast toward the northwest. However, three major regions are characterised by small heterogeneities observed in several regions of the country: plains, plateaus, and massif. The plains stretch, "from the Sea inwards," from the south of the country, with altitudes varying from 0 to 200 m. The region consists of a low, often marshy, littoral plain. Narrow in the west, where it disappears in places, the plains expand toward the east while a lagoon system develops. The plateaus stretch northward and progressively fragment with altitudes varying from 200 to 500 m. The massif is located in the west and constitutes an advanced oriental set of highlands centralised toward Guinea. The highest peaks are: Mont Songbe (1,072 m), Toura (1,170 m), Momi (1,302 m), and Nimba (1,752 m).

Globally, the Ivorian soils can be grouped together in four unequal principal entities: leached ferralsols; tropical ferruginous soils; and fluvisols or coastal soils, and other soils.

Ivory Coast belongs to a domain of warm climates of the intertropical zone. The rainfall regime is linked to the four types of climate: subequatorial (characterized by abundant rainfall varying from 400 to 2,500 mm); tropical humid (rainfall varies from 850 to 1,700 mm); the tropical humid is characterized by drought and a maximum rainfall of 1,000 mm; and, finally, the submountainous climate, which is influenced by the other three climates. The submountainous climate is the zone where the lowest temperatures are registered, generally below 25° C.

1.2 BIOLOGICAL

Ivory Coast contains diverse terrestrial and aquatic ecosystems, with an estimated 16,034 species of plants, animals, and other organisms. The terrestrial ecosystem is characterized by its vegetation, which has the most tangible influence over its physiognomy. The Ivorian flora is old. Speciation mechanisms have continued to play a remarkable role during the past 130 million years. There are estimated to be 5,509 species of terrestrial organisms and plants, of which 3,790 species are higher plants grouped into 202 families. There are 6,994 species of terrestrial animals, forming 11 categories grouped in 74 orders and 203 families, 731 genera, and 6,994 species. Insects constitute the largest number of identified animal species at 5,493.[1]

Ninety percent of Ivory Coast's territory contains a dense network of water resources consisting of rivers, streams, lakes, and artificial reservoirs. Although there is no data available on aquatic viruses, there is data on aquatic plants (1,734 species) and on aquatic organisms and animals (1,817 species). It should be noted that the study of bacteria in Ivory Coast is very limited—only 140 species of the 10,000 known worldwide have been identified. This situation highlights the urgent need for research in this field.

Knowledge of the diversity of species and the conservation levels of their populations are incomplete, but the constraints and threats to biological diversity are real. These primarily consist of the exploitation of forests, extensive agriculture, forest fires, air and other forms of pollution, the greenhouse effect, the development of infrastructure, poaching, illicit trade of species, and the uncontrolled collection of species.

* *Consultant, Ministry of State & Ministry of Environment.*

[1] *See generally infra* n. 4 and accompanying text.

1.3 Socio-Political

Ivory Coast has a population of more than 16 million, 46 percent of whom live in urban areas, and one of the highest population growth rates in Africa at 3.3 percent. The country gained independence on August 7, 1960. Its political capital in Yamoussoukro, while the economic centre is Abidjan. Ivory Coast has a long history of political stability and reinstated multiparty democracy on April 30, 1990, although the transparency of subsequent elections has been questioned. A coup on December 24, 1999 was followed by nine months of transitional military government, an interim period of civilian rule, and a military rebellion in September 2002. Reconciliation efforts have been undertaken within the framework of the Marcousis Accord and, at present, it seems that these efforts may restore stability to the country.

Ivory Coast is a member of the United Nations (UN), African Union (AU), Economic Community of West African States (ECOWAS), and the West African Economic Monetary Union (WAMU). Ivory Coast also has active relations with the World Bank, International Monetary Fund (IMF), and the European Union (EU) and has been admitted to the U.S. African Growth and Opportunity Act (AGOA) programme.

1.4 Economic

Ivory Coast has established itself as one of the most successful West African economies on the basis of the performance of the agricultural sector. In the period from 1965 to 1975, the national gross domestic product (GDP) grew at an average of 7.7 percent, surpassing the population growth rate for the period of 4 percent. In agriculture, this growth was essentially due to exports of agricultural and forestry products, which grew by 7 percent, almost double the growth rate of agricultural production. Agriculture makes up 33 percent of the GDP and 66 percent of foreign exchange earnings, the latter primarily derived from agro-industrial products.

Due to deterioration in the exchange rate, macroeconomic policies, and structural inadequacies, it is estimated that Ivory Coast has suffered an economic crisis between 1980 and 1993, with the GDP growth varying between 1.2 and –1.2 percent. However, with the shift in the exchange rate with the French Franc, resulting from the devaluation of the CFA Franc by 50 percent in December 1993, Ivory Coast regained its competitiveness, and it is estimated that the GDP grew 6.5 percent between 1995 and 1998. Ivory Coast suffered from the Asian financial crisis, with growth slowing to 1.6 percent in 1999; this situation has been aggravated by the December 1999 coup and the subsequent suspension of international assistance. The measures put in place after the military transition period allowed the country to return to growth after an estimated –2 percent GDP growth in 2000, but the subsequent military rebellion grounded these economic efforts. With the apparent success of reconciliation efforts, it appears that Ivory Coast is returning to the path of peace and is able to undertake economic activities.

The National Statistics Institute provides data on the fight against poverty. The relative poverty line increased, in real terms from 144,800 CFA Francs (US$216) per annum in 1995 to 162,800 FR CFA (US$243) in 1998. The corresponding percentage poverty rates were 36.8 percent in 1995 and 33.6 percent in 1998. Poverty increased by 4.5 percent between 1993 and 1995 but improved by 8.7 percent in 1998. Recognising the obstacle poverty presents to sustainable development, the government adopted a strategy to provide specific responses to the needs of less favoured and vulnerable social groups. Decree No. 98-685 of 25 November 1998 created a special office to fight poverty, attached to the office of the Prime Minister, with the following objectives.

Ivory Coast has enormous economic potential with abundant primary agricultural products, mineral resources, two ports and other infrastructure, significant skilled manpower, and a modern banking system. The country emphasises products in which genetic resources are an important component. For a number of years, annual cocoa production has been around 1,300,000 tonnes, making Ivory Coast the world's largest producer, meeting almost 50 percent of the 2,900,000 tonne annual global demand. Annual coffee production is 300,000 tonnes, the fifth largest worldwide. More than 200,000 tonnes of cotton are sold annually, nearly 300,000 tonnes of pineapple, up to 70,000 tonnes of kola, and more than 40,000 tonnes of karite (used in shea butter).

Forest resources are important for both consumptive and commercial purposes. In 1991, household wood consumption reached almost 22 million CFA Francs (16.3 million of monetary consumption and 5.4 million of nonmonetary consumption). Enterprises in the food trade made up 2.2 million CFA Francs in the same year.[2] Biomass-energy represents 73 percent of total energy consumed and 72 percent of primary energy produced

[2] At the exchange rate of US$1 = 635 CFA Francs, this represents approximately $25,700 in monetary consumption, and $8,500 in nonmonetary consumption, or approximately US$34,200 in total household wood consumption.

in Ivory Coast. These resources consist of wood (3,900,000 m^3), half of which is transformed into charcoal (427,000 m^3), and by the value from agro-industry and agriculture (approximately 483,000 m^3, constituting less than half of the total energy from vegetable residue, estimated at 1.5 million m^3).

This data shows the importance of Ivory Coast to the economy of the West African Monetary Union, making up more than 40 percent of the regional economy.

1.5 Assessments of Ivory Coast's Genetic Resources Potential

As noted, agriculture plays a dominant role in Ivory Coast's economy. This dominant position is partly due to the country's diversity of genetic resources, particularly plant genetic resources. Ivory Coast recognises the potential for bioprospecting to serve as a means to realise the value of this natural wealth. The resources of biological diversity have been the basis of the country's development to date and today still constitutes the foundation of the economy. In the context of agricultural production, significant contributions and potential of medicinal plants, cultivated and harvested food plants, plants of various other traditional uses, and ornamental plants have great utilisation value. The importance of genetic resources in Ivory Coast suggests the need for establishing programmes to preserve, maintain, and utilize plant genetic resources focusing on exploitation on both large and small scales.

The value of the usage of genetic resources comes from the extraction of products, services, and information: wood, fruit, medicinal plants and aromatics, hunting, agricultural production, breeding, genetic information, pollination, water filtration, and the regulation of the water cycle. For example, some of the values of forest resources in Ivory Coast are:

- Total income in the forest sector from 1990 to 1999 was 57,767,587,000 CFA Francs (approximately US$90,972,600).
- In 1991, 750 forest agents were licensed.
- From 1990 to 1999, exported debits rose to 57,767,587,000 CFA Francs.
- Tax allowance on processed lumps rose to 25,145,987,000 CFA Francs (approximately US$39,600,000).
- Debited quota on non-dried exported iroko is 18,728,000,825 CFA Francs (approximately US$29,493,000).

In the context of a more strictly defined concept of genetic resources, the Ivorian government has encouraged research in universities and institutions, discussed below, in order to better understand the levels of endemism in the country.

The various bioprospecting related activities discussed below confirm the significant economic, scientific, cultural, and sociological interests for conserving and sustainably using genetic resources. However, they also highlight the importance of efforts undertaken at both the national and international levels for a genuine sharing of the benefits derived from the resources of biological diversity.

1.6 Access to Genetic Resources Activities

In Ivory Coast, the focus of bioprospecting,[3] collecting, maintenance, development, and use programmes has been on plant genetic resources due to the importance of the agricultural sector to the national economy. Objectives vary according to the farming systems or the intrinsic characteristics of the varieties concerned. In general terms, cultivated plants are selected for their performance, efficiency of exploitation, and their adaptability to the needs of local people. Industrial crops are primarily for export (such as coffee, cocoa, and silk) and their selection is for improving their productivity and the quality of the product. Government initiatives are undertaken through the research institutions.

In 1999, in the context of the national biodiversity country study, the Ministry of Environment undertook an evaluation of Ivory Coast's biological resources with the assistance of Ivorian experts and foreigners.[4] This assessment found:

- Terrestrial flora includes mushrooms, bryophytes, filicinophytes or pteridophytes, progymnosperms, and angiospermes represented in different plant communities found in the diverse climatic zones and physiogeographic regions of the country;
- Terrestrial fauna has 11 types of animals grouped in 74 orders, 203 families, 731 genera, and 6,994 species. The endemism rate of terrestrial fauna is relatively low. Four groups of animals have endemic species: batrachia (4), mammals (20), myriapods (78), and arachnids (17). Ivory Coast has 26 species of domestic animals, allowing for the selection of numerous breeds.

[3] For the purposes of this chapter, bioprospecting connotes a preliminary stage involving a detailed analysis of genetic material, whether the origin of this material is from a plant, animal, microbe, or other organism containing functional units of heredity. Research extends into both the natural realm and the human realm.

- The number of terrestrial nematodes may be considerable as they can reach a prodigious number of 600 billion per hectare in favourable land.
- 134 species of reptiles have been identified in Ivory Coast. There are 70 genera, 21 families, and 5 orders.
- Ivory Coast has 712 species of birds in 20 orders, 83 families, and 314 genera. The order of passeriformes is the most important, with more than 50 percent of families and 45 percent of species.

Activities relating to genetic resources are undertaken by a variety of research institutions in Ivory Coast. These include:

- Forests Institute (IDEFOR) is responsible for plant genetic resources in the forest regions of the south of the country.
- Savannah Institute (IDESSA) is responsible for savannah regions in the central and north parts of the country.
- Cocody University (Abidjan) is concerned with identifying and describing local species and conserving the rare and endangered species in botanical gardens. The university has a genetic laboratory.
- National Agricultural Research Centre (CNRA), which was created in 1994, is responsible for the improvement of plant varieties. CNRA has five research departments that focus on coffee-cacao, fruits and vegetables, forestry, rubber producing plants, and oil plants. Improved varieties are the property of CNRA but, considering that its primary mission is on public service, its varieties are made available to farmers for free. To assist CNRA in benefiting from improved material and financial means, the state created an Interdisciplinary Fund for Research and Advice in 2002. This fund, which seeks to promote agricultural research, is supported by a levy on every kilogram of agricultural produce. National Agency for Rural Development (ANADER) is responsible for technical assistance to farmers.
- The agency helps to popularise the improved varieties developed by CNRA.
- National School for Advanced Agronomy (ENSA).
- Forests Development Society (SODEFOR).

IDESSA holds an important genetic heritage of wild and cultivated plants consisting of more than 22,000 accessions of crops, ferns, fibre plants, and sweetened plants. These accessions come from local and regional collections. This genetic heritage, exploited through variety improvement programs, has allowed for the creation of a laboratory of plant genetic resources responsible for managing the collection, regeneration, and in vitro conservation of delicate species, as well as the distribution of plant material. Certain collections of plant genetic resources are the object of national and international exchanges. The conditions for the transfer of plant material between Ivory Coast and other countries depend on the species concerned and on the nature of the particular material. In the case of improved commercial varieties in Ivory Coast, transfer to an international gene bank can be done if access to the genotypes considered is strictly according to an agreement with the Ivory Coast.

The utilisation of species is conducted at different levels. In the case of research institutes, IDEFOR and IDESSA work on perennial varieties such as silk, coffee, and cocoa; annuals such as cotton and sugar cane; and sylviculture varieties such as Java, raspberry, samba, and teak. CNRA works on the improvement of agricultural plants. In the case of farming populations, ANADER undertakes activities to adaptation improved varieties to the rural environment and popularise the varieties.

Bioprospecting also extends to medicinal plants. A number of research projects on medicinal plants have been conducted in Ivory Coast in the context of the activities of the National Floriculture Centre.[4]

The few examples of private sector interest in genetic resources in Ivory Coast are limited to companies working in the commercial agricultural sector. For example, the Ivorian Textile Development Company (CIDT) works on the improvement of cotton quality. Private companies such as PalmCI (palm oil) and HEVEGO (silk) benefit from research products and invest in the best varieties.

2. INSTITUTIONS

2.1 Government Agencies

In Ivory Coast, there is no single agency in charge of management, access, control, and benefit sharing of biological resources. The Ministry of Environment implements the Convention on Biodiversity (CBD) and accordingly is responsible for access to genetic resources policy pursuant to the CBD. With regards to obtaining access to plant genetic resources, a permit is required from the Ministry of Agriculture.

[4] The most important of these are Assi Ake, *Some Plants Used in African Traditional Medicine in Ivory Coast* (1988); Assi Ake, *Plants Used in the Treatment of Cardiac Conditions in Ivory Coast* (1988); *The Use of Diverse Species of Ficus (Morocceae) in the Traditional Pharmacopia of Ivory Coast* (1998); *Contribution to Census, Identification and Acknowledgement of Certain Plant Species in the Traditional Medicine and Pharmacopia of the Bété of Issia Department, Ivory Coast.*

A distinction must be made between biological resources found in protected areas, specifically in parks and reserves, and those found outside protected areas. In the case of biological resources found outside of protected areas, the state may permit, based on a contract, a private enterprise or a private institution to explore or exploit biological resources. The actual access to genetic resources is authorised by the ministry responsible for the environment in accordance with the rights of any third parties and the provisions of the agreement between the parties. Required provisions for such agreements include the payment of taxes and license fees, local development of products where possible, and a mandatory declaration of the origin of the genetic resources in question. These agreements are addressed on a case-by-case basis, highlighting the importance of genetic resources policies and the need to implement a specific institutional and judicial framework.

The Government of Ivory Coast is in the process of establishing a national centre for the conservation of genetic resources and in situ genetic reserves for particular species. It also plans to create a National Biodiversity Commission, the organisation, function, and powers of which will be provided for in regulations.

It is important to note that any bioprospecting activity is subject to government authorisation. Three ministries are involved in the field of biological resources:

- The Ministry of Environment, which is mandated with implementing international environmental agreements such as the CBD and its Biosafety Protocol;
- The Ministry of Agriculture, which is responsible for agricultural development policy and development, as well as the use and management of plant genetic resources; and
- The Ministry of Scientific Research, which is in charge of technological innovation, science, and discoveries.

These three ministries work in a complementary manner on policies and regulations relevant to genetic resources. In the period prior to the practical establishment of the National Biodiversity Commission, the authorisation of these three ministries is mandatory and bioprospecting must be undertaken in collaboration with the research institute and universities of Cocody and Abobo-Adjame (in Abidjan).

In protected areas, the law is much more specific. The requirements and procedures for research activities, collection, or harvest of biological resources conducted in parks or reserves are clearly defined by Law No. 2002-102 of 11 February 2002 relating to the creation, management, and funding of national parks and reserves. Decree No. 2002-359 of 24 July 2002, elaborates on the creation, organisation, and functions of the Ivorian Office of National Parks and Reserves (OIPR). According to article 19 of Law NO. 2002-102, the management of parks and reserves is mandated to a particular type of public institution, with legal personality and financial autonomy. This institution is mandated, inter alia, with the task of implementing a sustainable management policy by promoting legal activities compatible with the nature of the park or reserve in question and with its neighbouring zone.[5] To fulfil its mandate, the institution is charged with defining methods of protection and sustainable use of the natural resources of parks and reserves in perpetuity, including wild flora and fauna resources, both terrestrial and aquatic.[6] The implementing decree provides more details on the organisation and operation OIPR.[7] The office is headed by a Director General, who grants permits for scientific research, including any form of capture, collection, harvesting of fauna or destruction of flora. The Director General submits applications to the Scientific Council for its opinion and approval—this body must be consulted, and the Director General must take its opinion into consideration. Composed of members from scientific and research backgrounds, the Scientific Council's opinion is required, inter alia, in relation to any question, proposal, or programme relating to the status and diversity of biological resources in parks and reserves, as well as regarding their preservation. It is important to note that the technical supervision of parks and reserves is subject to the authority of the Ministry of Environment. In summary, authorisation for access to genetic resources in protected areas is subject to a permit issued by the Director General of OIPR pursuant to the opinion of the Scientific Council.

2.2 Nongovernmental Organisations (NGOs)

Few NGOs are known to have worked in the field of access to genetic resources at the local level in Ivory Coast. There are no specific examples, but local NGOs with interests in similar issues include: Ivory Coast Ecology, Nature Ivory Coast, Green Cross (a local affiliate of the international NGO), SOS-Forests, SOS-Taï, and Circle for Reflection, Study and Support of Environmental Education (CRESERE). International NGOs include Conservation International, the Network

5 Art. 20.
6 *Id.*
7 Decree No. 2002-359 of 24 July 2002, art. 1.

for Environment and Sustainable Development in Africa (NESDA), and the Worldwide Fund for Nature (WWF). The environmental NGOs are grouped in a federation, called the Forum of Environmental and Development NGOs (FONGED), but each maintains its freedom of action.

WWF has played an instrumental role in regulating access to genetic resources and benefit sharing. In the context of its biodiversity project, WWF's regional bureau for West Africa, based in Abidjan, organised a West African workshop on "Medicinal Plants, Access to Genetic Resources and Sharing of Benefits coming from the Exploitation of Biological Resources" in 1997 at the National Centre of Agronomic Research. The workshop sought to understand the relevant provisions of the CBD, including the regulation of access to genetic resources, fair and equitable benefit sharing, and prior informed consent. WWF also prepared and funded a project on developing access to genetic resources legislation and regulations in Ivory Coast.

The government has increasingly expressed the will to involve civil society, especially NGOs, in environmental management. In the forest sector, several NGOs are expected to be involved in implementing the forest policy. In the context of the Framework Policy for the Management of Protected Areas, NGOs are called upon to play a role in awareness raising and mobilisation of the people living along rivers in parks and reserves. The OIPR will be responsible for managing the involvement of NGOs in these contexts. NGOs also have the opportunity to take part in decisionmaking and the implementation of resolutions and recommendations. This innovative approach corresponds with the concept of participatory democracy that has been particularly strong in the environmental sector.

2.3 International Organisations

The West African Rice Development Association (WARDA) is a centre of the Consultative Group on Agricultural Research (CGIAR), a network of intergovernmental agricultural research centres, and has its headquarters in Ivory Coast. WARDA works primarily on the improvement and expansion of rice farming. After several years of research, WARDA created a new variety of rice adapted to the West African climate in 2001. The innovation reinforced national policies on food self-sufficiency and the fight against poverty.

Other examples of international institutions playing a role in the control and use of genetic resources in Ivory Coast are unknown.

2.4 Communities

The concept of local communities is ambiguous and does not exist in Ivorian law, but villages and other isolated areas are analogous. The policy of decentralization, adopted in 2001, was to include all rural locations into a commune. The key element of this new policy was identifying general councils through elections. The councils will be responsible for formulating and executing the development policy of their administrative region.[8] The general council will derive its legitimacy from its electors, and thus its development activities and projects will have to be done for the benefit of the population. This is a significant change, as in the past development projects were state initiatives and certain regions of the country were not favoured.

Decentralization is being offered as a policy of proximity, giving people the possibility to closely follow the consideration of their interests. Each département had the right to benefit by between US$5 and $20 million, according to its relative demographic and economic importance. The implementation of this policy appears to have been compromised by the conflicts that have affected Ivory Coast since September 2002.

The regulatory system for access to genetic resources is generally centralised. However, in this instance, the situation resembles devolution. Devolution is a technical process between centralisation and decentralisation and appears to be, first and foremost, a pragmatic arrangement. This is the system currently applied to access to genetic resources in Ivory Coast. It is particularly a technical devolution because decisionmaking power is in the hands of authorities or specialised technical bodies. This could be a minister, an administrative director, or a state body. In the case of parks and reserves, an office was created, which is headed by a director general, who is nominated by the Minister of Environment upon the recommendation of the recruitment office. This system allows for a unity of action and is also relatively inexpensive because it constitutes a continuity of state action.

3. LAWS AND POLICIES

3.1 Specific Access and Benefit-Sharing Legislation and Policies

The policy on access to genetic resources in Ivory Coast is still in preparation, and no specific text yet exists. Although the National Committee on Access to Genetic Resources has been in place in the Ministry of

[8] The French term is "*département.*"

Agriculture since 1997, the committee has yet to propose an overall policy on access to genetic resources. This issue has been approached in a utilitarian manner with research focusing on the immediate needs of the population, particularly agriculture and breeding. To that end, an Office of Genetic Resources has been created in the Ministry of Agriculture in the field of breeding.[9] This office has a mandate to:

- provide the technical secretariat of the National Commission of Genetic Improvement;
- coordinate and supervise the technical plan and programmes for the genetic improvement of breeds;
- elaborate regulations for the genetic improvement of breeds and supervise their implementation; and
- centralise and analyse data related to the selection of breeds.

Access to genetic resources is, in reality, the subject of a single policy forum under the auspices of the Ministry of Environment, which manages the CBD and the Biosafety Protocol. This policy discussion on access to genetic resources should prompt the development of a more coherent legal and institutional framework. In particular, it should result in a higher valuing of biological resources in general, and agricultural and medicinal resources in particular. This utilitarian option, initiated since Ivory Coast's independence, has contributed to the reduction of poverty because of the agricultural focus that Ivory Coast adopted just after independence. The strength of the agricultural sector has contributed to the growth of agro-industries.

Generally, it appears that immediate economic considerations determined Ivory Coast's approach to genetic and biological resources. As the statistical information provided earlier suggests, Ivorian economic policy was based on agricultural resources and agro-industrial products.

3.2 Laws and Policies Relevant to Genetic Resources

3.2.1 The Constitution

The Ivorian Constitution of August 1, 2000 has no provisions relating to the ownership of genetic resources or rights to control access to, utilisation of, or fair and equitable share of benefits derived from such resources. However, the Constitution does, for the first time, contain provisions for the protection of the environment and human rights relating to the environment as a fundamental principle. Article 19 provides for the right to a healthy environment for all. Article 28 adds that the protection of the environment and quality of life are a duty for the community and for every person, physically and morally. The importance that the Constitution confers on the environment is a significant advance and expresses Ivory Coast's objective of creating the conditions for bold policies on environmental matters. This constitutional recognition of the environment implies, by extension, consideration of genetic resources as essential components of the environment.

Although it contains no specific provisions regarding genetic resources, the Constitution does, however, have important provisions on international conventions. Article 87 provides that, "[r]egularly ratified treaties or agreements have, from their publication, a superior authority to that of the law, conditional, for each treaty or agreement, upon its implementation by the other party." The Constitution therefore confers superior authority to international treaties compared to that of national laws. But this text adds a reservation of reciprocity that requires knowledge of implementation by other parties. Above all, this provision has significant implications for environmental conservation generally and for biological resources in particular, especially in light of the Convention on Biological Diversity (CBD) and the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGR).

3.2.2 Laws, Decrees, and Policies Implementing the CBD

A number of legislative and regulatory texts address conservation of nature and the environment, which seek to implement the CBD, are relevant to management of genetic resources. These include:

- Law No. 96-766 of 3 October 1996, providing for the Environmental Code;
- Law No. 2002-202 of February 2002, relating to the creation, management, and financing of national parks and natural reserves;
- Decree No. 92-392 of 1 July 1992, on the development and protection of plant varieties and the production and commercialisation of seeds and plants; and
- Rule No. 024 MINAGRA 25 of February 1997, establishing an Office of Genetic Resources.

The Environmental Code seeks to protect soils, subsoils, sites, nature, national monuments, fauna, flora, and, in particular, protected areas (namely, the existing national parks and reserves). The code establishes fundamental principals for managing and protecting the

[9] Rule No. 024/ MINAGRA of 24 February 1997, art. 1.

environment against all forms of degradation, recognising the value of natural resources, and combating all forms of pollution and nuisances. It aims to improve the livelihoods of communities in harmony with their environments. The Environmental Code also seeks to create conditions for the rational and sustainable use of natural resources for present and future generations; guarantee a healthy and balanced environment for all citizens; and restore damaged areas.

The main objective of Law No. 2002-202 is to establish the framework for parks and reserves in Ivory Coast and to allow for strengthening global policies on the conservation of nature.[10] This law created a network of biological reserves in proportion with the intensification of exploitation of soils. The creation of this network should, in theory, be achieved by means of decree, but this decree is yet to be issued. Parks and reserves are created and managed to allow for the conservation of the natural environment, terrestrial and aquatic flora and fauna, and biological diversity and ecological processes against all causes of degradation that threaten them. They are also intended to contribute to promoting public participation, through recreation and public education, in a harmonious balance with rural and urban communities. The law places parks and reserves in the inalienable public domain of the state.

Law No. 2002-202 also addresses the administration and financial management of parks and reserves, with particular provisions relating to management contracts for each park or reserve. The law also provides for police powers, the financing of parks and reserves through donations of charitable foundations meant exclusively for financing parks and reserves, and fiduciary contracts. The law also provides sanctions for violations, with fines up to 100,000,000 CFA Francs (about US$150,000) and imprisonment for up to five years.

Decree No. 92-392 establishes the conditions for developing and protecting plant varieties, as well as the importation, production, control, certification, commercialisation, and exportation of seeds and plants.

Ivory Coast ratified the CBD on November 14, 1994. The CBD recognises the intrinsic value of biological diversity and its constituent elements, and it provides a global strategy for conserving and sustainably utilising biological diversity. Pursuant to the CBD, and articles 6[11] and 26 in particular, Ivory Coast elaborated its National Biodiversity Country Study in 1999. This study, which is a critical step to developing a plan of action, has allowed for an assessment of the state of biological diversity in the country–notably, a taxonomic and ecosystem inventory, an identification of threats, an economic valuation of biological resources, and the means to ensure conservation.

Implementing the various provisions of the CBD requires policies and strategies for the sustainable management of biological diversity and the means to mobilise funds for the conservation and sustainable management of biological diversity. In Ivory Coast, strategies for the sustainable use of biodiversity include the Forestry Management Plan, National Environmental Action Plan (NEAP), and Framework Plan for the Management of Protected Areas (PCGAP).

The Forestry Management Plan, covering the period 1988-2015, is an action for conserving and developing the forestry and other plant resources. It aims to maintain the exploitable potential of the natural forest; restore forest cover, with a priority on areas around forests, including savannahs; reforest and manage protected areas; increase the economic return from exploitation; and enhance the commercialisation of wood.

The NEAP, covering the period 1996-2010, seeks to create a national context that fosters an integrated approach to development and the environment. The first operational phase consists of a series of projects costing 180 billion CFA Francs and proposes approximately 10 further projects for the next decade. Programme No. 2 addresses the conservation of biodiversity by conducting an inventory of fauna and flora, improving management of protected areas, and enhancing participation of neighbouring communities.

The PCGAP is a long-term sectoral program of investment in the sustainable management of national parks and reserves, which are priority areas for the conservation of biodiversity. The PCGAP is funded by the World Bank, IMF, EU, KFW, the French Development Agency, WWF, CI, the French Fund for the Global Environment, and development partners in Ivory Coast with more than 93 billion CFA Francs (approximately US$138,800,000) over a period of 12 years. This important program to conserve biological resources was approved by the Ivorian Parliament through the adoption of Law No. 2002-202.[12]

3.2.3 Other Legal Instruments Relating to Biological Diversity

In addition to the instruments implementing the CBD, Ivory Coast has a number of other laws, decrees, and rules relating to the conservation and sustainable use

[10] Art. 2.

[11] Article 6 refers to the formulation "of a plan of action to ensure the conservation and sustainable use of biological diversity."

[12] *See supra* sec. 3.2.2.

of biological diversity that pre-date the CBD. The most relevant to genetic resources are:

- Decree No. 66-122 of 31 March 1966, identifying protected forestry resources;
- Decree No. 67-522 of 28 November 1967, regarding suspension of forest exploitation permits;
- Decree No. 67-567 of 15 September 1967, regulating the profession of exporter of wood or raw materials;
- Inter-Ministerial Rule No. 5085 AEF of 24 January 1968, implementing the provisions of Decree No. 67-576.

However, there are many other legal texts addressing various aspects of the conservation, use, and management of biological diversity.[13]

3.2.4 International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

In November 2001, Ivory Coast signed the ITPGR, and at the time of writing the ratification process is almost complete. The instrument of ratification was sent to FAO Headquarters in Rome in May 2003, following approval by the cabinet. The treaty, which considers the concerns of developing countries as the main providers of plant genetic resources, did not raise any particular objection. At this point it is too early to speak of initiatives for implementing the treaty, but all ministries are aware of its existence and implications. In technical terms, the state has created a number of the necessary structures for agronomic research and farmers' training, discussed above.

The priority of the government is to reduce poverty. As previously indicated, research focuses on plant genetic resources due to the importance of the agricultural sector. The Ivory Coast has concentrated its development efforts on agricultural products, and therefore on biological resources, in its fight against poverty.

The guiding plan for the agricultural sector sets forth a series of agricultural developments until 2015. The objectives are: improvement of productivity and competitiveness; research on self-sufficiency and food security; high diversification of agricultural products; and development of maritime and freshwater fishing. Ivorian policy emphasises the improvement and value of agricultural products, in particular export products. The value of direct and immediate use has been particularly emphasised.[14]

3.2.5 Forests

The project that may be the most important is the revision of the Forestry and Conservation of Nature Code. The forestry and fauna sectors in Ivory Coast require a thorough review before they can be adapted to the context of sustainable management and use. The proposal is for a bill that integrates all the broad issues in terms of biological resources. However, certain aspects of the management of water and of aquaculture will have to be the object of specific sectoral laws. According to preliminary investigations, this proposed framework law needs to address the conservation, sustainable management, and rational use of forests, fauna, and marine resources. These resources constitute the natural wealth of the country and are the national heritage that should contribute to the improvement of the lives of the people. The framework law also addresses the preservation of biological heritage; classification of animal species and their diet; hunting licenses, practices, products, and guidelines; guidelines for tourism; ranching, capture, and breeding of wild animals; the economic valuation of forest resources; and enforcement issues.

The Forestry Code is under the supervision of SODEFOR, a state company created by Decree No. 93-106 of February 3, 1993. Applications for access to genetic resources in forests under the authority of SODEFOR must be submitted to the Director General for approval. This structure, which is under the technical supervision of the Ministry of Water and Forests, is

[13] *E.g.*, Law No. 66-255 of 4 August 1965, relating to the protection of fauna and hunting rights; Decree No. 64-423 of 15 September 1966, establishing a regime for hunting permits and modalities for their distribution in the Republic of Ivory Coast; Decree No. 66-425 of 15 September 1966, regulating the trade, circulation, importation and exportation of trophies of protected animals and their carcasses; Rule No. 621 AGRI/EFC of 29 December 1966, for the elimination or removal of harmful animals; Rule No. 621 AGRI/EFC of 29 May 1967, regulating the destination of hunting products; Rule No. 1068 of 29 September 1967, regulating the hunting of crocodiles and monitor lizards for commercial purposes; Rule No. 1069 of 29 December 1967, regulating the capture of animals; Rule No. 68 of 23 January 1967, establishing fees for hunting and wild animal capture; Decree No. 66-428 of 15 September 1966, establishing procedures for the classification and declassification of protected forests; Decree No 94-368 of 1 July 1994, modifying Decree No. 66-421 of 15 September 1966, regulating the exploitation of soft and hard wood, for manufacture [such as polewood and furniture] and for fuel and charcoal; Rule No. 1399 of 4 November 1966, establishing modalities for the implementation of Decree No. 66-421; Decree No. 66-50 of 8 March 1966, regulating the forestry profession; Decree No. 66-420 of 15 September 1966, regulating wood industries; Rule No. 1577 of 5 December 1966, establishing implementation modalities for Decree No. 66-420; Rule No. 243 of 1 March 1967, correcting Rule No. 1577; Decree No. 66-52 of 8 March 1966, establishing modalities for the representation of the administration before disciplinary tribunals and procedures for transactions in forestry; Decree No. 66-427 of 15 September 1966, regarding sharing of net revenues from fines, confiscations, restitutions, damages, orders, injunctions, and transactions in matters of forestry enforcement; and Ordinance No. 93-106 of 3 February 1993, regarding the creation of a state company called the Forests Development Company (SODEFOR).

[14] *See also* Law No. 63-301 of 26 June 1963, relating to the repression of fraud in sales of merchandise and the falsification of foodstuffs and agricultural products; Law No. 64-490 of 21 December 1964, relating to plant protection; Law No. 88-650 of 7 July 1988, relating to law enforcement in the commercialisation of agricultural products, as modified by Law No. 89-521 of 11 May 1989; and Decree No. 92-392 of 1 July 1992, relating to the development and protection of plant varieties and the production and commercialisation of seeds and plants.

mandated to assist in elaborating and implementing government policy on developing the national forest heritage and forestry production, adding value to forest products, and conserving forest zones.

Articles 14, 15, 16, and 17 of the Forestry Code provide for user rights for fruits and natural products of forests. These rights go further than rights of use of the forest in encompassing its fruits and products; they are limited by the needs of the user and their family. Natural resources, particularly land, are exploited according to ancestral traditions. They cannot be considered the object of private appropriation, but rather they belong to the community.

The new forestry policy, adopted August 4, 1999, is an element of the Forestry Management Plan (1988-2015). The policy emphasises the necessity of balancing environmental concerns and economic productivity. This policy requires the rational and sustainable exploitation of forests and institutes measures, such as the requirement for reforestation in the book of obligations of forestry exploiters, the forestry exploitation perimeter (PEF), and reform of the forestry economy.

The forestry policy provides for the transfer of ownership of trees to rural communities. The policy also proposes a development program for the forestry sector. The general objective of the policy is to contribute to the sustainable development of Ivory Coast. Its specific objectives are to ensure the maintenance of the multiple environmental and socio-economic functions of forests in rural areas; protect and realise the value of the biological heritage of natural forests; ensure sustainable management of the various types of softwood; and contribute to the improvement of the incomes and livelihoods of rural communities.

The new policy is based on conservation of biodiversity resources in Ivorian forests and restoration of its productive capacity. The reforms promote the sustainable use of biological resources, and its implementation would contribute significantly to economic development in Ivory Coast by realising "investment in reafforestation, the creation of the sylvo-industrial complex, the enhanced value-adding with raw materials, the promotion of the economic valuation of biological diversity and eco-tourism." An action plan for implementing the new forestry policy is being executed.

3.2.6 WTO, TRIPs, and UPOV

Ivory Coast has been a member of the WTO since the entry into force of the Marrakech Agreement in January 1995. In acceding to the WTO, Ivory Coast also adhered, inter alia, to the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs). Although Ivory Coast has a few years before it must fully implement the TRIPS Agreement in 2006, steps need to be taken to create the necessary conditions. Limited efforts are underway, for example, to organize seminars and workshops to inform the public of the implications of the WTO Agreements. However, the reluctance of NGOs regarding certain provisions of the TRIPs Agreement, particularly article 27.3(b) addressing the patentability of lifeforms, should be noted.

The position of Ivory Coast regarding article 27.3(b) is in accord with that of the African Group and certain NGOs. This article provides that member states of the WTO may grant patents on plants and animals, and states must provide for the protection of plant varieties by patents, by an effective sui generis system, or by a combination of the two. In other words, if a state excludes "non-transformed" plants from patenting, it must protect the intellectual property rights of the inventor of a plant variety or a plant in which a foreign gene has been inserted.

Ivory Coast, as with other African countries, is concerned about the need for introducing patents on lifeforms, as it may contribute to misappropriation of biodiversity resources. Patents on lifeforms may favour the interests of industrial monopoles on technology, seeds, genes, and medicines. Such patents could also threaten the practical needs of sustainable agriculture, an in particular the lifestyles of communities that for generations have conserved, used, maintained, and improved plant varieties with their knowledge. They may suffer a form of injustice by not allowing them to profit from patenting their varieties. The difficulty arises because a patent can only be granted if three conditions are fulfilled:

- The invention must be new,
- The invention must involve an inventive step, and
- The invention must be industrially applicable.

Local communities are not able to meet these conditions, which favour multinational companies.

However, under article 8(j) of the CBD, member states must respect, preserve, and maintain the knowledge, innovations, and practices of indigenous and local communities that practice traditional lifestyles promoting the conservation and sustainable use of biodiversity. Communities must also receive an equitable share of benefits resulting from the use of this knowledge, innovations, and practices. Article 15.1 of the CBD recognizes the sovereign rights of states over their natural resources as well as the right to control their access.

There is, then, a conflict between the provisions of the TRIPs Agreement (article 27.3(b)) and the provi-

sions of the CBD mentioned above. The conflict takes place in the broad field of the dialectic relationships between international trade laws and the norms of the environmental protection. This conflict creates simultaneous ethical, moral, socio-economic, and food security problems. In effect, the granting of patents on genes, cells, DNA sequences, and other natural forms of life blurs the fundamental distinction between discoveries and basic scientific information, which are meant to be freely exchanged on the one hand, and genuinely invented products or processes that deserve to be protected by patents on the other.

Without completely rejecting the provisions of TRIPs, the amendment of article 27.3(b) has been requested to ensure compatibility with the relevant provisions of the CBD, including: recognition of national sovereignty over biological resources, prior informed consent, and fair and equitable sharing of benefits derived from the exploitation of biological resources and traditional knowledge. However, it should be noted that the identification of a gene or a gene sequence is a discovery (non-patentable), while the identification of the function of the gene is considered an invention.

The appropriate response to the concerns of Ivory Coast, particularly in terms of control over access to genetic resources, fair and equitable sharing of the benefits of biological resources, and the rights of local communities can primarily be found in the elaboration of a coherent legal framework. While this framework is still under construction, rights to the use of forestry resources exist in the field of forestry. Chapter II of title II of the Forestry Code is entirely devoted to rights of use. Article 7 provides for user rights that include what is found on the surface of forest soils, fruits, and natural products of forests, and commercial aspects of these fruits and natural products. The user rights found in the Forestry Code are of genuine utility, intermittent and not automatic, and give to those who exercise the right, for their needs and according to their residence, certain products of the forests of third parties. These rights are genuinely useful because of the profit that accrues to the possessor of the asset to which it is attached: whether this is the individual who lives there or who owns it, and not to a particular identified person.

In December 2000, Ivory Coast ratified the revised Bangui Accord of 1999 and became a member of the African Intellectual Property Organization (OAPI). Annex 1 of the agreement addresses the patentability of inventions. Article 6 provides for non-patentable objects. Inventions, the object of which are plant varieties, animal breeds, and essentially biological process for the production of plants or animals (except microbiological processes and the products obtained by these processes), are non-patentable. Microbiological processes and products obtained by these processes are clearly patentable. This provision follows article 27.3(b) of TRIPs.

Ivory Coast has not ratified the UPOV Convention, but in ratifying the Bangui Accord establishing OAPI, Ivory Coast committed to adhere to the provisions of UPOV 1991.

In Ivory Coast, there is, as yet, no national legal instrument dealing specifically with questions of intellectual property laws in the field of genetic resources. However, the Ivorian legal framework offers interesting elements in matters of customary laws over forestry resources.

Individual and collective rights of ownership are recognized on condition that forests are registered in their names and that they have a title deed.[15] The Rural Code contains the same concept, stating that ownership of land in rural areas is established by registering this land in the registry of title deeds opened for this purpose by the administration, and where this concerns land in customary areas by a certificate of title.[16]

Annex 10 of the Bangui Accord provides for the protection of plant varieties. Article 3 provides that all botanical genera are protected, except wild species or those that have not been cultivated or improved by people. In other words, plant species that have not been the subject of human intervention of one form or another, whether for cultivation or improvement, are excluded from plant variety protection.

For an object to be patentable, the same three criteria as enumerated above must be fulfilled, namely, newness, inventiveness, and industrial applicability.[17] The invention may be or relate to a product, a process, or the use of a produce or process. On the other hand, an invention that is contrary to public order or morality is excluded from patentability, provided it is not so considered only because its exploitation is prohibited by a legal or regulatory provision.[18] The reasons for these provisions may be found in the need to avoid problems with public order or the prejudicing of morality, as well as the provisions of article 6. The concepts of public order and morality are not precise but refer generally to moral and ethical values, as well as religious and philosophical values that define a society and in the name of which limits and bans are established.

15 Forestry Code, art. 26.

16 Rural code, art. 4.

17 Bangui Accord, ann. 1, art. 2.

18 *Id.*, art. 6(a).

Plant varieties, animal breeds, and essentially biological processes for the production of plants or animals are also excluded, whereas microbiological processes and their products are patentable. This regulation follows article 27.3(b) of TRIPs. Surgical, therapeutic, and diagnostic methods for the treatment of humans or animals are also excluded, as are simple presentations of information.

3.3 New Initiatives

In December 1997, the Ministry of Environment established a National Committee on Access to Genetic Resources responsible for examining a working document vaguely entitled "Preliminary Study of a Text for a Bill on Access to Genetic Resources." The key provisions of this text, which served as the basis for a new bill, are:

- Food sovereignty and security.
- Rights and responsibilities of the state.
- Rights and responsibilities of local communities.
- Value of traditional knowledge (biological diversity, technology, inventions, and indigenous culture).
- Genuine participation of local communities in decisionmaking concerning drafting and implementation of plans, policies, and programs for conservation and sustainable use of biodiversity.
- Regulation of access to biological and genetic resources.
- Fair and equitable sharing of benefits derived from the use of genetic resources.
- National bodies (including focal points and the
- National Committee on Access to Genetic Resources).
- Breeders Rights.
- Rejection of the patenting of lifeforms.
- Contracts for bioprospecting.
- Transfer of technology.
- The determination of benefits (monetary, non-monetary, or intangible benefits).
- Confidentiality agreements.

Following the meeting, the Ministry of Environment—in collaboration with the Ministry of Agriculture and the Ministry of Scientific Research—drafted legal texts on access to genetic resources and on genetically modified organisms (GMOs). The two texts will be presented to the cabinet for adoption, at which point there could be modifications in the texts. After their adoption by the cabinet, they will be sent to the National Assembly for further examination and then to the President of the Republic for promulgation. While there is no draft law on sui generis protection, the draft law on access to genetic resources is likely to take this into consideration.

The issue of benefit sharing between bioprospectors, rural communities, research institutes, and the government has not been resolved due to its extremely sensitive nature. Consideration is underway in the context of the process for developing a bill on access to genetic resources. Among the range of possible benefits, monetary benefits seem to prevail. The sharing of benefits between the state and bioprospecting or research and development companies is determined according to a contract, which must be concluded. However, other forms of non-monetary benefits should be considered, including capacity building, technical equipment, creation of infrastructure, elaboration of management techniques for biological diversity, publications, partnerships, and international cooperation. However, it is not easy to agree on the sharing of non-monetary benefits.

4. CONCLUSIONS

The regulatory system for access to genetic resources in Ivory Coast is at an embryonic stage, and informal approaches dominate. It is not surprising that this has facilitated the abusive extraction of genetic resources, which has entailed a considerable loss of resources.

Ivory Coast has genuine potential in the field of genetic resources and has initiated efforts in national and international research institutes and its universities for conservation. Protected areas provide mechanisms for in situ conservation, and Ivory Coast has approximately 147 protected forests with a total surface area of 2,900,000 hectares; 8 national parks covering 1,732,100 hectares; 6 natural reserves covering 339,630 hectares; and 16 botanical reserves covering 198,418 hectares. These protected areas represent a number of different ecosystems, but they are also rich in endemic resources.

In the context of ex situ conservation, Ivory Coast has developed, because of its agricultural focus, one of the most important collections of cultivated plant genetic resources in Africa. These collections specialize in the plant genetic resources targeted by research programs. Ex situ conservation sites tend to focus on reafforestation, and the rich collection of the National Botanical Centre bears mention. Certain research and educational institutions possess more modest collections, such as the Biosciences Education and Research Unit (FRU) at the University of Cocody, the Oceanographic Research Centre, the Research Centre for the Ecology of Algae and Protozoa, and the Swiss Centre for Scientific

Research, which is concerned with ferns. In the University of Cocody (Abidjan) and the National Botanical Centre, Ivory Coast has provided a unique resource in West Africa for more than 40 years. Professor AKE Assi of the University of Cocody (Abidjan) has developed a herbarium containing 58,500 specimens from across West Africa. The centre also provides a botanical garden containing numerous species conserved in living form or preserved in the herbarium for those that are in the collection of cultivated plants.

The workshops that have been held in Abidjan and the resulting reports have revealed a number of weaknesses. The first weakness relates to the legal framework. The Bangui Accord, Environmental Code, and Law No. 2002-102 (relating to national parks and natural reserves) all exist, but they do not address access to genetic resources. There are also institutional weaknesses, since there is no national centre for the conservation of genetic resources or national biosafety commission

The structures envisaged by the proposed law on access to genetic resources should be noted. These structures should allow for the regulation of the recurrent question of biopiracy and the management of risks. They should also contribute to the establishment of genuinely appropriate technology.

CHAPTER 11
ACCESS TO GENETIC RESOURCES IN THE REPUBLIC OF KENYA

Robert J.L. Lettington*

1. BACKGROUND

1.1 Physical

Kenya is located on the east coast of Africa, with the Equator running almost straight through the middle of the country. It has a land area of 582,644 km^2, of which 45,240 km^2 (7.8 percent) is national parks and reserves,[1] and an extensive coastline along the Indian Ocean. East Africa is well known for its wide range of ecosystems and Kenya is fully representative of this diversity. This includes high montane forests and afroalpine ecosystems, dense tropical lowland forests, plains and savannahs, and arid and semi-arid lands. In addition, the Kenyan coast consists of a diversity of ecosystems, including dry coastal forests, coastal dunes, floodplains, freshwater and saltwater marshes, mangrove forests, coral reefs, lagoons, sandy beaches, and rocky shores.[2] Kenya's freshwater and soda lakes are renowned for their levels of species richness and endemism,[3] despite only limited knowledge of the true extent of this diversity. These ecosystems support an estimated 35,000 identified species of animals, plants, insects, and microorganisms[4] and new species, particularly of plants, insects, and microorganisms, are constantly being identified. A significant proportion of these species are endemic to Kenya—larger if one considers the East African sub-region—and the country is home to a number of endangered or threatened species,[5] the best known including primates, megafauna, and birds.

Despite its diversity, Kenya is characterised by two fragile ecosystems: the Central Highlands and the arid and semi-arid lands (ASALs). The Highlands begin at the centre of the country and spread westwards and northwards, supporting the vast majority of Kenya's population and constituting the centre of crop cultivation.[6] The significance of the Highlands is founded on the combination of good rainfall, fertile volcanic soils, and a mild climate, making the region one of the richest agricultural areas in the world. The low-lying ASAL regions of Kenya are sparsely populated and cover the northern two-thirds of the country. In political terms the majority of North Eastern and Eastern provinces are ASALs, as is the majority of the north of Rift Valley Province. Rainfall is low, below 600 mm in most areas, and highly erratic with frequent droughts and severe problems of desertification.

Apart from these characteristic regions, there are three others that make up significant proportions of Kenya and contribute significantly to the country's biological diversity. On the western edge of the Highlands the land slopes down into the Lake Victoria Basin. Lake Victoria is the second largest freshwater lake in the world and the mass of water creates a microclimate for the woodland savannah in the region of the Basin.[7] The Coastal Belt and the Nyika Plateau (the classic Kenyan open savannah) are probably the most famous of Kenya's regions as they provide the basis of the country's tourism industry. The Coastal Belt receives regular rainfall from the northeasterly and southeasterly monsoons, and its forests are part of a chain running from northern Mozambique through Tanzania and Kenya, almost up to the Somali border. Arabuko-Sokoke is the main fragment of this forest remaining in Kenya, and East Africa,

** The author is Deputy Director of the Southern Environmental and Agricultural Policy Research Institute (SEAPRI), the legal and policy division of the International Centre of Insect Physiology and Ecology (ICIPE).* *The author would like to acknowledge the assistance of Gachambi Maina Mwang in certain aspects of the research for this paper. The opinions provided in this study are those of the author and do not in any way represent the official position of SEAPRI or ICIPE.*

1 Kenya: Land of Splendour at 2 (Ministry of Environment and Natural Resources (2000).

2 UNEP, Africa Environment Outlook 105 (2003).

3 *Id.* at 67.

4 A Summary of the Kenya National Biodiversity Strategy and Action Plan at 7 (Ministry of Environment and Natural Resources (2000).

5 UNEP, *supra* n. 2 at 67.

6 *Id.* at 200.

7 Kenya: Land of Splendour, *supra* n. 1.

today. It covers approximately 420 km^2 and is home to between 600 and 700 plant species,[8] more than 230 bird species,[9] a number of mammals and amphibians and a largely unstudied plethora of insects.[10] The key significance of this diversity is that it contains a high proportion of Kenya's threatened forest species: 50 percent of the plants, 60 percent of the birds, and 65 percent of the mammals, including several endemic or globally threatened bird and mammal species.[11] The savannah occupies the area between the Coastal Belt and the Highlands, the two meeting slightly to the east of the capital, Nairobi, and stretches into the south of the country. The savannah is relatively dry and primarily consists of scrub grassland with scattered acacia trees, the habitat that supports the majority of Kenya's wildlife.

In addition to the main regions of the country, Kenya contains a number of smaller ecosystems that are highly species diverse and are home to many of the country's endemic species. Notable among these are the Eastern Arc Mountains and Kakamega Forest. The Eastern Arc Mountains straddle the Kenya-Tanzania border and are the oldest mountains in the sub-region. The combination of age, a climate influenced by the Indian Ocean and the high altitude, separated peaks of the chain have nurtured unique montane forests that have evolved largely in isolation. These forests harbour large numbers of endemic animals and plants to the degree that they are acknowledged as one of the 25 internationally recognised hotspots of biodiversity.[12] Kakamega Forest occupies approximately 240 km^2 in Western Province and is the last remaining Kenyan fragment of the ancient Guineo-Congolian forests, which have a history of some 15,000 years[13] and used to stretch from West Africa right across Central Africa into what is now Kenya. The importance of these particular forests is indicative of the broader significance of forests to Kenya's species diversity. Kakamega alone contains 380 different identified plant species, 330 species of bird, a number of mammals, numerous lizards and amphibians, and innumerable insect species.[14] Between 10 and 20 percent of these species are found nowhere else in Kenya.[15] However, although 30 percent of Kenya is covered by forest or woodland, a mere 2 percent of this is genuine forest,[16] understood as closed canopy forest, and even this 2 percent is under severe pressure.[17]

The fact that an estimated 56 percent of Kenyans live below the poverty line[18] illustrates the level to which Kenyans depend on their natural environment and the resources it provides. Depending on the province between 20 percent and 70 percent have to travel for more than one hour to reach a dispensary,[19] and some 70 percent to 80 percent of the population depend directly on agriculture for their livelihood. The case of agriculture, particularly where this is predominantly rain-fed, is obvious but poverty and lack of effective primary health care also have significant implications as regards naturally derived products and traditional medicines. The established, and currently or previously exploited, values of natural resources are manifold. The Coastal Belt and freshwater lake environments provide their neighbouring communities with a range of products and services, such as fish and seafood (a number of communities depending almost exclusively on fish for animal protein[20]), construction materials, and energy sources, while also serving as the basis of a significant proportion of Kenya's tourist industry and other industrial and transportation activities.[21]

The natural environment also serves as the basis of the tourist industry in the rest of Kenya. However, just as in the Coastal Belt and lake basins, biological resources provide a wide range of products and services to the communities that live among, or near, them. They have been employed for agricultural, pharmaceutical, construction, textiles, ornamental, and other purposes that are of significant value to local communities but also to national and export markets.[22] Even the ASALs, which at first sight are resource poor, are valuable for a range of resources. The most obvious of these is livestock, an important but neglected element of the Kenyan economy, but the ASALs are also home to important species of medicinal plants and an unknown quantity of arthropods, microorganisms, and other resources. However, possibly the most important ecosystems economically are forests, with some 10 percent of the population estimated to live within 5 km of a natural forest.[23] Forests

8 Arabuko-Sokoke Forest & Mida Creek: The Official Guide at 15 (1994).

9 *Id.* at 18.

10 *Id.* at 19-26.

11 *Id.* at 10.

12 UNEP, *supra* n. 2 at 140.

13 Kakamega Forest: The Official Guide at 9 (1994).

14 *Id.* at 15-21.

15 *Id.* at 14.

16 FAO, Forest Resources Assessment (2000).

17 It should be noted that due to climatic conditions, only approximately 15% of Kenya could support closed-canopy forest. Arabuko-Sokoke Forest & Mida Creek: The Official Guide, *supra* n. 8 at 10.

18 The Little Fact Book: The Socio-Economic and Political Profiles of Kenya's Districts at X (Institute of Economic Affairs, 2002).

19 *See generally id.*

20 FAO, Review of the State of the World Fishery Resources: Marine Fisheries (1997).

21 UNEP, *supra* n. 2 at 105.

22 *Id.* at 67.

23 *Id.* at 140.

provide a range of resources, including fuelwood, grazing, polewood, and timber, with fuelwood supplying 75 percent of Kenya's energy needs[24] and the total value of these resources estimated at US$94 million per year.[25] However, the value of forests is not limited to the provision of basic commodities as they provide the majority of the plants that are the basis of traditional medicine and ethno-veterinary medicine for all the country's tribes as well as indirect benefits, such as their role as water catchments.

Every element of Kenya's enviable natural resource base faces severe threats. Erosion[26] and pollution[27] threaten the Coastal Belt. The inland areas of the Coastal Belt are also threatened by phenomena such as the clearance of mangrove swamps and destruction of coral reefs, which promote inundation and contamination from seawater,[28] as well the conversion of coastal forests to alternative land uses, primarily cultivation and grazing.[29] Rapid population and economic growth, as well as poor management have meant that conversion and direct consumptive uses are also the major threats to inland ecosystems.[30] The fragile ASALs are often threatened with desertification due to overgrazing and other unsustainable practices, whose impact is exacerbated by frequent drought. However, the biggest threat, and that with the most significant implications, is that to Kenya's indigenous forests. At least 20 indigenous tree species are endangered,[31] and the species that depend on these forests are not spared, with at least 23 of the estimated 1,086 bird species found in Kenya threatened with extinction.[32] The degradation of Kenya's forests is overwhelmingly the result of unplanned, and often technically illegal, conversion and development due to the pressure that population growth creates for fuel and agricultural land.[33] As noted earlier, the scale of the problem is severe: the remaining 2 percent of Kenya that remains under closed canopy forest being extremely vulnerable. Twenty percent of this remaining forest is made up of the Mount Kenya Forest Block,[34] which provides the water catchment for some two-thirds of Kenya's freshwater and is to be found at the edge of one of the more heavily populated regions of the country, the Central Highlands.

Alien invasive species also present threats to both specific species and, in some instances, whole ecosystems. The most prevalent of these affect Lake Victoria: the Nile perch and water hyacinth. The Nile perch was introduced to the lake due to its attraction for the fishing industry but its predatory nature has led to the disappearance of at least 200 endemic fish species,[35] particularly tilapias. The water hyacinth presents an even greater threat, forming dense mats on the surface of Lake Victoria. These mats inhibit water flow, even to the degree of preventing navigation, block the supply of sunlight and nutrients below the surface, and, when decomposing, release toxic compounds into the water.[36]

1.2 Political

In theory, Kenya operates a parliamentary government along the lines of the British, "Westminster" model, and thus Parliament is considered sovereign. However, unlike the British system, there is a written Constitution. The Constitution is based on the one drafted as part of the Lancaster House talks that led to Kenya's independence in 1963, but has been extensively amended over the last four decades. Kenya's executive branch is in the shape of the President as head of state. The President wields extensive powers, mostly granted by either the Constitution or Parliament, but also participates in parliamentary matters. Thus, there is only limited separation of powers between the executive and legislative branches of government and, in practice, it is not clear who the supreme constitutional authority is among Parliament, the Judiciary, and the President. The Constitution is currently being reviewed and this process is expected to be completed sometime in 2003, although it is not yet clear when the new text may be brought into force.

Kenya has remained politically peaceful and stable compared to many of its neighbours in East and the Horn of Africa. This fact has enabled it to remain relatively economically stable, maintaining its independence position as the largest economy in the sub-region,[37] the national economy being valued at 788 billion Kenya Shillings (approximately US$10.5 billion) in 2002. However, the economy first stagnated, and then slid into

24 FAO, *supra* n. 16.

25 UNEP, *supra* n. 2 at 140.

26 IOC-INC-WIO IV: Reports of Governing and Major Subsidiary Bodies, Fourth Session (UNESCO, 1997).

27 UNEP, *supra* n. 2 at 104.

28 *Id.* at 106.

29 *Id.* at 139.

30 Ministry of Environment and Natural Resources, *supra* n. 4 at 7.

31 Kenya Forests Working Group, *Endangered*, East African Standard, July 2, 2001, at 5.

32 M. Nyambala, *Rare Bird Species Threatened*, East African Standard, July 2, 2001, at 6.

33 UNEP, *supra* n. 2 at 141.

34 P. Ngare, *Situation at Mount Kenya*, East African Standard, July 2, 2001, at 4.

35 UNEP, *supra* n. 2 at 69.

36 *Id.* at 70.

37 Institute of Economic Affairs, *supra* n. 18 at X.

decline in the late 1980s and, in 2000, after five years of consistent decline, registered its worst performance since independence at –0.3 percent growth.[38] This economic growth level must be seen in the context of a population that is growing at approximately 2.5 percent,[39] a rate that is only gradually slowing, and government debt estimated at 605 billion Kenya Shillings (approximately US$8.1 billion), or 70.2 percent of the value of the national economy, in 2002.[40] The economic situation has had a profound impact upon basic indicators, with 56 percent of the population estimated to be living below the poverty line in 1999.[41] In only the three years from 1994 to 1997, rural poverty increased by 13 percent and urban poverty by 30 percent, while between 1999 and 2000 primary school enrolment fell from 86.9 percent to 67.6 percent.[42] Wealth is very unevenly distributed across Kenya, with Nairobi, Central, and Rift Valley provinces having human development indicators matching those of middle human development category countries, such as Mexico, and North Eastern, Eastern, Nyanza, and Coast provinces matching low human development category countries such as Sierra Leone.[43]

Two sectors dominate the economy: tourism and agriculture. The tourist industry is the country's second largest source of foreign exchange and was estimated to make up 19 percent of the gross domestic product (GDP) in 2000.[44] Despite a reasonably developed industrial sector and only 8 percent of the country under cultivation,[45] agriculture dominates Kenya's economy, providing a livelihood for 75 percent of the population, largely subsistence farmers, and estimated to provide 21 percent of GDP and 60 percent of foreign exchange earnings.[46]

2. INSTITUTIONS

Experiences with access to genetic resources activities in Kenya to date represent a broad cross-section of the field, with a full spectrum of actors ranging from the activities of students to those of multinational corporations. The examples provided here are not intended to be exhaustive but rather to present an overview of the types of activity that have been undertaken. The detail provided for each example varies significantly due to two factors. One is the existence of confidentiality regarding the details of many agreements, particularly in the commercial sector. The second is the fact that the ad hoc nature of many activities means that detail is not always readily available.

2.1 Commercial Access to Genetic Resources

Commercial interest in genetic resources falls into three broad categories. The first is that of formal activities involving in-country partners and conducted according to specific agreements. The second is that of activities conducted by corporations directly and is generally not covered by specific agreements. The third category is that of activities conducted by proxy, i.e. by local researchers on behalf of multinationals. The extent of activity in this latter category is particularly difficult to assess, as examples are usually only identified incidentally.

The activities of Diversa Corp., which is primarily involved in the hunt for industrially useful enzymes, is a good example of formally structured activity involving in-country partners. The partners in Kenya are the Kenya Wildlife Service (KWS) and the International Centre of Insect Physiology and Ecology (ICIPE), which cooperate under a framework agreement establishing their partnership for commercially oriented access to genetic resources projects. The third-party agreement with Diversa allows for the collection of a fixed number of samples, such as soil, water, etc., in areas under the jurisdiction of KWS over a period of years. Under this third-party agreement, the company retains intellectual property rights over any products that it develops, provided that ICIPE and KWS have the option of a royalty free license for local adaptation in Kenya where this is feasible.[47] As the in-country partners, KWS and ICIPE receive a number of fixed and variable benefits. The fixed benefits consist of financial resources, infrastructure assistance and training relating to the project's activities, although KWS and ICIPE view these as having the potential to contribute to broader scientific capacity building efforts. The variable benefits are those that depend upon successful product development on the part of Diversa and consist of milestone and royalty payments. Informally, Diversa has also suggested that it might consider providing matching funds for biodiversity conservation activities relating to its fields of interest. The legal basis of the ICIPE-KWS partnership, and thus in turn the third-party agreement with Diversa, is KWS'

38 *Id.*

39 World Bank, African Development Indicators 2001 (2001).

40 Institute of Economic Affairs, *supra* n. 18 at XI.

41 *Id.* at X.

42 *Id.* at XI.

43 *Id.*

44 World Bank, World Development Report 2000 (2000).

45 UNEP, *supra* n. 2 at 200.

46 World Bank, *supra* n. 39.

47 Although it is not expected that this will be a likely option.

statutory mandate to regulate research in protected areas, discussed in a later section of this case study. It should be noted that part of KWS' motivation in facilitating such commercially oriented activities is that it is hoped these will lessen the incentive for biopiracy. The mechanics of the arrangement are that the required authorisation for the project is embodied in the third party agreement between KWS and ICIPE of the one part and Diversa of the other, with KWS undertaking to ensure that all necessary Governmental permits or other authorisations are obtained. Collections are easily monitored as these are primarily conducted by ICIPE and KWS staff or, on rare occasions, by Diversa staff accompanied by ICIPE and KWS. At least one other multinational corporation is operating in Kenya under an arrangement similar to that of Diversa, and it seems possible that there is further room for the expansion of such activities.

A recent example of directly conducted corporate activity in Kenya is that of Genencor International Inc., a U.S. corporation with interests in Europe. In 2002, the company announced the development of a new product, an enzyme, which causes a faded look in denim. The denim industry has previously used a process of washing new denim with pumice stones to produce the faded look. The enzyme speeds up this process while also creating fewer problems with incidental wearing in the fabric. The commercial value of this enzyme is not yet clear but the scale of the denim industry suggests that it could run into the tens, if not hundreds, of millions of U.S. dollars. Genencor acknowledges that the enzyme was discovered by one of its scientists in a Kenyan saline lake but little detail is available on the legal basis of Genencor's activities in obtaining the enzyme. Given that all of Kenya's saline lakes fall within the boundaries of protected areas, the permission required for the conducting of any scientific research is given by the Kenya Wildlife Service (KWS). The KWS research application process is a generic one applying to any research activity in biodiversity conservation areas, including protected areas and private or public sanctuaries managed by KWS, and thus has no specific terms and conditions or guidelines relating to access to genetic resources and associated benefit sharing. At the time of writing there are no benefit sharing mechanisms in place regarding Genencor's discovery, although it is believed that informal approaches have been made post facto. Although Kenya is a party to the Convention on Biological Diversity, the absence of specific measures relating to access to genetic resources in the country means that Genencor's activities may be—despite the absence of mutually agreed terms, prior informed consent, or benefit sharing measures—legal in a technical sense, provided that they met the basic administrative requirements for a KWS research permit.[48] No research has, as yet, been conducted among the documentation of lead agencies such as KWS to determine the level of activity fitting this category.

The final category of corporate activity, that conducted by proxy as mentioned earlier, is the most difficult to assess. The reason for this is that such activities generally seem to be based on individual relationships, and thus agreements or arrangements involve foreign corporations and individual Kenyan scientists, but not the parent institutions of the Kenyans. As a consequence there is little or no screening and monitoring of such agreements, and the fact that the Kenyans involved are often scientists with little or no experience of the legal and policy implications of access to genetic resources means that they have very limited capacity to reach equitable agreements. A good example of this situation was an agreement between a chemistry professor at one of the major Kenyan universities and a major multinational corporation that became the subject of some discussion at a workshop in 1998. The agreement provided that the professor would forward to the corporation any samples of purified compounds that were developed during his research activities but that were surplus to his needs. The fixed benefits to the professor consisted of a payment of US$50 per sample, while the variable consisted of the payment of a royalty, to be decided at the corporation's discretion, in the event of the commercialisation of any product developed from the samples. The agreement contained no provisions regarding monitoring or reporting, and the samples were shipped unconditionally as regards ownership, intellectual property rights, or any other considerations. It is widely believed that this is not an isolated instance and that it is also probably one of the better examples in that there was at least some form of written agreement, despite concerns about its equity. On the positive side, awareness in public institutions of the concerns involved with any transfer of biological samples outside Kenya has dramatically increased in the last five years, and it is thus likely that these unscreened proxy arrangements are declining.

2.2 Governmental Institutions

The AGR-based activities of public institutions in Kenya also fall into three broad categories. However, in this sector the categories are defined by the nature of the

[48] As discussed later, the individual scientist operating in Kenya on behalf of Genencor may not necessarily even have been required to disclose his employer or ultimate purpose in any detail.

institutions involved rather than by that of the activities conducted. The most obvious category is that of Kenyan institutions, whether governmental or academic. These conduct activities primarily focused on national needs and interests although in certain instances they have acted in cooperation with foreign institutions, constituting the second category of activity. The final category of activity relates to international institutions that have a significant presence in Kenya.

The main institutions seeking access to genetic resources at the domestic level are the institutions that make up the national research system. These institutions are established by statute and, while being largely autonomous parastatal corporations, they are (nominally) coordinated by the National Council for Science and Technology (NCST) and derive their mandates from the Science and Technology Act.[49] Probably the highest profile of these institutions is the Kenya Agricultural Research Institute (KARI). One of KARI's key roles is in developing new varieties of key staple and commercial crops for the country. In pursuit of these activities, KARI has developed an extensive germplasm collection, which is primarily held at the national genebank (including both long-term cold storage and field maintenance of varieties). Since its establishment, the national genebank has also held significant collections on behalf of other countries in the sub-region, partly due to instability in those countries but also for standard duplication of accessions. While KARI has developed some varieties based on the collection of germplasm in Kenya, it has also made extensive use of the collections of the International Agricultural Research Centres (IARCs) of the Consultative Group on International Agricultural Research (CGIAR). In turn, Kenya has generally made its national collections openly available to the CGIAR and other countries. The ownership of Kenyan germplasm, and in particular nationally developed improved varieties, is currently somewhat in a state of flux. Under Kenyan law, applications for plant variety protection over most of these varieties have been made but many of these have been made jointly between KARI and the Kenya Seed Company. Kenya Seed is also a parastatal corporation,[50] thus maintaining ownership of germplasm by the government of Kenya. However, there have been discussions over the possible privatisation of Kenya Seed for a number of years now and it is not clear how the ownership of germplasm would be resolved in such an event. Finally, it should also be noted that the Kenya Plant Health Inspectorate Service (KEPHIS) falls within KARI, although there are plans to establish it as an independent entity. KEPHIS is responsible for plant variety protection, discussed elsewhere in this study, as well as plant health and quarantine issues, which may have an impact upon those seeking access to genetic resources in certain circumstances.

The Kenya Forestry Research Institute (KEFRI) conducts extensive AGR-based activities. Primary among these are research into and maintenance of useful tree species.[51] In addition, KEFRI conducts a range of activities involving non-timber forest products. Notable amongst these are KEFRI's initiatives to catalogue and conserve medicinal plants. A network of nurseries has been established nationwide, although funding has been a serious constraint on effective implementation. The cataloguing of medicinal plants has also proved problematic as, in the absence of any regime regarding the ownership of this knowledge, the catalogue cannot be made public without risking the loss of any intellectual property rights, whether these rights are individual, community, or national. This reflects somewhat the concept of the "tragedy of the anti-commons", where "too many property rights may lead to [an] underuse of research resources ... in which innovation is delayed or deterred altogether."[52]

The Kenya Medical Research Institute (KEMRI), and in particular its Traditional Medicine and Drugs Research Centre, is also substantially involved in applied activities relating to genetic resources, often in collaboration with other agencies, both foreign and local. The most obvious of these are its research into traditional medicines, both for their potential as phytomedical products and as the base for more sophisticated modern pharmaceutical products. This area is likely to expand significantly if a preliminary draft of a Traditional Health Practitioner's Bill, published by the Ministry of Health in late 2002, progresses. The bill proposes involving KEMRI in quality control of traditional medicines, which would inevitably involve some study of their contents and possibly even chemical structure, but also proposes the publishing of data on effective traditional medicines. This has significant implications for those

49 Laws of Kenya, ch. 250 (Rev. ed., 1980).

50 Although its ownership is currently under dispute with the revelation that the Government of Kenya's shareholding of 52%, held through the Agricultural Development Corporation, was secretly diluted to only 40%, thereby privatising the company, under the former regime. The new Government (as of January 2003) has announced its intention not to recognise, or in any way honour, the transactions that led to this dilution but it is not clear how this will be achieved in legal terms. J. Kisero, *Secret Buyers of Kenya Seed Shares Could Lose Millions as AG Probes Deal*, DAILY NATION, May 13, 2003.

51 Including, in certain circumstances, the establishment of plantations. A good example of this strategy is *Prunus Africana*, where the pressure on the wild population led to KEFRI investigating the viability of establishing commercial plantations of *Prunus* to relieve this pressure.

52 R. SHOEMAKER, (ED.), ECONOMIC ISSUES IN AGRICULTURAL BIOTECHNOLOGY 37 (2001), *available at* http://www.ers.usda.gov/publications/aib762 (last visited 3 July 2003).

seeking access to genetic resources by providing accurate information on the specific chemical activity of identified species. However, the bill, in its current form, undermines the rights of the traditional health practitioner's who agree to cooperate by providing that information on medicines be made public with no provisions regarding the rights of the knowledge holders who provide this information. The detail of this bill is discussed in more depth in section 4, hereinbelow.

Other national research institutions, such as the Kenya Trypanosomiasis Research Institute (KETRI) and the Kenya Marine and Fisheries Research Institute (KEMFRI), and those involved with particular agricultural products, such as the Pyrethrum Board and organisations focused on coffee and tea production, also conduct activities related to their specific fields that fit a broad understanding of access to genetic resources and that could be of considerable commercial interest both within Kenya and elsewhere.

The public universities[53] are also active in the field of genetic resources and play a variety of roles, apart from that of a proxy discussed above. The first of these is in the universities accessing resources for their own uses. As was mentioned earlier, chemistry departments are frequently involved in the collection of material, both plant and otherwise, for purification and analysis. In some of the more advanced laboratories, this extends to more applied uses, something that is likely to expand in an era of shrinking budgets and increased self-reliance. Other departments notable for their activities are: biology, microbiology, pharmacology and pharmacognosy, and botany. Botany departments also play a role in the official identification of plants intended for export, something that is required to meet the quarantine requirements of KEPHIS and to establish that the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), for which KWS is the management authority, are fulfilled. The public universities often conduct biodiversity-inventorying activities, pursuant to the Convention on Biological Diversity (CBD), and these have been growing more sophisticated in recent years. A good example of this is the University of Nairobi's participation in an international pilot project sponsored by the Global Environment Facility (GEF) on "below-ground biodiversity." This is expected to involve comprehensive collection activities in a few identified "hotspots," documentation and ex situ maintenance of specimens, and limited research on the microorganisms collected. At the time of writing there are no provisions established by the project regarding access to any material collected or to any evaluation or characterisation information that may be generated.

Public universities have often been seen as a, if not the, major point of unauthorised activity relating to access to genetic resources in Kenya. This has largely been because many of the individuals involved were not aware of the broader legal and political issues involved with access and benefit sharing. However, increasing awareness amongst faculties and administrations has begun to limit the problems of leakage. While approaches to addressing the issue are still generally informal and often random, they seem to be heading in the same direction as the policies of the national research institutions, which normally require clearance from some form of centralised research committee before activities such as the export of biological material can be undertaken. Remaining difficulties relate to the fact that the independent activities of numerous departments, satellite campuses, field projects, professors, and collaborators are difficult to manage in a manner that is effective but is not overly restrictive or burdensome in terms of transaction costs.

Where public universities continue to experience problems is in the activities of their students, and particularly those that are attached to foreign universities for post-graduate research work. These students frequently collect genetic resources in Kenya and then take them overseas, in both raw and purified form, as the focus of their theses. These materials are rarely, if ever, covered by any agreements relating to ownership, intellectual property rights, or similar matters, and little or nothing is known of their fate once they leave the country.[54] In theory, such activities require governmental permission, which is obtained from the Office of the President (OP) and NCST under a generic[55] process, which is discussed in more detail in section 3.1.3, hereinbelow.

Related to the activities of public universities is a bilateral project between several of them and a group of universities in Sweden that is supported by the Swedish International Development Agency (SIDA). The Biotechnology East African Regional Network (BioEARN) seeks to develop the capacities of universities in Kenya, Tanzania, and Uganda in modern biotechnologies. As part of the project, East African students travel to Sweden and conduct research on genetic

53 Private universities in Kenya generally do not have the necessary scientific capacity in the sciences and are thus not of concern at this time.

54 Cases, however rare they may be, such as that of the Ethiopian Endod, which was patented in the United States after a student used samples as the basis of his doctoral research at a university there, show that this can be a real issue for concern.

55 This process is "generic" in the sense that it applies to all forms of research conducted in Kenya, whether biological resource-based or otherwise.

resources they have collected in their home countries. Activities under the project are governed by an agreement among all the parties involved; and in Kenya, the involvement of NCST as a signatory to the agreement and in the policy aspects of the project is the source of its official authorization. The primary benefits provided to the countries providing genetic resources under this agreement are in the form of in-kind benefits, such as support for the training of the students involved and for the development of capacity and infrastructure at the partner institutions. The commercialisation of products is not an objective of the project, although, as with other activities, there has been concern over genetic resources leaving the country with limited monitoring capacity in place.

The National Museums of Kenya (NMK) falls under a slightly different bracket than the national research institutions. While it does conduct a broad range of research activities, it is administratively separate from the institutions discussed above in that it is not under the authority of the Ministry of Science and Technology but rather is established by the Antiquities and Monuments Act (1984).[56] In common with the institutions discussed above, NMK is a largely autonomous parastatal corporation. The most relevant of NMK's activities are those involving the East African Herbarium and the National Botanic Garden, which are both administratively housed within NMK, and physically located at NMK's headquarters in Nairobi. The Herbarium has conducted wide-ranging collections of plant genetic resources, even prior to Kenya's independence in 1963. However, the majority of these collections are stored as dried specimens, or are otherwise preserved, and are thus not of significant use as genetic resources in and of themselves. However, the Herbarium specimens may be important since they are usually accompanied with relatively detailed "passport data," which indicates when and where they were collected but frequently also ethnobotanical information. NMK is also involved with experiments in the micro-propagation of endangered species and similar endeavours that may have more direct relevance to access to genetic resources. Within NMK, the Kenya Resource Centre for Indigenous Knowledge (KENRIK) has focused on compiling traditional knowledge in Kenya, in particular medicinal knowledge, with encouragement by international agencies such as UNESCO. This has not been accompanied by the development of any policies regarding rights over, and access to, this knowledge, which is freely available, leading to some concerns regarding the rights of the initial knowledge holders. NMK is responsible for the administration of national monuments and in recent times several sacred groves, primarily in Coast Province, have been declared as monuments. The importance of these groves in the conservation of biodiversity has been recognised and thus the power to "control access to and development or use of any place or site that has been declared a protected area for purposes of preservation of the antiquities and monuments thereon," provided for in section 12 of the Antiquities and Monuments Act, has obvious implications for access to genetic resources found within them.

NMK provides the highest profile example of access to genetic resources by foreign public institutions through cooperation with Kenyan public institutions: the Millennium Seed Bank project of the British Royal Botanic Gardens at Kew (RBG-Kew). This project is collecting a broad selection of accessions from across the arid and semi-arid (ASAL) regions of northern Kenya as part of a global initiative for the conservation of biodiversity. Some reports on the project to date suggest that there has been a focus on the collection of medicinal plants. It is planned that the accessions will be kept in long-term cold storage in Britain and their viability monitored; they could thus be used for propagating purposes if so desired. The project operates under an ad hoc contract developed specifically for the purpose. RBG-Kew negotiated the agreement with NMK, NCST, KWS, KEFRI, a professor from the University of Nairobi Faculty of Law, and the Attorney General's Chambers while the Managing Director of the Kenya Industrial Property Institute (KIPI) chaired the final discussions. The agreement provides that the material collected will be kept exclusively for conservation purposes, and thus ownership and all associated rights remain with Kenya. The benefits provided to Kenya consist of support for NMK, including financial resources, training, and infrastructure assistance. It is also envisaged that the training components may involve staff from other lead agencies. Kenya also receives duplicates of all accessions, a significant benefit in and of itself. The high cost of collecting missions in the north of the country, primarily due to security issues, has meant that the Herbarium has been unable to collect in this region for decades. Despite the existence of the agreement, there has been some unease regarding the RBG-Kew agreement in Kenya. Although the project is intended to be exclusively for conservation purposes, early mention of royalties if a product based on Kenyan material were to be commercialised, combined with RBG-Kew's previous collaborations with multinational pharmaceutical corporations

[56] Laws of Kenya, ch. 215.

and the perceived focus on medicinal plants has led to concern in some quarters. The key problem may well be that Kenya has little capacity to monitor the use of collections stored beyond its borders and, even were it to have greater capacity, this might well be impossible anyway. Such a situation points to the relevance of the discussions on user measures in the Convention on Biological Diversity, as without such measures, fears of abuse might prevent many projects.

A number of international research institutions are headquartered in Kenya and conduct significant activities in the country. Primary among these are two IARCs of the CGIAR, the International Livestock Research Institute (ILRI) and the World Agroforestry Centre (ICRAF), and the independent ICIPE. All of these centres depend on access to genetic resources from a number of countries, but, due to their histories and location, a large proportion of their collections still have Kenyan and East African origins. The Government of Kenya does not generally regulate the centres, due to their intergovernmental status; rather they have internal policies that govern their collection, use, and distribution of genetic resources. Some IARCs have begun to accept conditions by donor countries on accessions deposited into their collections, but such a practice is both administratively complex and politically problematic. IARCs have traditionally provided free access to the bulk of their collections, the exceptions normally being materials under development. IARC collections have been, and continue to be, collected from tens of, and in most cases more than one hundred, countries; so moving to a system where accessions can only be distributed according to conditions established by each country of origin would create enormous bureaucracy, probably limit access, and require enormous financial resources. On the political side, it is difficult for an institution that is answerable usually to twenty or more member governments to have its policies and practices conditioned by particular countries. Where the IARCs collect in Kenya, the legal basis of these activities is their charters and host agreements, which specifically recognise the nature of the institutions' mandates. Consequently, they do not go through any further process for obtaining access to genetic resources. At the same time, the IARCs generally do try to co-ordinate their activities with any governments that may be affected by their activities, and the responsibilities and profile of their intergovernmental status has provided an incentive for effective self-regulation. The greatest problem for the IARCs headquartered in Kenya is that the absence of a clear Kenyan regime governing access to genetic resources, particularly on issues such as benefit sharing and prior informed consent, makes it difficult to assess whether the IARCs' internal policies sufficiently account for Kenyan priorities to the degree desirable for an international institution hosted by the country.

In an effort to resolve these uncertainties in the particularly sensitive field of commercially oriented access to genetic resources, ICIPE concluded a framework agreement with KWS in 2000 to undertake all such activities in Kenya as a full partnership between the two institutions. The activities undertaken pursuant to this agreement have thus far primarily involved ICIPE and KWS as one side of the agreement and foreign corporations as the other. Activities under the agreement are limited to areas under KWS jurisdiction, although ICIPE has agreed to forego any other commercially oriented access to genetic resources activity in Kenya. There are no specific terms and conditions for access or benefit sharing provided for in this agreement beyond an acceptance that, as full partners, KWS and ICIPE will share equally in any benefits that may be derived from their activities and that the institutions will apply these in pursuance of their respective mandates. Actual terms and conditions for access and benefit sharing in relation to partnerships developed pursuant to the agreement are agreed on a case-by-case basis. The framework appears to have been successful thus far, despite some early concerns about the terms and conditions that might be reached with third parties. However, the partnership is still relatively new, and no products have yet been launched by any of the third parties accessing genetic resources. The tangible realisation of benefit sharing in the event of commercialisation may prove to be the ultimate test of the partnership's strength.

2.3 NGOs

NGOs are also active in the development and management of genetic resources and their activities fall into several categories. One category is that of NGOs focused on the introduction of modern biotechnologies. These are largely Kenyan NGOs, although a number of them have extremely close relationships with foreign organisations. A number of these have recently been created, some with the support of foreign agencies and companies such as the U.S. Agency for International Development (USAID) and the Monsanto Corporation. Their objectives largely focus on the development of products for use by Kenyan farmers, and thus they do not appear to be involved in the export of genetic resources. The activities of these groups have thus far

focused on products for use by resource-poor farmers, such as the micro-propagation of disease-free banana suckers, and thus immediate commercialisation has not been an issue. However, the NGOs with clearly strong, but often discreet, links with particular foreign corporations have raised concern in some quarters.

A second category of NGOs includes those, both Kenyan and foreign, that are involved in rural development projects and have initiated the establishment of facilities such as community seed banks or have promoted the introduction of participatory plant breeding or formally improved crop varieties. Thus, while these groups are not seeking access to genetic resources themselves, they are promoting the development and use of these resources by Kenyan communities.

A third category of NGO focuses on traditional medicines. The activities of these groups tends to be similar to those of KEFRI and KENRIK, discussed above, in that they are primarily concerned with the documentation of traditional knowledge and associated activities, such as the establishment of nurseries for medicinal plants. The absence of a policy framework for these activities, in the light of the risks of the alienation of traditional knowledge through publication, has been a cause for concern in recent years.

A final category of NGO engaged in genetic resource issues are those focusing on the policy aspects of the field. In Kenya, this has almost exclusively involved the activities of the Worldwide Fund for Nature (WWF), an international NGO, and the African Centre for Technology Studies (ACTS), a regional intergovernmental organization, although a number of other NGOs have occasionally sought to intervene on particular practical issues, such as community seed banks. The activities of WWF and ACTS were restricted to a short period in the late 1990s and are discussed in section 3.1.2, hereinbelow.

3. LAWS AND POLICIES

Kenya has no specific regulatory regime in place governing access to genetic resources. Pieces of a potential regulatory structure have been put in place, but they have yet to develop into a substantive regime. However, there is a range of statutory, regulatory, and policy provisions in place that affect access to genetic resources, whether directly or indirectly. These are largely sectorial provisions, designed with other purposes in mind, but due to the nature of the implementing agencies for some of these provisions they have come to have a wider significance in recent years.

3.1 Specific Access to Genetic Resources Legislation and Policies

The basis of a regulatory regime governing access to genetic resources exists in terms of a framework statutory provision, while there are also administrative provisions, legally in force, that derive from earlier efforts to establish just such a regime.

In policy terms, the primary document of relevance is the Kenya National Biodiversity Strategy and Action Plan (NBSAP).[57] In its strategy component, section 4.6 of the document points out the need to "formulate a national policy on bioprospecting and trade in biodiversity products."[58] Section 4.11 of the Strategy specifically addresses access to genetic resources and contains two elements. The first is that Kenya will "develop and implement policies and legislation to articulate and regulate the rights of access to, and benefit sharing, of national genetic resources." The second is that Kenya will "strengthen the capacity of Kenyans to carry out bioprospecting activities." The government of Kenya has not, thus far, undertaken any activities to implement this stated policy.

The Action Plan builds upon the Strategy in actions 19 and 21.4. Action 19[59] provides that, by 2000, Kenya will "facilitate access to genetic resources and transfer of technology" and that the government of Kenya, KWS, NMK, and NCST will take the lead in this activity. No specifics are given as to what "facilitating access to genetic resources" might involve. As of the publication of the NBSAP, no policy initiatives have been undertaken by any of the agencies referred to, although some of them have undertaken practical activities, as discussed in section 2, hereinabove. Action 21.4[60] provides that, by 2001, Kenya will "explore options and modalities for access and benefit sharing mechanisms in the national context" and that the government of Kenya, NCST, NMK, universities, and NGOs will take the lead in this activity. As with action 19, no action has yet been taken to implement this provision and it is not clear what its implementation may involve.

3.1.1 The Environment Management and Coordination Act (1999)

The Environment Management and Co-ordination Act (1999) is Kenya's framework legislation coordinating

57 Kenya National Biodiversity Strategy and Action Plan (Ministry of Environment and Natural Resources, 2000).

58 A Summary of the Kenya National Biodiversity Strategy and Action Plan, *supra* n. 4 at 24.

59 *Id.* at 34.

60 *Id.* at 35.

all environmental management activities in the country. As such, it constitutes the primary implementing legislation for the CBD. A number of the provisions of the Act have either direct or indirect potential impacts on the issue of access to genetic resources. The most obvious of these is section 53, "access to genetic resources of Kenya." In general terms, section 53 mandates the National Environment Management Authority (NEMA) to "issue guidelines and prescribe measures for the sustainable management and utilisation of genetic resources of Kenya for the benefit of the people of Kenya." In more specific terms, sub-section 53.2 requires that any guidelines issued or measures prescribed,

> shall specify -
> a) appropriate arrangements for access to genetic resources of Kenya including the issue of licenses and fees to be paid for that access;
> b) measures for regulating the import or export of germplasm;
> c) the sharing of benefits derived from genetic resources of Kenya;
> d) biosafety measures necessary to regulate biotechnology;
> e) measures necessary to regulate the development, access to and transfer of biotechnology; and,
> f) any other matter that the Authority considers necessary for the better management of the genetic resources of Kenya.

Two features are immediately noticeable about these specific requirements. First, they go far beyond orthodox understandings of the concept of access to genetic resources in the context of article 15 of the CBD by addressing issues such as biosafety and access to, and transfer of, biotechnologies. Second, these provisions suggest that the option of issuing guidelines is largely precluded since several of the measures clearly require the force of law, in particular those of sub-section (b) relating to the import and export of germplasm.

The breadth of these specificities may create conflicts, or at a minimum overlapping mandates, between NEMA and Kenya's established authorities. In particular, clarification will be needed regarding interaction among: Kenya Plant Health Inspectorate Service (KEPHIS), with a mandate including plant quarantine and protection; the interdisciplinary National Biosafety Committee headed by the National Council for Science and Technology (NCST);[61] and NCST, the Kenya Industrial Property Institute (KIPI), and the national agricultural research institutions, in particular the Kenya Agricultural Research Institute (KARI), with their mandates including matters of technology development and transfer. The relationship between the mandates of NEMA and the Kenya Wildlife Service (KWS) is also unclear, as KWS has exclusive statutory jurisdiction over all matters relating to protected areas.

The impact, if any, these questions may have on the basic aspects of access to genetic resources and associated benefit sharing in Kenya is unclear. For example, current practice is that any international shipments of germplasm are subject to quarantine restrictions, but the inclusion of a mandate for NEMA to address issues of the import and export of germplasm could potentially lead to changes in this system. The main reason for this uncertainty is that NEMA is yet to take action under section 53, nor has it initiated any preparatory consultations. NEMA has made it clear that the process of implementing section 53 is not imminent because it has not been given a high priority and NEMA has limited financial and human resources.

3.1.2 Administrative Provisions

Prior to the publication and entry into force of the Environment Management and Co-ordination Act, several initiatives were undertaken to develop regulations governing genetic resources in Kenya. The first of these was prompted by the activities of two NGOs, the World Wide Fund for Nature (WWF) and Africa Centre for Technology Studies (ACTS), in initiating a national dialogue on the subject. Under the Chairmanship of NCST, due to its mandate regarding research in Kenya, a cross-sectorial Expert Group on Access and Benefit Sharing was convened. The Expert Group consisted of representatives of the two NGOs and key lead agencies, ministries and departments and progressed to the point that the structure of a committee to oversee the management of a future regulatory system was gazetted, thus providing it with legal force, in 2000.

At the same time, the National Museums of Kenya (NMK), under the mandate of the East African Herbarium but otherwise without a statutory mandate, developed a Plant Genetic Resources Working Group. This initiative was largely prompted by the interest of NMK's British partner, the Royal Botanic Garden at Kew (RBG-Kew), in undertaking significant collecting activities in Kenya, discussed above in section 2.2. The drafting sub-committee of this group included representatives of a number of lead agencies and the Office of the Attorney General and developed a preliminary draft of

[61] The National Biosafety Committee oversees the implementation of the National Regulations and Guidelines for Safety in Biotechnology in Kenya (1996), which outline measures for risk assessment, management, and monitoring of operations involving GMOs, rDNA technologies, and products arising from these.

possible regulations that were presented at a public workshop for consideration. In 1999 and 2000, the possibility of unifying the NCST and NMK initiatives was discussed; however, before this could be achieved both initiatives stalled and have yet to be effectively restarted.

A combination of factors led to the stalling of these initiatives, and despite being legally established the committees developed by them have never been convened. The entry into force of the Environment Management and Coordination Act had a significant impact, in that it undermined the legitimacy of the existing initiatives without replacing them with an initiative under the new National Environment Management Authority. It is possible that NEMA may revisit the results of these initiatives when it does address the implementation of section 53. The NCST-led initiative also suffered from the departure of key staff, while the conclusion of an ad hoc agreement for the RBG-Kew collecting project removed much of the impetus and available resources for the NMK-led initiative. It is unclear at this point whether NEMA will, at some point in the future, make use of the collective experiences of these two initiatives.

3.1.3 Institutional Structures

As illustrated by the discussion in section 2, hereinabove, there are a multiplicity of lead agencies that have some form of mandate of relevance to genetic resources and many of these also have powers, more often de facto than de jure, to authorise and facilitate access. However, there is also a more political structure that plays a critical role from the point of view of any applicant for access to genetic resources. The Office of the President (OP) and NCST are often the key agencies in granting permits to access genetic resources through their control of the authorisation of all permits for research in Kenya, whether for Kenyans or foreigners. The granting of research permits has become the de facto system of authorization for access to genetic resources where a researcher is not operating through a lead agency, and in some cases is still required in these cases. The line between where OP/NCST authorisation is required and where it is not is difficult to draw, as neither this authorisation process, nor those of many lead agencies, are explicitly established in law but are rather interpreted under broader mandates. The OP/NCST process is administratively, rather than legislatively, established, apart from NCST's statutorily established general supervisory role in research activities, and involves several steps. The first is an application for a provisional permit, which is normally obtained from OP, or more often from the Ministry of Education on behalf of OP. The requirements for a provisional permit include the submission of a research proposal, the payment of an administrative fee[62] and the identification of a Kenyan partner institution or sponsor. Provisional permit holders are allowed to conduct their research pending the issuance of the final permit, although where the research is to be conducted in rural areas the permit holder is required to inform the local administrative authorities (usually the District Commissioner or Chief, both representatives of OP) of their activities. Once a provisional permit has been issued the application is forwarded to NCST for review. NCST forwards copies of the application to any relevant lead agencies for comment and then gives final approval or denial. The fact that one can act, including collecting and exporting genetic resources, under a provisional permit has led to concerns of loopholes, particularly regarding biological resource-based activities. The reason this is accepted is that the original process, which did not allow for activities prior to the issuance of the final permit, was considered too time-consuming, thereby stifling research, particularly for those with limited funds to support their work.

3.2 Legislation and Policies with Relevance to Access to Genetic Resources

3.2.1 The Constitution of Kenya (1992)[63]

The Constitution of Kenya (1992) does not directly refer to the scientific or commercial fields and only refers to the environment in the context of governmental powers for the purposes of conservation. As a consequence, it does not directly refer to the ownership of, access to, or benefit sharing of genetic resources. However, certain provisions can have direct impacts on these questions, while others could have some indirect effects depending on how case law may develop. In particular, the Constitution's provisions regarding personal property and trust land may be relevant. The "may" should be stressed as there has no been no litigation on the matter and Kenyan courts are traditionally hostile to broad legal interpretations, except regarding executive powers. The dearth of constitutional precedents largely derives from the reluctance of the judiciary to question executive powers, although the current political transition and proposed reforms of the judiciary may contribute to a more activist judiciary.

Furthermore, the Constitution is currently undergoing a comprehensive review, which is intended to be

62 At the time of writing, fees ranged from Kenya Shillings (KShs) 50 for Kenyan undergraduates, KShs10,000 for Kenyan researchers, and US$250 for foreign researchers.

63 The Constitution of Kenya 1992 (1987), as *amended* 1997.

complete by mid- to late 2003. Although the review process is primarily concerned with political structures and dispensations, environmental questions[64] have been raised at some of the Review Commission's public hearings and at least questions of land ownership and usage will be a major issue. Discussion regarding land may be extended to related issues, such as deforestation, watershed management and similar environmental questions, due to the high profile these have had in recent Kenyan history. As can be seen in discussion regarding some of Kenya's sectorial legislation elsewhere in this study, the management of specific areas, such as watersheds or forests, may indirectly affect access to any genetic resources in such areas due to the assigning of general resource management responsibilities. In short, the new Constitution can, at a minimum, reasonably be expected to have a fundamental effect on the provisions of the existing Constitution relevant to governing genetic resources. Interest in related questions, such as scientific research and intellectual property rights, may lead to the inclusion of further provisions of relevance to access to genetic resources but it is not clear what form these might take at the time of writing.

3.2.1.1 Genetic Resources and Trust Land

The aspect of the Constitution of Kenya most relevant to access to genetic resources is chapter IX, dealing with the status of trust land in the country. Trust land is a major component of the tenure system in Kenya, in its various categories making up some 456,991 km^2, or 78.4 percent of the total land area, in 1990.[65] Almost the entire northern two-thirds of the country are trust land, while there are also significant areas in the coastal, eastern, and southern regions. There is a significant correlation between areas traditionally inhabited by pastoralist tribes and trust land.

Section 115 places the principal responsibility for trust land in county councils, for instance the Narok District Council is responsible for the Maasai Mara national reserve and various other pieces of trust land within its jurisdiction. Bodies of water that had been subject to the authority of the central government at independence remain so, and no rights to minerals or mineral oils are vested in county councils. Subsection (2) of section 115 is of critical importance as it is the clause that obliges county councils to hold trust land for the benefit of the ordinary residents of the land and to "give effect to such rights, interests or other benefits in respect of the land as may, under the African customary law for the time being in force and applicable thereto, be vested in any tribe, group, family or individual."

With 42 major tribes, and numerous sub-tribes and clans, it would be impossible to discuss the details of all customary laws and practices here. As an example, among pastoralist tribes, "in general, natural resources are usually owned by the highest social level . . . recognized in the group, and are then allocated down the hierarchy to lower levels of social organization through intricate systems of distribution."[66] However, this "ownership" is not so much a private right as part of a system of "public trusteeship and stewardship."[67] Amongst the Turkana of northwestern Kenya,[68] whose land is all trust land, this pattern is reflected in the concept of "ekwar" (pl. *ngikwarin*): the rights of use relating to trees. Although not explicit in Turkana customary law, *ekwar* also refers to control of land. The sense of ownership is somewhat flexible. The herd owner controlling an *ekwar* is seen as owning the resources contained within it but his close relatives and some outsiders do have rights to access and use these resources without prior permission. The scope of these rights of access and use for those other than the "owner" varies considerably between wet and dry seasons, reflecting the relative availability of resources. In addition, while *ngikwarin* are relatively long-term rights, frequently being "owned" through generations, their maintenance is dependant upon recognition by the wider community of use by the "owner." *Ekwar* may not relate directly to access to genetic resources, given its focus on more immediately consumptive uses of resources, but access to genetic resources is not a common activity among the Turkana. In the event of a researcher seeking the permission of the Turkana for access, it is likely that the community would adapt the basic concepts of *ekwar*, or one of their other customary laws relating to resource use, to the new situation, much as courts of law often do. Evidence of this can be seen in the practices of a Maasai herbalist in the Kajiado District of Kenya. After expressing interest in publishing the details of his medicines, the herbalist was queried about his individual rights to do so. He replied that while he felt he had the right he could not actually do so without the permission of the elders of his extend-

64 In particular an NGO lobbying group, the Greenbelt Movement, has conducted a high-profile campaign for the consideration of environmental protection, particularly questions of *locus standi*, in the new Constitution. One of the justifications is that this will improve general governance in the country.

65 Peter Ondiege, *Land Tenure and Soil Conservation*, in CALESTOUS JUMA & J.B. OJWANG, IN LAND WE TRUST 117, 123 (1996). Data derived from REPUBLIC OF KENYA, STATISTICAL ABSTRACTS (1991).

66 M. NIAMIR, COMMUNITY FORESTRY: HERDERS' DECISION-MAKING IN NATURAL RESOURCES MANAGEMENT IN ARID AND SEMI-ARID AFRICA 51 (1990).

67 Edmund Barrow, *Customary Tree Tenure in Pastoral Lands*, in JUMA & OJWANG, *supra* n. 65 at 259, 260.

68 Discussion of the Turkana concept of *ekwar* is derived from Barrow, *supra* n. 67 at 267-69.

ed family.[69] Publishing books on traditional medicine is not a traditional activity of the Maasai and the fact that the herbalist saw it falling within the range of activities customarily requiring the permission of elders demonstrates the application of customary law to new situations.

At a minimum, these examples suggest that if one were to seek access to genetic resources in a region where customary law applied pursuant to constitutional provisions then the permission of the elders from the region would be required. It is not clear what terms and conditions for access a council of elders might deem appropriate, particularly relating to benefit sharing. In addition, the fact that customary laws generally provide for flexible and limited user rights based on need, rather than alienation and absolute ownership, may cause problems when issues such as the option to seek intellectual property rights over genetic resource-based products are introduced.

Despite the recognition of customary law in trust land areas, the force of these laws is qualified by the requirement that they will only be recognised to the extent that they are not "repugnant to any written law."[70] This qualification generally reflects the Kenyan government position regarding the relationship between the dominant common law system and the various customary systems that can be found in the country. Customary systems are accepted to the extent that they do not conflict with constitutional, statutory, or regulatory provisions. In section 3, the Judicature Act[71] extends this to case law through the recognition of English common law as applicable law in Kenya, thus giving it the status of written law in relation to customary law, although it is still considered subordinate to other forms of written law. The relationship between the common and customary legal systems is generally interpreted in a flexible manner such that the common law courts will recognise customary practices in marriage, inheritance, and similar matters where all the parties involved recognise these practices. Given that the Kenyan parliament has yet to enact any legislation on the subject of genetic resources, and no ministry has promulgated regulations, customary law could be assumed to have significant force where access is sought to genetic resources found on trust land. However, this role could be extinguished in the event of a specific regulatory regime being promulgated.

Section 116 of the Constitution is relatively straightforward but significant in that it allows for councils to provide for the excision (alienation) of trust land provided that this done in accordance with a relevant act of Parliament. In a similar vein, sections 117 and 118 allow for the setting apart of trust land by the county council under parliamentary authorisation and by the central government respectively. The grounds for setting apart trust land generally relate to public use or use for the benefit of the people of Kenya. In the absence of precedent, and with the historical examples of allocation of land to individuals with little evidence of benefit to the nation, the latter category of grounds for setting apart seems extremely broad. Where land is set apart under either of these sections, according to subsections 117(2) and 118(4)(a), "any rights, interests or other benefits in respect of that land that were previously vested in a tribe, group, family or individual under African customary law shall be extinguished," thereby ending the government's fiduciary responsibility to the traditional occupants of the land. In both cases, compensation is required for any group or individual whose rights have been thus extinguished, but there is no requirement for any form of hearing and the Constitution is also silent on the subject of judicial review. In high profile cases, such as that of large-scale development projects in Turkana,[72] traditional rights have generally been ignored and no compensation paid. Ultimately, sections 116–118 would seem to mean that, in the case of trust land, the central government can override any form of local rights, including those to any resources related to that land. Given that trust land is theoretically held as such for the benefit of its specific traditional occupants, and not for the nation as a whole, the fact that the government can extinguish these rights at will would seem to be a precedent that the government has the power to claim authority over any land, or rights associated therewith, including rights to control genetic resources. This also, in theory, means that compensation to the original rights holder would be payable by the government but the precedent of no compensation being paid combined with the current political transition makes the entire situation highly unpredictable.

3.2.1.2 Genetic Resources and Parastatal Corporations

Section 75(7) of the Constitution, an element of the constitutional property regime, has direct impact on access to genetic resources and, while it is not explicitly mentioned, can be assumed to underlie the statutory authority of the national research institutions, discussed above. This section stipulates that any law that provides for compulsory acquisition for the benefit of parastatal

69 R. Lettington & G. Maina, *Concepts of Traditional Knowledge in Kenya* (Unpublished, on file with author).

70 Constitution of the Republic of Kenya, sec. 115(2).

71 Laws of Kenya, ch. 8.

72 *See, e.g.*, Barrow, *supra* n. 67 at 269.

institutions cannot be held to be unconstitutional. Thus, any genetic resource could be seized for use by institutions such as KARI or the Kenya Medical Research Institute (KEMRI), despite the fact that both of these institutions have been involved in the commercialisation of products, sometimes in partnership with the private sector. The operation of section 75(7) can be seen in KARI's activities in plant breeding, where compensation has not been paid for its use of farmers' landraces, and in some of KEMRI's research on traditional medicine. In both of these cases, the institutions have accessed resources in an atmosphere of cooperation with communities, and thus 75(7) has not really had to be invoked. It is not clear exactly what the limits of this provision might be, particularly if a compulsory acquisition of something like private sector intellectual property rights were to be ordered for the benefit of a parastatal.

3.2.1.3 The Constitution of the Republic of Kenya: Genetic Resources as Property

Kenya approaches the concept of property based on the English common law system, except for the instances where this is superseded by the Constitution or statute. This concept provides for the two basic categories of "real" and "personal" property, the former encompassing land and the latter everything that is the subject of ownership and not coming under denomination of real property. The understanding of real property includes land and whatever is erected or growing upon or affixed to land to the extent that it is considered immovable by law. In many cases this includes anything beneath the surface and the air above, although this area is the subject of most of the exceptions created by both common law and by the Constitution or statutes in Kenya. Personal property includes corporeal personal property, which consists of movable and tangible things, such as goods, chattels and money, as well as intangible property, which consists of rights such as patents, copyrights, and stocks and shares. The exceptions to these broad categories of property generally involve specifically identified assets, such as minerals or mineral oils, and rights of way, such as through airspace, over which the government retains control for the benefit of the public.

Kenya, like many other African states, has yet to address the legal status of genetic resources. Depending upon precise interpretations, in their terrestrial form they could be considered as part of the rights that make up real property, in that they invariably are growing upon or are affixed to land in some manner. This approach is supported by a decision of the High Court, which held "that according to common law and/or customary law of the inhabitants of this country, those entitled to the use of land are also entitled to the fruits thereof which include the fauna and flora unless this has been negated by law."[73] However, given that under most definitions of a genetic resource, its value is primarily in its more intangible aspects, such as knowledge, or the traits, of a particular genetic sequence or chemical compound, they would seem to exist more in the realm of personal property. As the Kenyan Constitution simply deals with property, i.e. both real and personal,[74] this ambiguity does not currently have constitutional consequences. If any future regulatory regime does clarify the matter, this may have consequences in the application of land laws.

The main potential constitutional question regarding genetic resources is whether they are an asset controlled by the state, or whether they are the subject of private ownership and control. There is little case law to shed light on this matter, and practice to date is not consistent. For example, the activities of the RBG-Kew project provide for benefits to go to national agencies rather than to the traditional occupants of the trust land where the activities are carried out, thus implying governmental control of the genetic resources involved. The activities of KWS and the KWS-ICIPE collaboration shed no light as they take place exclusively in national parks, which are government land. The activities of other parastatal corporations do not give any hint either as these are specifically addressed by section 75(7) of the Constitution, as discussed earlier. However, the fact that in the development of most genetic resources projects institutions have clearly indicated a desire to avoid private property, explicitly because of the question of rights, suggests that there is some belief that genetic resources may be the subject of private ownership and control. The actual question of whether the government owns nationally applicable rights to genetic resources, has limited powers to regulate the use of these rights, or only has powers over genetic resources on government controlled land (bearing in mind that trust land, and thus the majority of the country, would have to be addressed separately) is thus open and is only likely to be resolved through the development of a statutory or regulatory regime, and perhaps even only with litigation regarding the implementation of that regime. The Hassan v. KWS

73 Abdikadir Sheikh Hassan and 4 Others v. Kenya Wildlife Service, Civil Case No. 2959 (High Ct. of Kenya, 1996).

74 This is established both by the plain meaning of "property," as addressed in the Constitution and in the common law, as well as by the practice of administrative agencies of the government. For example, KIPI regards the issue of fair compensation for compulsory licensing or governmental use of patents, which are clearly personal property, as being a constitutional issue within the context of section 75, despite the fact that the issue has never been decided upon by the courts.

case would seem to suggest that in the absence of statutory or regulatory provisions, private rights apply; but the development of a regulatory regime could extinguish these rights. However, this case was not a constitutional reference and thus the precedent could be overruled.

The substantive provisions of the Constitution addressing property, as noted in the preceding discussion likely to include property rights in genetic resources, are introduced by the umbrella provisions of section 70 and dealt with in more detail by the specific provisions of section 75. Section 70 of the Constitution establishes fundamental rights and freedoms, subject to the condition that their maintenance shall not infringe upon the fundamental rights and freedoms of others. Thus, section 70(c) provides citizens with "protection for the privacy of his home and other property and from deprivation of property without compensation." The details of the fundamental rights and freedoms are provided in later sections. In the case of rights to property, the detail is provided section 75, which delineates the Government's powers of eminent domain, also known as compulsory taking. Under subsections (1) and (2), the government may compulsorily take possession of property, or any interest therein or right thereover, only where such is deemed necessary for various public interests, such as public safety, public order, etc., and, perhaps most importantly for discussion here, for the development or utilization of property so as to promote the public benefit. The government must promptly pay full compensation for any such seizure, but first the government actions must meet a test where the public need justifying a seizure is balanced against the hardship it will cause to any person with an interest in or right over the property in question.

Discussion of section 75 here necessarily assumes a scenario where the government determines that genetic resources are the subject of private rather than public property rights or, in the alternative, that they may be considered an "interest in real property," i.e., part of the rights to a piece of land that constitute its value. This scenario essentially commoditizes individual sources of genetic resources. Where a genetic resource has potential for use in fields such as pharmaceuticals or agriculture, it is not hard to imagine a situation where its "development or utilization" might "promote the public benefit" in a country with systemic problems in the public health and agricultural sectors. Under this interpretation the government, even in a situation of private property rights, has the power to be the ultimate arbiter concerning access to genetic resources.

Still assuming a private property scenario, section 75 could also be argued to address benefit sharing issues. In order to fulfil the compensation requirements of section 75, a determination of what constitutes "full compensation" must be made. In the first instance, this determination would be made by the government, although it would be subject to judicial review. If compensation were to be made on the basis of raw genetic resources, it would likely become controversial, as industry, supported by numerous commentators,[75] has consistently argued that the real value of genetic resources lies in the value added rather than in the resources themselves.[76]

The valuation question may also be significant for the test of the legitimacy of government action. It is unlikely that the compulsory taking of a few plants or blood samples from livestock could be held to cause hardship to the owner of the livestock or the land on which the plants were growing. Thus, the question would more likely be one of the value subsequently derived from those samples, and it is hard to imagine unjust enrichment constituting hardship for the original owner. Even if it were, where only the value of raw genetic resources was assessed, the hardship would be minimal and almost any seizure could be easily justified.

Subsection 6(a) of section 75 lists a range of situations where compulsory acquisition by the state should not be held to be in contravention of the Constitution. The majority of these are standard situations such as where the acquisition is in satisfaction of taxes or in execution of a court judgement. However, there are two exceptions that could be interpreted as being of relevance to genetic resources. The first is clause (v):

> in circumstances where it is reasonably necessary so to do because the property is in a dangerous state or injurious to the health of human beings, animals or plants;

Although unlikely, it is possible to interpret this clause in reverse, i.e. where the seizure could help in the prevention of a dangerous state or ameliorate a health problem for human beings, animals or plants it would be justified. The low likelihood of such an interpretation mostly results from the fact that it would give the gov-

75 See, e.g., Kerry ten Kate & Sarah Laird, The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing (2000).

76 The majority of cases of legitimate access to Kenyan genetic resources for commercial purposes to date, which admittedly can probably be counted on one's fingers, have valued raw and semi-processed resources for chemical, including pharmaceutical, purposes in the range of US$50-200 per sample (including duplicates in some instances), with the payment being made to the immediate provider rather than according to any predetermined pattern. Payment of this is frequently through in-kind contributions, including training and equipment.

ernment extremely broad powers of seizure that would not be subject to the normal constitutional checks. Clause (vii) also provides an option for governmental seizure of rights to genetic resources:

> for so long only as may be necessary for the purposes of an examination, investigation, trial or inquiry or, in the case of land, for the purposes of soil conservation or the conservation of other natural resources or work relating to the development or improvement that the owner or occupier of the land has been required, and has without reasonable excuse refused or failed, to carry out.

If a genetic resource with chemical or pharmaceutical application were to be seized by the government for the purposes of "examination, investigation, trial or inquiry," i.e. for research and development, by the time it had to be returned, because its retention was no longer "necessary," its commercial value, the value added, could already have been developed and alienated through the means of intellectual property or entry into the public domain to the benefit of the government or its appointed agent. Equally, the government could require the owner of the genetic resource to conduct screens for activity in partnership with national research institutions (thus obviating the reasonable failure excuse that the rights owner or holder did not have the capacity to conduct such research), and then seize the resource once some activity has been established. In this latter instance seizure might not even be necessary as the physical biological resource could be returned with the government retaining rights to any associated intellectual property that was developed from it.

A central question in any discussion of the possible relevance of section 75 to genetic resources, apart from the fundamental one of public versus private control, is the breadth of operation that the government would be permitted. In the case of real property, and much of personal property as well, one is concerned with non-fungible, or unique, assets; it is the particular piece of land or house that counts not land or houses in general. While this is sometimes the case with genetic resources, due to extreme rarity, endemism, or particular local conditions, generally genetic resources are fungible. Thus, the question arises of whether the government would be able to seize rights to all samples of a particular resource within the Republic of Kenya. Presumably, if it were able to make any seizure at all, the answer would be yes, as a substantial proportion of the value of the resource lies in general, rather than particular, control. This could even be used as a justification for the seizure in the first place on the basis that by asserting general control the government could potentially realise greater benefits than any individual Kenyan could.

3.2.2 The Environment Management and Co-ordination Act (1999)

While section 53 of the Environment Management and Co-ordination Act directly addresses access to genetic resources, as discussed above, two other types of provisions are potentially relevant. The first are a set of provisions relating to the conservation of categories of geographic areas or features. Section 42.3 provides the Minister for the time being responsible for the Environment with broad powers to issue orders, regulations, or standards for the management of riverbanks, lakeshores, wetlands, and coastal zones. In particular sub-sections (g), (h), and (j) are relevant to genetic resource management. Sub-section 42.3(g) provides that the Minister may regulate the "harvesting of aquatic living and non-living resources to ensure optimum sustainable yield." Sub-section 42.3(h) provides for "special guidelines for access to and exploitation of living and non-living resources in the continental shelf, territorial sea and the Exclusive Economic Zone." Sub-section 42.3(j) is a catch all clause providing for "the management of biological resources." The application of these provisions supersedes previous fisheries legislation in respect of genetic resources, as fisheries legislation did not contain any specific measures applicable to genetic resources while the provisions of 42.3(h) are specific in this regard. Although these provisions may appear to raise the possibility of loopholes or policy gaps, in that they are drafted in such a manner that they could be interpreted narrowly and thus apply to relatively specific situations, they should not be considered as exhaustive. Between the Minister's general powers to manage in the chapeau to 42.3 and the catch all clause of 42.3(j), the possibility of developing a comprehensive approach to genetic resources is clearly established. Sections 44, 45, and 47 address hill sides, hill tops, mountain areas, and forests, and while not providing equivalent detail to that of 42.3 regarding genetic resources, they do provide for general management powers that could be interpreted as mandating the implementation of regulations governing access to genetic resources distinct from the provisions of section 53. The notable exception to these geographically related provisions is any mention of drylands. Given that some two-thirds of Kenya's land territory consists of

arid or semi-arid regions, the absence of such provisions is significant.

The second type of provisions potentially relevant to access to genetic resources includes those relating to the general conservation of biological diversity. Section 50 contains broad provisions of both direct and indirect relevance. Sub-sections 50(a), (b), and (c) provide for the inventorying of biological diversity and assessments of status and threats. The effective execution of these provisions could create obvious benefits in the field of access to genetic resources, significantly assisting any potential applicants for access. Related to these provisions is the more directly relevant language of 50(g), which requires that NEMA:

> Measure the value of unexploited natural resources in terms of watershed protection, influences on climate, cultural and aesthetic value, as well as actual and potential genetic value thereof.

While some specific assessments of value, such as for the watershed value of the Mt. Kenya forest[77] or the consumptive value of forest resources to local communities mentioned in section 1.1, hereinabove, have been conducted, a process of more comprehensively assessing the value of natural resources according to the terms of 50(g) is something that could facilitate the activities of applicants for access to genetic resources while also allowing for more efficient negotiating on the part of the Government where commercial activities are envisaged. However, moving beyond the coordination of current valuation activities, which are largely limited to specific projects with targeted objectives, is likely to be prohibitively expensive without significant external assistance. Sub-sections 50(d) and (e) provide for the establishment of "national strategies, plans and government programmes for conservation and sustainable use of biological diversity" and for their integration into existing government and private sector activities.

Sub-section 50(f) addresses an issue that appears in several parts of the act: local community rights. Sub-section 50(f) provides that any measures for the conservation of biological diversity "shall . . . protect indigenous property rights of local communities in respect of biological diversity." The implications of this sub-section are not entirely clear but, given Kenya's historical recognition of customary law in various fields, it would seem, at a minimum, to indicate an intention to recognise customary rights over natural resources. Such an interpretation would seem to be consistent with other references to community rights in sections 43 and 48. Section 43 provides that "the Minister may, by notice in the Gazette, declare the traditional interests of local communities customarily resident within or around a lake shore, wetland, coastal zone or river bank or forest to be protected interests." Sub-section 48.2 is more of a negative right in that it provides that the Director-General of NEMA "shall not take any action, in respect of any forest or mountain area, which is prejudicial to the traditional interests of the local communities customarily resident within or around such forest or mountain area." While these three provisions are clearly related, they are somewhat disjointed and it is not entirely clear what final picture of community rights will emerge. Section 43 places no real obligation on the government, as action under it is at the discretion of the Minister. Sub-section 48.2 is a little stronger, but even though it prohibits NEMA from taking action prejudicial to traditional interests, it does not actually recognise those interests. Much will also depend on the interpretation of "traditional interests." This could be seen to involve only traditional activities, thereby excluding the assertion of an interest in genetic resources in many fields, such as modern industrial or biotechnological purposes. Furthermore, sub-section 48.2 does not prevent the Minister from regulating in a manner that is prejudicial to traditional interests. Sub-section 50(f) is probably the strongest of the three provisions regarding local community interests in genetic resources. However, there is also a concern over interpretation here: What exactly are "indigenous property rights of local communities in respect of biological diversity"? This term has not previously appeared in Kenyan law and thus is open to a wide range of interpretations that may or may not exclude interests in genetic resources. This point is particularly significant due to the fact that common law pre-empts customary law in the event of a conflict unless statutory provisions specifically recognise elements of customary law, as is the case with marriage and succession.

The ambiguities resulting from interpretative issues in the Environment Management and Co-ordination Act (1999) point to the main difficulty with the act at the time of writing: none of the regulations, guidelines, or measures specifically governing genetic resources have been promulgated or drafted. This is primarily due to the fact that NEMA is a new institution that has a broad mandate and limited resources, both financial and human, with which to fulfil it. This situation has led to necessary prioritisation, and access to genetic resources

[77] Estimated at US$55 million in terms of effects on production and replacement cost. L. Emerton, An Environmental Economic Assessment of Mount Kenya Forest (1997).

has been stated as being a relatively low priority for the Authority. Consequently, the act is unlikely to have direct impact on access to genetic resource activities in the near future.

3.2.3 The Wildlife (Conservation and Management) Act (1977, as amended 1989)

Prior to the introduction of the Environment Management and Co-ordination Act (1999), the Wildlife (Conservation and Management) Act was the most wide-ranging piece of Kenyan legislation of relevance to governing genetic resources. Some 10 percent of Kenyan territory, both terrestrial and marine, is covered by national park, national reserve or local sanctuary status. The central element of the act is the establishment of the KWS[78] as an autonomous parastatal body supervised by a Board of Trustees chaired by a presidential nominee and composed of other members appointed by virtue of their positions in central government or by the minister responsible for KWS's, currently the Minister for Environment and Natural Resources. KWS's has exclusive authority over national parks and significant influence over the administration of other categories of protected areas.

There are several operative elements of the legislation that either directly or due to interpretation govern the management of genetic resources in protected areas. The first, and most obvious, aspects are those related to KWS's mandate contained in Section 3A. Section 3A(a) provides that KWS shall "formulate policies regarding the conservation, management and utilization of all types of fauna (not being domestic animals) and flora." The first thing to note about 3A(a) is its reference to "fauna and flora" rather than "wildlife." This, in the absence of a formal definition, is one of the roots of KWS's interpretation of wildlife as including both fauna and flora, something that has fundamental impacts on its approach to genetic resource issues. Under Section 3A(a), KWS does not overtly intervene in national policy beyond issues affecting protected areas and the fauna and flora therein. The major exception to this is with regard to wild fauna, where KWS has jurisdiction regardless of whether particular animals are found in protected areas or not due to the need to manage the relationship between humans and often dangerous or destructive animals. A less intrusive exception is that KWS, in cooperation with other sectorial lead agencies, actively participates in the policymaking initiatives of other government ministries, departments, and institutions. An example of this is KWS's participation in the establishment of NEMA.

The mandate of KWS under 3A(a) is frequently interpreted along with that under section 3A(g), where KWS shall "conduct and co-ordinate research activities in the field of wildlife conservation and management" to jointly provide, inter alia, the mandate for many of KWS's genetic resource activities. In particular, bioprospecting activities fall within the ambit of these sections. This includes both commercial and non-commercial activities and situations where KWS is an active partner or where it simply provides authorisation. Where KWS provides authorisation, which applies to all situations where it is not an active partner, KWS has established an administrative requirement that any research proposal must be approved by an internal review prior to authorisation. There are no explicit conditions for the granting of such authorisations but it is assumed that, at a minimum, projects should not be detrimental to the objectives of KWS and, ideally, should be of value in promoting these objectives in some manner. The main limitation to KWS's involvement in bioprospecting is geographical, in that it restricts itself to collecting activities in areas under its direct jurisdiction. Where KWS is an active partner in any activity there is no procedure since it is simply fulfilling its statutory mandate.

Section 3A(j) is the last of the provisions relating to KWS's mandate that has a bearing on genetic resources. This provides that KWS shall "administer and co-ordinate international protocols, conventions and treaties regarding wildlife in all its aspects in consultation with the Minister." KWS does not act as the focal point for the CBD, but does play that role for a number of other conventions, among the most notable being CITES, the Ramsar Convention, the Convention on the Conservation of Migratory Species of Wild Animals and the Convention Concerning the Protection of the World Cultural and Natural Heritage. Of these, CITES is the most obvious in terms of its role in the management of genetic resources. As KWS is the National Management Authority for CITES, any person wishing to import or export any species listed under that convention must receive authorisation from the responsible officer in the Service. However, several of the other conventions for which KWS serves as the national authority also have a bearing upon genetic resources. The Ramsar Convention and the Convention Concerning the Protection of the World Cultural and Natural Heritage both place obligations on their parties to take special measures regarding the management of natural resources located within specific geographical areas.

[78] Sec. 3.

The more direct powers of KWS regarding national parks are contained in sections 13 and 16.1 of the act. While both of these sections address the general management of national parks, they have significant direct implications for access to genetic resources. Section 13.3 sets out a range of activities that are considered offences within the boundaries of national parks in the absence of official authorization. Sub-section 13.3(a) is a basic prohibition on entry into, and residence in, national parks. Sub-section 13.3(d) is of more direct relevance and makes it an offence for anybody who "wilfully damages any object of geological, prehistoric, archaeological, historic, marine or other scientific interest within a National Park, or knowingly removes or attempts to remove any such object or any portion thereof from a National Park." This provision is interpreted strictly and thus the removal of any plant, animal or microorganism, or anything else, is prohibited. Given that access to genetic resources is almost exclusively sought for some form of scientific purpose and that KWS actively implements the prohibition on removing anything from a national park without authorisation, it can be considered to be expressly regulated by this section. Section 13.4 is a link to section 16 in that it provides that any act listed in section 13.3 may only be considered authorized if applicable rules are complied with or the written permission of a KWS officer is obtained. Section 16.1(c) empowers the minister to make regulations for "the conditions under, and the extent to, which any of the acts mentioned in … subsection (3) of section 13 may be lawfully performed and the fees to be paid in respect of such performance," as recognised by section 13.4. While providing a wide range of powers to the minister, 16.1(c) clearly encompasses authority to regulate the terms and conditions under which access to genetic resources in national parks may be sought, and is interpreted accordingly. As noted earlier, the process for seeking access to genetic resources under the jurisdiction of KWS is not specific to the field but is rather addressed in the same manner as any other form of research and has no specifically iterated terms and conditions but is rather addressed on an ad hoc basis.

Categories of protected area other than national parks are addressed in sections 15, 18, and 19. Section 18 allows for the establishment of national reserves. National reserves are areas set aside with the agreement of the local authorities normally having jurisdiction over them. Section 18 provides that the default conditions for the management of national reserves are the same as those for national parks. Variations to these conditions may be made upon agreement with the competent local authority or by declaration of the minister. No variations of specific relevance to access to genetic resources have been made as of the time of writing.

Sections 15 and 19 deal with protected areas that are established to address specific problems. Section 19 allows for the establishment of "local sanctuaries." The only restriction on activities in local sanctuaries is a ban on the hunting of specifically gazetted animal species. This has an obvious impact on access to animal genetic resources but, as awareness of genetic resource issues increases, it is possible that the hunting or collecting of other species may be prohibited or regulated. Section 15 allows for the declaration of "protection areas." These areas may be established adjacent to national parks, national reserves, or local sanctuaries and their purpose is to preserve the habitat and ecology of these areas where they may be threatened by activities in adjacent areas. No specific conditions are set for the management of protection areas, but the minister has broad powers to establish any conditions that he deems necessary to achieve their purpose, potentially including the regulation of genetic resources.

3.2.4 The Forests Act (1992)

Forest reserves covered some 9,116 km^2, or 1.6 percent of the total land area, of Kenya in 1990.[79] These reserves, and other forms of government-owned forest land fall under the jurisdiction of the Minister responsible for natural resources, currently the Minister for Environment, Natural Resources and Wildlife, according to the provisions of the Forest Act (1992).[80]

In general terms, the Forests Act allows for the comprehensive regulation of access to genetic resources in forest areas. However, to date little attempt has been made in this direction and all that is required to obtain access is the issuance of a licence by the Director of Forestry, the only condition being the payment of an administrative fee and the provision of prima facie evidence that the intended access will not pose a threat to the conservation of any species or ecosystem. On a more positive note, the fact that the Forests Act is currently administered by the same minister who is responsible for the Environment Management and Co-ordination Act and the Wildlife (Conservation and Management) Act may allow for the development of a comprehensive approach to access to genetic resources in the future.

Section 4 of the act empowers the minister to establish, or disestablish, any unalienated government land as a forest area, while section 6 allows for the declaration of

79 Ondiege, *supra* n. 65 at 123.

80 Laws of Kenya, ch. 385.

any forest area, or a part thereof, as a nature reserve. Sections 7 and 8 require authorisation of the Director of Forestry for a number of activities in forest areas that have an impact on access to genetic resources. The most relevant of these are sub-sections 8(1)(a)(i) and (viii), which address the felling, cutting, taking, burning, injuring, or removal of any forest produce and the capturing or killing of any animal. Sub-section 8(1)(a)(xi) restricts the collection of honey or beeswax. Sub-sections 8(1)(a)(ii) and (x) have indirect impacts on access by prohibiting the presence of a person in a forest area between 9pm and 6am or in any closed area respectively. Sub-section 8(1)(b) places similar, if less restrictive, requirements on unalienated government land.

Under sub-section 6(1), the purpose of a nature reserve is the preservation of the "natural amenities thereof and the flora and fauna therein," thus encompassing any genetic resources within the reserve. Sub-section 6(2) prohibits the "cutting, grazing, removal of forest produce or disturbance of the flora" except with the permission of the Director of Forestry, such permission only to be given "with the object of conserving the natural flora and amenities of the reserve." Activities relating to fauna are similarly restricted by sub-section 6(3), except that the Director of Forestry shall consult with the Chief Game Warden in giving permission for any restricted activity.

Section 9 primarily addresses offences relating to false representation under the act, and in sub-section 9(1)(a) any unauthorized marking of forest produce indicating that it is either "the property of the Government or that it may be lawfully cut or removed" is declared an offence.

Section 15 provides general rulemaking powers to the minister in areas with potential relevance to access to genetic resources. Sub-section 15(a)(i) provides for the regulation of the "sale and the disposal of forest produce and the felling, working and removal thereof." Sub-section 15(a)(ii) allows for the regulation of "the use and occupation of land in a Central Forest or forest area, for the purposes of residence, cultivation, commercial or industrial purposes." Sub-sections 15(a)(iii) and (viii) provide for the establishment of terms and conditions, including the prescribing of fees or royalties, for any licenses issued under the act. Sub-sections 15(a)(iv), (v) and (vi) provide for regulation of the access of persons to any forest area.

3.2.5 The Crop Production and Livestock Act (Revised Edition, 1977)[81]

The Crop Production and Livestock Act (1977)[82] provides for the control and improvement of crop production and livestock. Of specific relevance to access to genetic resources, sub-section 4(1)(b) of the act gives broad powers to the minister responsible for agriculture to regulate the methods for the production of any crop; while sub-section 4(1)(c) provides powers regarding the improvement of the quality of any agricultural produce. In sub-section 4(1)(d), the minister is also empowered to prohibit the cultivation, or destruction, of "any kind of crop, tree or plant, or variety thereof." Finally, sub-section 4(1)(h) allows the minister to regulate, license and control trade in any agricultural produce or crop. Of the rules promulgated under the Crop Production and Livestock Act, those relating to African Produce (1964) are probably the most significant as they regulate the improvement and inspection of legumes, sorghum, potatoes, rice, bulrush millet, finger millet, wheat, fresh vegetables, fresh fruit, onions, and simsim grown by Africans. As can be seen by the antiquity of the Crop Production and Livestock (African Produce) Rules, this act has not been used significantly to govern access to genetic resources for food and agriculture, or research based on these resources in recent decades.

3.2.6 Intellectual Property Rights

Kenya has been a member of the WTO since its inception in 1995. As a developing country, it was required to fully comply with TRIPs by January 2000. Although it was generally accepted that only minor changes to Kenya's 1989 Industrial Property Act were required for compliance, these were only passed by Parliament in mid-2001, receiving presidential assent soon afterwards. The Industrial Property Act (2001) entered into force in May 2002, upon the issuance of a commencement order by the Minister for Trade. The new legislation was reviewed by the TRIPs Council in June 2001 without major controversy and can thus be assumed to have been endorsed as generally compliant with TRIPs.

Kenya led the African Group at the Seattle and Doha ministerial conferences and, as the author of the Seattle African Group position, fully supports it. Kenya also generally supports developing country positions on the relationship between TRIPs and the CBD, arguing that there are crosscutting issues that should be resolved.

81 This section is derived from F. Situma, *Regulating Access to Kenya's Genetic Resources* at 8 (Unpublished, on file with the author, 1997).

82 Laws of Kenya, ch. 321.

3.2.6.1 Industrial Property Rights

Kenya's international position and national legislation regarding the relationship of intellectual property rights and genetic resources reflect different principles. Domestic policy addressing patents on life forms has tended to be complex and arguably has become more so with the passing of the Industrial Property Act (2001). Section 6.3(a) of the 1989 Act placed strict conditions on patentability of life forms:

> The following shall not be regarded as inventions for the purposes of patent protection—
> (a) discoveries or findings that are products or processes of nature where mankind has not participated in their creation (including animals, plants and micro-organisms) …

Despite this seemingly explicit restriction, the first Kenyan patent granted to a Kenyan institution was issued in 1994 for a protein with identified potential utility. At the time of writing, no Kenyan patents have been granted on simple genetic sequences, such as express sequence tags, without a clear demonstration of utility. Thus, even though the dividing line between patentable and non-patentable genetic components seemed legislatively clear under the 1989 Act, the interpretations of the Kenya Industrial Property Office (KIPO, now known as the Kenya Industrial Property Institute, or KIPI, after the entry into force of the 2001 Act) introduced a degree of ambiguity. The key factor in the patentability of genetic resources under the 1989 Act was, thus, KIPO's interpretation of invention vs. discovery, in the form of its definition of the point at which mankind could be considered to have participated in the creation of a plant, animal or micro-organism. KIPO's interpretation of invention versus discovery, at least in the case of the 1994 protein patent, seems to hinge upon demonstrating utility. In essence, a demonstration of utility allowed a discovered genetic component to be considered as created by mankind without any manipulation of the actual component.

The prohibition on the patenting of plants is also addressed by section 11(a); which deems not patentable, "Plant varieties as provided for in the Seeds and Plant Varieties Act, but not parts thereof or products of biotechnological processes." The inclusion of this language suggests that an improved variety would be considered to be a plant in whose creation mankind has contributed sufficiently for it to be patentable, thus rendering this additional exclusion from patentability necessary. If this were not the case, 11(a) would be redundant, a concept normally considered repugnant in law. However, 11(a) creates uncertainty in two main ways. The first relates to the fact that the Seeds and Plant Varieties Act provides for the granting of plant variety protection (PVP) over a specific list of genera and species. This creates the possibility that plant patents could be granted over improved varieties not on this list. The second, more obvious, uncertainty relates to the closing language of 11(a): "but not parts thereof or products of biotechnological processes." If one can assume that an improved plant variety would, but for 11(a), be patentable under 6.3(a), then the products of biotechnological processes would also seem to be patentable. However, the eligibility of plant parts for patentability within the understanding of 6.3(a) is far from clear. Once again, the only answer seems to be KIPO's interpretation of invention vs. discovery on a case-by-case basis. The ambiguous situation with plants and plant components under the 1989 Act may also muddy the waters as regards the patenting of animals and micro-organisms. Although these are not addressed by the Act except in the non-patentability language of 6.3(a), it is impossible to say conclusively that they would not be subjected to the same conditions as plants.

The approach to the patenting of life forms is substantially clearer under the 2001 Industrial Property Act. Section 26 of the 2001 Act makes a specific reference to "plant varieties as provided for in the Seeds and Plant Varieties Act," excluding them from patentability. Thus, in terms of TRIPs Article 27(3)(b), Kenya has taken the option of recognising an effective sui generis system for plant varieties, and to exclude the possibility of patenting. However, the same exclusions to this non-patentability clause are maintained as in section 11(a) of the 1989 Act; i.e. "parts thereof [of plant varieties] or products of biotechnological processes" are patentable. The 2001 Act is less ambiguous than that of 1989 on this point, as section 6.3(a) of the 1989 Act has been dropped. There are also no other specific exclusions relating to life forms in the Act, whether addressing plants, animals or humans. This situation is seemingly at odds with Kenya's international position. Nevertheless, there are two possible grounds for life forms to be refused patents. The first would be if the granting of such a patent were to be considered "contrary to public order, morality, public health and safety, principles of humanity and environmental conservation" according to the terms of section 26(b).[83] The second option, as under the 1989 Act, would depend on the interpretation of sec-

[83] It is assumed that the phrase should be read "or environmental conservation," rather than "and," to the effect that only one of these criteria needs to be met rather than all.

tion 21(3)(a), which excludes "discoveries" from patentability. Discovery is not defined in the act, although section 21(1) does define invention: "[f]or the purposes of this Part [patents: patentability], 'invention' means a solution to a specific problem in the field of technology." Given that a solution to a specific problem could be a discovery, this does not shed much light on the matter.

Section 29 provides detailed requirements for the depositing of microorganisms as part of the standard disclosure requirements for patents so it must be assumed, in combination with the broader context of TRIPs provisions, that microorganisms are patentable. No definition of microorganism is provided, so the exact coverage of the term could create similar controversy to that experienced at the international level. Section 34(5) also deals with disclosure requirements, including the depositing of microorganisms, but in addition addresses "self-replicable material." This term is defined in section 2 as "any matter possessing the genetic material necessary to direct its own replication by way of a host organism or in any other indirect way."

Section 58(6), dealing with the limitation of patent rights, also suggests a broad interpretation of microorganism and a liberal interpretation of the line between discovery and invention: "The rights of the patent shall not extend to variants or mutants of living forms or replicable living matter that is distinctively different from the original for which patents were obtained where such mutants or variants are deserving of separate patents."

In all, while the 2001 Act does not directly address the issue, a reasonable interpretation of it will allow for the patenting, at a minimum, of plant parts, biotechnological products, and a wide range of micro-organisms. Plants that do not fit the requirements for recognition as plant varieties, and animal and human genetic material are likely to be patentable, subject to the limitations of Section 26(b) mentioned above. This is clearly a "TRIPs plus" approach and may actually place very little restriction on the patenting of life forms at all.

3.2.6.2 Plant Variety Protection

Kenya introduced the Seeds and Plant Varieties Act in 1977, and both this and the 1991 revised version provide for the granting of plant breeder's rights. However, the rights did not become active until the necessary implementing regulations were put in place in 1994. The 1977 Act (as revised in 1991) and the 1994 regulations broadly comply with the standards of UPOV 1978. Kenya became a party to that agreement in April 2000, the last possible date for entry. The parent legislation and the implementing regulations are both currently being revised. It is expected that these will include some features of UPOV 1991. When the revised versions may come into force is uncertain due to the parliamentary calendar.

The key point to note with Kenya's PVP legislation is the manner in which it addresses the genera and species within which varieties may be eligible for the grant of PVP. The legislation itself provides that all genera and species may be eligible. The "may" comes from the fact that the Minister responsible for agriculture gazettes the actual genera and species eligible. The relevance of this to the question of access to genetic resources beyond the agricultural sector is found in a provision of the 1977 Act that does not appear in the 2001 draft bill. This provision (section 1 of part II of the fourth schedule of the 1977 Act) requires that a condition of the grant of PVP is that any variety for which such protection is sought must demonstrate some agronomic advantage.

The requirement that any variety demonstrate agronomic advantage is effectively a qualification of novelty requirements in that an advantage over previously known varieties must, by its nature, be new. The deletion of this provision dilutes the standard of novelty while also allowing for the granting of PVP over plant varieties that are useful in medicine or for industrial or chemical purposes rather than simply those that are useful in agriculture. This must be seen in the context of the possibility of plant patents, discussed earlier, as any variety that is eligible for PVP is automatically rendered non-patentable. Thus, in effect, all plant varieties of whatever genera or species are subject to some form of intellectual property right; if they are not subject to PVP then they are subject to patents.

It should be noted that neither the 1977 Act nor the 2001 draft bill have specific provisions addressing the question of farmers' rights. The 2001 draft bill does contain provisions, reflecting those of UPOV 1991, stating that PVP rights shall not be enforceable in certain circumstances, including where a farmer plants harvested seed on his own land. However, as these provisions still prohibit the exchange of seed among farmers they fall far short of the realisation of farmers' rights.

4. RIGHTS OF INDIGENOUS PEOPLES AND LOCAL COMMUNITIES

Apart from the customary laws and rights in trust land, discussed above, there is no legislation or policy

specifically addressing the rights of indigenous peoples or local communities to control access, ownership, utilisation, and benefit sharing of genetic and biological resources. However, there are a number of laws and policies that may be interpreted as having implications for the field. KIPI has made efforts to cultivate the use of utility model certificates (known as petty patents in some jurisdictions) to protect the rights of traditional healers and the "jua kali" (literally "hot sun," meaning informal) sector generally. These certificates provide rights similar to those of patents but in a weaker form, particularly as regards their duration, and have less strict conditions for grant than patents, particularly as regards novelty. Some healers and innovators have taken up this opportunity, but the use of utility model certificates does not pretend to address the rights of indigenous peoples and local communities either as a particular group or in any broader context. At the time of writing, KIPI is in the early stages of examining options for the protection and promotion of traditional knowledge, but it is not yet clear what path this initiative will take, and when. The Ministry of Culture currently registers traditional healers but, while some healers are satisfied with the arrangement, many healers believe this to be inappropriate given that they are medical professionals. The Ministry of Culture registration procedure is also problematic in that it has not proven capable of controlling the proliferation of fraudulent healers or of facilitating lobbying by genuine healers for their interests.

One major problem with the recognition of customary rights in the context of access to genetic resources is the absence of more than "snapshots" of customary approaches. An example of such a snapshot is that of the management *ekwar* by the Turkana, discussed earlier. In a direct interpretation, this example may not seem to apply to access to genetic resources for anything other than consumptive purposes. However, the often adaptive nature of customary legal systems suggests that if Turkana elders were presented with the question of whether customary law did apply to the new situation of access to genetic resources they could use the traditional management of browsing rights as a basis for the management of the new situation. They could also use it as a basis of objection to activities regarding which they had not been consulted. The fact that customary systems do not specifically address access to genetic resources, but may rather have a capacity to adapt as is necessary to address the issue, highlights the importance of consultation with communities in the development of any national regulatory system.

The Minister for Health recently announced the intention[84] of the Ministry of Health to prepare legislation addressing the use of traditional medicine in formal medical settings, such as public hospitals. A preliminary draft Traditional Healthcare Practitioners Bill (2002) has been released for discussion purposes. This bill does not specifically address the question of the rights of traditional healthcare practitioners over their medicines, but a number of its provisions do have significant implications for such rights. Section 37 of the draft bill requires that any "drug, medicine, mixture, liquid or other substance claimed by a traditional healthcare practitioner to have medicinal properties shall be . . . registered as a drug under [the] Pharmacy and Poisons Act." Section 38 reinforces this by requiring that any claimed medicine must be subjected to "customary drug development protocols and subsequent under the Pharmacy and Poisons Act." Without considering the controversies over the appropriateness of applying standards designed for Western medicine to a fundamentally different system, for a traditional healthcare practitioner to meet the requirements of these sections, the practitioner will have to declare in precise detail the recipe for any medicine that he or she intends to administer. Where modern pharmaceutical products are subjected to these requirements, they are invariably already the subjects of patent rights, or, at minimum, priority applications. Consequently, there is less concern about revealing sensitive information. Traditional knowledge holders have difficulties in having their rights recognised by the established intellectual property rights system, whether due to socio-economic or technical issues, and thus revealing the details of their medicines is problematic in the absence of any guarantees. The draft bill does not address the question of the confidentiality of any details on medicines submitted for testing pursuant to it. In sub-sections 42.2(a) and (b), it potentially takes an opposite path by providing for measures to identify and classify known medicinal plants and to encourage public and private research institutions to coordinate research into known and suspected medicinal plants and compounds. The likelihood of negative implications for the rights of traditional knowledge holders, due to the effective placing of private information in the public domain, is reinforced by the provisions of 42.2(e), which require the dissemination of "knowledge about and the standardization of the names of plants with known or suspected medicinal properties across ethnic and regional boundaries."

Section 42 also contains the only provisions of the draft Bill with direct relevance to access to genetic

[84] Statement by Professor Sam Ongeri, Minister for Health (Jan. 8, 2002).

resources. Sub-section 42.2(d) mandates the preparation of "rules regulating the cultivation and sustainable harvesting of . . . medicinal plants." All activities under subsection 42.2 are to be undertaken in consultation with the Director of Forests and the Director-General of NEMA, thereby mitigating, to some degree, concerns regarding the overlap of mandates. However, as the Director of Medical Services is envisaged as being the primary implementer of the draft bill, there is a question of competence regarding capacity to address issues of both intellectual property rights over, and the conservation and sustainable use of, genetic resources.

While not specifically addressed in their enabling legislation, a number of government lead agencies do address the question of indigenous and local community rights in their policies and practices. The most obvious of these are KWS, KEFRI, and the Forest Department. KWS has, in recent years, interpreted its mandate as having a key element of cooperation with communities historically living in and around protected areas. This frequently involves the recognition of customary resource rights. Such rights usually relate to direct consumption and use, but as the Kenyan access to genetic resources regime develops it is possible that an interest in this regime, possibly including the ownership or control of resources, may also be interpreted. The likelihood of such recognition is increased by the possibility of genetic resources contributing to income diversification and broader poverty alleviation objectives. KEFRI has undertaken extensive work in the area of genetic resources, primarily, but not exclusively, in the field of medicinal plants and non-timber forest products. It has catalogued many medicinal plants and encouraged the establishment of local nurseries for both conservation and sustainable use purposes. In the absence of a regime to protect community interests in these resources, KEFRI has been unable to make this catalogue publicly available, thereby limiting the application of this valuable work. The agricultural sector has recognised the value of genetic resources to the extent that they contribute to plant breeding activities, but these resources almost invariably are seen as public goods and there is little or no recognition of community interests.

Kenya was not an active participant in the negotiations for the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), but was represented in several of the key sessions. The country acceded to the Treaty on May 27, 2003. However, as there was no public consultation regarding the Treaty, the timetable for implementing its provisions is unclear.

Currently, there are no legislative provisions or regulations recognising the concept of farmers' rights, although the Seeds and Plant Varieties Act (1977) is currently being reviewed, so it is possible that the concept may be introduced (although it is not included in early drafts). Such recognition would fulfil the government's stated commitment to "identify and recognise the rights of farmers" in section 4.1.3 of the National Biodiversity Strategy.[85] It should also be noted that the initial proposed draft for a new Constitution alters Kenya's approach to international agreements by introducing the concept of self-executing treaties. Previously, an agreement ratified or acceded to by Kenya required the approval of implementing legislation by Parliment before its provisions became legally enforceable at the national level. If the provisions of the draft Constitution on this issue are maintained, international agreements will become legally enforceable from the moment of ratification or accession and will have a status superior to that of national law.

5. CONCLUSION

5.1 Strengths and Weaknesses of the Current Approach to Access to Genetic Resources in Kenya

As a country with geographic zones ranging from desert to tropical forest, several isolated and fragmentary ecosystems, a number of endemic species and a range of habitats suitable for extremophiles, Kenya has clear comparative advantages in the field of access to genetic resources. These natural advantages are reinforced by a relatively well-developed domestic scientific capacity in the form of national research institutions, public universities and several international research centres. Internally, the country's research institutions have been able to benefit from this situation through the direct application of locally available genetic resources in their activities relating to agricultural and medicinal products. However, the country has largely been unable to derive significant benefits from foreign interest in its genetic resources, whether in terms of financial resources or access to technology and assistance in product development. The few exceptions to this, such as the NMK-RBG Kew and KWS-ICIPE partnerships, tend to prove the rule since they have almost all had to be based on agreements that fall outside the current de facto legal and regulatory regime for access to genetic resources. In addition, the absence of any national policy or legislative

[85] A Summary of the Kenya National Biodiversity Strategy and Action Plan, *supra* n. 4 at 13.

framework, which might provide benchmarks, means that it is difficult to assess the relative success of these partnerships.

The absence of any national policy or legislative framework, and application of an ad hoc process without resources or political direction, is at the root of the problems facing the sector. There are two main problems facing the current ad hoc process administered by the Office of the President and the NCST. The first is that it is relatively easy for an applicant to make any collections they wish under the provisional research permit, involving only minimal administrative requirements and conditions, and then to export or alienate, by means of intellectual property rights, any genetic resources they collect. The only instance in which such an applicant for access might be concerned about the issuance of a final research permit is where a project requires the ongoing collection of particular genetic resources. Given industry's increasing capacity to synthesise active compounds, or at a minimum to cultivate plants, breed insects etc., this renders the final permit largely redundant in all but exceptional cases. The second difficulty is that, in the absence of any legislative or regulatory framework, it is unclear how the ad hoc process coordinates with the institutional processes of lead agencies that have mandates covering particular geographic areas or fields of activity, such as the research permit process implemented by KWS for protected areas. These agencies operate independently of any harmonised policy or process, and, since the only legal requirements related to export by, or under the umbrella of, national institutions are those of CITES and for quarantine purposes, the export of genetic resources without conditions is not difficult. This creates significant loopholes in the current approach, loopholes that are easy to exploit due to the enormous contrasts in the relative capacity of different lead agencies and universities in access and benefit sharing policy. The lack of coordination, and existence of multiple and overlapping mandates, also creates problems for potential applicants for access to genetic resources. There is no single agency that can be approached or negotiated with and, in many cases, the ad hoc nature of the current system may mean that it is not necessarily a straightforward exercise to discover which might be the appropriate agency for a particular project. These problems are likely to act as a significant disincentive to any potential applicant, particularly one seeking to uphold high standards of practice in their activities.

While there are problems deriving directly from the nature of the existing ad hoc approach, the lack of any harmonised policy or regulatory structure also creates a number of problems in the facilitation of, and maximising the benefits from, access to genetic resources. The foundation of these is the absence of any clear rationale for Kenya's interest in access to genetic resources and benefit sharing. Each institution involved in such activities to date has been involved in the context of its own particular objectives and interests. While these objectives and interests are invariably benign, the lack of coordination suggests that Kenya could be losing out in terms of benefit sharing. This is both through the advantages that coordination and experience give in negotiating benefits and in terms of the national advantages that coordination in benefit sharing policy can bring in areas such as capacity building and infrastructure development.

Related to the problem of illegal, or undeclared, access to genetic resources is the fact that there is no mechanism for, or resources to support, monitoring and follow-up regarding the activities of applicants for access. Where these do not exist, it is all too easy for an applicant to agree to any conditions and then to simply ignore them once they have left Kenya's jurisdiction. The question of conditions for access is also one that is fundamentally affected by the presence, or absence, of a clear policy. In such a situation, even reasonably well-coordinated lead agencies will have difficulties in developing a harmonised approach to conditions for access, particularly where different sectors may have different needs. Given that there are no harmonised conditions, or even any institutions with consistently applied access-specific conditions for their internal use, for access to genetic resources in Kenya this presents a serious enforcement problem.

In considering the internal consequences of a lack of any policy or regulatory framework on access and benefit sharing for Kenya, the final point to be made here relates to community involvement in the policy process and implementation. As is recognised by article 8(j) of the CBD, amongst others, local communities play a critical role in the maintenance of ecosystems and individual species. In addition, a community that is aware of the question of access to genetic resources is one that can assist its government in enforcement: it is extremely difficult for an outsider to conduct any activity in a rural African community without that community knowing something about it. A third point about local communities is that even relatively modest benefits can have a profound impact on them. A few thousand dollars might not make a major difference at the ministerial or parliamentary level but it can easily translate into a dispensary or the refurbishment of a primary school in a village, things that, when accumulated, can make a tangible dif-

ference in terms of poverty reduction, the major priority of Kenya's government. The absence of any national policy means that there is no framework to support community involvement and consultation, whether in terms of facilitating access or for the development of a comprehensive, locally relevant, benefit sharing strategy.

5.2 The Way Forward

There are a number of steps that Kenya could take to address the current situation where the country's genetic resources are removed and commercialised without significant benefit to the country and, in many cases, through misappropriation. These steps are relatively easy to suggest but the process of their implementation would be considerably more complex.

Some form of a detailed technical assessment of Kenya's capacity in access to genetic resources should be undertaken. This would consider the potential value of the market for Kenya's resources, both internal and external, and the existing capacity of the Government of Kenya to implement a regulatory regime for access and benefit sharing.

The basic rationale of Kenya's approach to access and benefit sharing needs to be clearly iterated. The National Biodiversity Strategy and Action Plan does not do this and no other policy document even pretends to. The basic interests to be prioritised and balanced appear to be conservation, national development objectives and strategies and community development, although others could be identified. The rationale should, ideally, be based on a combination of the capacity assessment suggested above and consultations with lead agencies and, to the degree feasible, local communities.

Depending on the conclusions reached in the two points above, a decision could be made as to whether a formal regulatory regime is necessary, or whether guidelines supported by a coherent policy document would suffice. Similarly a decision could be made as to how access and benefit sharing should be approached institutionally: should it continue to be managed by individual lead agencies under the harmonised framework or would some form of coordinating body, or even a central authority, be identified or established?

The fact that Kenya does have a diverse, and potentially valuable, genetic resource base, combined with the fact that the presence of a mandatory ad hoc research process has not prevented illegal and undeclared activity in the country, suggests that the development of a harmonized, binding, regulatory regime under the Environment Management and Co-ordination Act (1999) could address Kenya's problems. However, this depends upon NEMA's taking the initiative.

CHAPTER 12
ACCESS TO GENETIC RESOURCES IN MADAGASCAR

*Nat Quansah**

1. BACKGROUND

1.1 Geo-Physical Context

With a north-south length of 1,600 km and a maximum width of 580 km, Madagascar's surface area of 587,000 km² makes it the fourth largest island in the world. Madagascar lies near Africa's southeast coast separated from the continent by the Mozambique Channel. Madagascar has an extremely varied and often rugged topography, rising to 2,876 m. Climatic conditions are also varied, with mean annual temperatures usually between 16°C and 19°C in the central highland areas and between 23°C and 27°C in the lowland areas.

Rainfall and temperature variations combine to produce a number of bioclimatic regions in Madagascar. The diverse bioclimatic conditions have led to the existence of diverse biomes: tropical rainforests, wooded savannah, montane prairies, and spiny forests with their unique diversity of flora and fauna throughout the country. Madagascar is home to a high level of endemic plant and animal species: 80 percent of the estimated 10,000 to 12,000 plant species found in Madagascar are endemic. Madagascar is home to seven kinds of baobab, six of them endemic (the rest of Africa and Australia have three kinds of baobab). Whole groups of plants—such as the family Didiereaceae—are endemic. Numerous plants serve as sources of food, medicine, energy, and construction materials for the Malagasy people. The animal species also exhibit endemism and uniqueness. Ten species of native rodents in seven genera are found in Madagascar, and all are endemic. All but two of the 28 species of lemurs are endemic to Madagascar.[1]

Madagascar is a global biodiversity "hot spot" as a result of its unique and high level of endemic flora and fauna, as well the risks of extinction faced by these species due to habitat loss and ecosystem degradation. This has led the international community to strongly support and guide the Malagasy government in its diverse conservation programs.

1.2 Socio-Political Context

Madagascar is a republic run by a democratically elected government based on the national Constitution of 1992, revised in 1997. Madagascar has at least 18 formally recognized ethnic groups, and the country is divided into six provinces (administrative divisions).

The population of Madagascar was estimated to be 15,982,563 by July 2001, and the annual population growth rate is estimated to be at 3.02 percent.[2] Population density is low, averaging 17.5 per km², with 80 percent of the population living in rural areas. When urban population distribution is excluded, the population density averages 4.5 per km². The gross domestic product (GDP) of Madagascar was estimated in 2000 at US$800 per capita, with a real growth rate of 4.8 percent annually. Seventy percent of the population live below poverty line.

1.3 Bioprospecting

Bioprospecting with extensive collection of samples is strictly forbidden, especially in protected areas.[3] However, the Government of Madagascar has conducted some activities that might be described as bioprospecting, particularly as a result of inventories that seek to assess the nature and levels of biodiversity of the country. There is a clear interest in further developing such activities, but the extent to which this intention may influence any access to genetic resources regulatory regime is unclear. Private sector activity in bioprospecting is not very clear, however, many individuals and institutions do engage in the collection, processing, and export of medicinal and aromatic plants and their extracts. While details of such activities are not available,

* ***Founder, Integrated Health Care for Conservation Program.***

[1] M.D. Jenkins (ed.), Madagascar: An Environmental Profile (1987).

[2] USAID, USAID Assistance to Madagascar (Oct. 11, 2000), *available at* http://www.usaid. gov/press/releases/2000/fs001011.html (last visited Aug. 17, 2003).

[3] Personal communication, National Association for the Management of Protected Areas (ANGAP) to Nat Quansah (2001) (response to questionnaire).

it is possible that undeclared and illegal activities do occur and these may have some commercial motives, at least at a small scale or informal level.

The majority of access to genetic resources occurring to date seems to involve foreign academic and research institutions, as well as NGOs and their researchers. These institutions reach agreements with different Malagasy academic and research institutions as well as any lead agencies with responsibility for the geographical area of their intended research. Monitoring of these activities is limited, if it takes place at all, and Madagascar has no capacity regarding the activities of researchers once they leave the jurisdiction of Madagascar. It is possible that this could constitute a major point of leakage of genetic resources, as has been experienced in other developing countries.

In short, the majority of bioprospecting activity in Madagascar has either been conducted on an ad hoc basis, or the government has not been aware of its occurrence.

2. INSTITUTIONS

Access to genetic resources in Madagascar is made possible through the issuance of a permit or a use agreement to the bioprospector. The issuance of permits used to be carried out at the central government level. This function is now being decentralized, with regional representatives of the ministries and concerned institutions mandated to act with the approval of the concerned ministers or given the authority to act independently, depending on the situation.

The regulatory system governing access to genetic resources in Madagascar emphasizes control of the commercialization of genetic resources, especially forest products, in the hope that through this process the country can attain appropriate economic development. The regulatory system also aims to give responsibility to the various governmental actors involved in genetic resources use, with the view to promoting sustainable management of the genetic resources of the country. However, the emphasis again appears to be on the commercial exploitation of the resources by these actors, since the Malagasy government has placed a priority on poverty alleviation through economic development. The regulatory system is still in the process of evolving and devolving in Madagascar. It is hoped that it will eventually be fine-tuned to attain the balance that it is supposed to achieve: fair access to all thereby evoking responsibility to use biodiversity in a sustainable manner to attain economic development and alleviate poverty.

2.1 Governmental Agencies and Procedures for Obtaining Access

Institutional planning, coordination, and decision-making concerning environmental protection is the prerogative of the state. In line, however, with the evolving and devolving legislative and policy regimes governing access to genetic resources in Madagascar, a number of ministries and lead agencies have responsibility in the field. The leading ministeries are the Ministry of Environment (MoE), the Ministry of Higher Education, the Ministry of Water and Forests, the Ministry of Scientific Research, and the Ministry of Fisheries and Aquaculture. These ministries exercise their mandates directly or indirectly by delegating authority to other agencies.

The MoE has a mandate to oversee implementation of the National Environmental Action Plan (NEAP). The NEAP is the total set of arrangements conceived, adopted, and programmed by the government designed to implement the National Environmental Policy. The NEAP is a long-term, 3-phase program executable over at least a 15-year period. Environment Program[4] I (PE I) was from 1991-1996, PE II from 1997-2001, and PE III is scheduled for 2002-2007.

The National Office for the Environment (ONE),[5] under the authority of MoE, is charged with executing the NEAP. This office is responsible for the management, coordination, follow-up, and support for all public and private environmental programs in Madagascar.

Various national research centers under the authorization of the Ministry of Scientific Research—including the National Center for Environmental Research, National Center for Oceanographic Research, National Center for Industrial and Technological Research, Agricultural Research Center, and the National Silo for Forest Grains (SNGF)—are mandated to execute the environmental research aspects of the NEAP under the coordination of the Scientific Committee of ONE.

The Ministry of Water and Forests[6] is responsible for forestry policies, the creation of protected areas, the management of human resources pertaining to the management of these resources, and the management of classified forests in the country. The Directorate of Water and Forests (DEF),[7] under the Ministry of Water and Forests, issues permits for the use of resources, including forest products. The relationship between the central administration of the Ministry of Water and Forests and

4 In French, *Programme Environnement.*

5 *L'Office National pour l'Environnement.*

6 *Ministère des Eaux et Forêts.*

7 *Direction des Eaux et Forêts.*

its regional services, represented by the state representatives on the one hand, and the decentralized territorial communities represented by the presidents of the executive offices[8] on the other hand, is established on a contractual basis and is complementary.[9] On no account should the relationship be seen as a hierarchical or supervisory. The practicability of this will be evident when the decentralized territories are fully operational.

The National Association for the Management of Protected Areas (ANGAP),[10] an NGO, has been mandated by the Ministry of Water and Forests to manage the protected areas of Madagascar. ANGAP is authorized to create, conserve, and manage in a sustainable manner a network of national parks and reserves representative of the biodiversity and the unique natural environment of Madagascar.

The District Head[11] under the authorisation of the Minister of Water and Forests provides hunting permits, whereas hunting permits for scientific purposes are obtained directly from the Ministry of Water and Forests.

The Ministry of Fisheries and Aquaculture[12] is responsible for authorising all forms of fishing and aquaculture, including subsistence, commercial (traditional and industrial), and recreational. The Ministry of Fisheries and Aquaculture is not, however, responsible for authorising use of fishery resources for scientific or experimental purposes. Authorisation of fishing for scientific or experimental purposes is granted instead by the Ministry of Water and Forests.

The SNGF is the authority mandated to manage all activities related to phytogenetic resources—especially those concerning research and production of seeds, seedlings, and plants—in Madagascar. The Ministry of Water and Forests is responsible for issuing permits for the exploitation and exportation of these resources. If these resources are for scientific and research purposes, however, then prior approval of the Ministry of Scientific Research[13] is required for the issuance of a permit by the Ministry of Water and Forests.

In general, most issues relating to genetic resources, at least in terms of the commercialisation, conservation, and monitoring of these resources, fall within the mandates of the above institutions. However, several key aspects lie within the mandates of other ministries, while a number of lead agencies, as well as NGOs, also have overlapping jurisdictions in terms of program execution.

Access to biological resources present in the country is regulated by diverse legislation and depends on whether the resource is in a protected area or not. Procedures pertaining to biological research inside and outside protected areas are available from the General Directorate of Water and Forests upon request. It is strictly prohibited to undertake any collection in protected areas except with express authorisation from ANGAP and the Committee for the Orientation of Environmental Research (CORE).[14] ANGAP and CORE have permitting responsibility, but this applies only to scientists and their activities. The authorisation from ANGAP and CORE is issued only on the basis of a scientific justification.[15] It is only when a person has obtained an authorisation to enter a protected area from ANGAP and CORE that the General Directorate of Water and Forests will issue a collection permit to that person.

The practice in place for accessing protected areas for scientific purposes is basically a permit system that consists of a letter of approval obtained from ANGAP and CORE and an expectation of compliance with other relevant requirements such as research, collection, phytosanitary, and quarantine clearance. There are formal requirements for information that must be provided (to ANGAP, CORE, and DEF), as well as conditions of access and fees that must be paid. These are provided to the researcher when the researcher applies for research authorization, since these conditions are case-dependent.

The institutional structure governing genetic resources in Madagascar is still evolving and devolving, as efforts to balance economic development and the conservation needs of the country continue. Inter-ministerial consultations and workshops are often organised to enable the government to consult various stakeholders and discuss the way forward. As a practical matter, there is no overlap in the mandate and functioning of the various institutions, as these are regularly in contact. Similarly, these institutions have together designed procedures that determine each one's role.[16]

Within the national system governing access to genetic (and more generally biological) resources, the lead agency is the Ministry of Water and Forests, with other ministries such as the Ministries of Environment, Agriculture, Scientific Research, and Fisheries and Aquaculture also playing significant roles. As mentioned

8 *Presidents des bureaux exécutifs.*

9 Law No. 97-017 of 8 Aug. 1997, Relating to the Revision of Forestry Legislation, at 47.

10 *L'Association Nationale pour la Gestion des Aires Protégées.*

11 *Chef de Canton.*

12 *Ministère de la Peche et de l'Aquaculture.*

13 *Ministère de Recherche Scientifique.*

14 *Comité d'Orientation des Recherches Environnementales.*

15 ANGAP, *supra* n. 3.

16 *Id.*

earlier, these ministries often mandate other agencies to carry out specific functions pertaining to the management of biological resources in the country.

2.2 NGOs, International Institutions, and Bilateral Agencies

A number of NGOs, both national and foreign, are active in biodiversity (genetic resources) management in Madagascar predominantly due to conservation interests. Among the national Malagasy NGOs that are active are the National Association for Environmental Actions (ANAE)[17] and ANGAP. International and foreign NGOs include BIODEV International, CARE, Conservation International (CI), the Missouri Botanical Garden (MBG), The Peregrine Fund Inc., and World Wide Fund for Nature (WWF)-International. These NGOs are also largely interested in access to genetic resources for reasons tangential to their main objectives. Some of these organizations are collecting materials, but it is difficult to obtain authoritative data on the precise nature or extent of such collection activities.

Strong external influences have affected the history of the devolution of Madagascar's responsibility for biodiversity conservation and economic development legislation. Both bilateral and multilateral contacts with foreign governments and institutions have influenced the policy framework and the regulatory structures on access to genetic resources that is being established in the country. For example, financial and technical assistance for implementing Madagascar's environmental programs has largely come from the international community, including (but not limited to) the Indian Ocean Commission's Environmental Program,[18] European Union (EU), French Aid,[19] International Monetary Fund (IMF), GTZ, Swiss Development Corporation (SDC), United Nations Development Programme (UNDP), United States Agency for International Development (USAID), and the World Bank.

At the regional level, the initiatives are principally within the context of the Indian Ocean Commission (IOC). The IOC is made up of the four countries of the region—Comoros, Madagascar, Mauritius, and Seychelles—and the French Department of Reunion. Of relevance here is the Indian Ocean Regional Environment Project with its component aimed at the conservation of endangered plants in the region as well as for medicinal plants.

2.3 Local Communities

A 1996 law assuring local management of renewable natural resources addresses the rights of local communities relating to genetic resources.[20] The Secured Local Management of Natural Resources[21] (GELOSE) component of this law enables local communities to gain access rights and responsibilities to manage local renewable natural resources on a contractual basis. Formal legal contracts based on negotiations between local communities, the national government, and other stakeholders will be established to enable GELOSE to be effective. GELOSE was included in the second phase of Madagascar's Environmental Program (PE II) of 1997-2001. This program is financed by the World Bank, French Aid, and USAID.

3. LAWS AND POLICIES

From time immemorial, the Malagasy state has known and recognized the importance of natural resources in the lives of her people. At the beginning of the 19th Century, Andrianampoinimerina (the first King of Madagascar) declared:

> The forest is a common patrimony where anyone lacking the means of existence (widows, orphans, poor) must be able to collect wild materials for subsistence. Similarly, the forest provides wood necessary for constructions.[22]

This declaration was later followed by a regulatory mechanism that made all forests of the country property of the state. Access to forest resources (entailing all natural resources in the forest) came under regulation by the state. However, there appeared to be a conflict in the declaration and the regulatory provision for its application to access to genetic resources. The Malagasy saw the regulatory mechanism as restrictive because access to forests and forest resources required a central government authorisation even for populations living near forests and whose livelihood depended mainly on forest resources. The remoteness of communities and the nonexistence and the poor state of the roads that linked them to the capital made it difficult for most local communities to obtain the authorisation needed to access the forest and forest resources. Diverse motives—including

17 *Association Nationale d'Actions Environnementales.*

18 *Commission de l'Océan Indien (COI) Programme Environnement.*

19 *Coopération Française.*

20 Law No. 96-025 of 30 September 1996.

21 *Gestion Locale Sécurisée. See infra*, sec. 3.2.4.6; *see also* http://www.madagascar_sage.org/gelose.htm (last visited Aug. 13, 2003).

22 C. Ratovoson, *Les Problèmes du Tavy sur la Côte Est Malagache*, 35 Madagascar Revue Geographie 141-65 (1979).

internal security, protection of the unique biological diversity of Madagascar, and meeting the socio-economic needs of the Malagasy people—have been the basis for legislative and regulatory measures to access natural resources in Madagascar.

Within the legal framework, ownership of all resources within the boundaries of the state rests with the state, while private ownership is accorded to owners of private properties. This framework has evolved through the development of a complex system of laws and policies aimed at protecting Madagascar's unique biodiversity and promoting economic development in the country.

On the whole, there are many laws and regulations addressing the management of biological diversity, with an implied reference to genetic resources. The regulatory system has always been a centralised one; however, since the 1990s, efforts have been made to decentralise the system. The decentralisation program has been strongly influenced by the international community, which has provided funding to facilitate decentralisation.

A 1994 law relating to the authority, competences, and resources of decentralized territorial communities[23] seeks to transfer responsibilities and associated benefits from the central government to the decentralised territories of the country.[24]

Under this law, the transfer of responsibilities does not override the pre-eminence of the nation-state, especially in terms of sovereignty. The decentralized territorial communities are sovereign in competencies allotted by the Constitution, including the management of their natural and cultural patrimony. They are autonomous with respect to each other, but function in cooperation with the state and with each other to ensure the overall development of the country.

The decentralised territorial communities oversee access to and use of the resources within their territories; however, the income accruing from the exploitation of these resources is shared between the state and the community concerned. In practice, the partitioning of the income depends on the type of decentralised territorial community as well as the resource.

The rules relating to the organisation, functioning, and attributions of the decentralised territorial communities are set by law.[25] A decentralised territorial community is defined as

> a portion of national territory in which all eligible voters of Malagasy nationality, manage regional and local activities with the view to promote the economic, social, sanitary, cultural, scientific and technological development of the area. The decentralised territorial community assures, in cooperation with the state, the development of the territory, the protection of the environment, the improvement of living conditions of inhabitants as well as the preservation of her identity. Similarly, with the state, the decentralized territorial community assures public security and administration. The decentralised territorial community is endowed with a moral personality and is financially autonomous.[26]

There are three types of decentralized territorial communities:

- Region:[27] the territorial community at the strategic level;
- Department:[28] the territorial community at the intermediate level; and
- District:[29] the base territorial community.

At the district level, there are urban districts[30] and rural districts,[31] according to the population size.

Partitioning of income from the exploitation of mining, agriculture, forestry, breeding and fishing, and craft and industry, as well as medicinal plant resources destined for sale locally or for export, that occurs in the territory of a region is fixed annually by a central government decree. The decree is based on the information on the income provided and the amount for each party proposed by the regional council concerned.

At the level of a department, the partitioning of income arising from resource use is fixed annually by deliberation of the departmental council. The law does not provide communities with any rights to consent to or impose terms and conditions on access or share in other types of benefits, such as technology transfer or participation in research. These aspects may be covered by future laws passed as part of the decentralisation process.

23 *Collectivités territoriale décentralisées.*

24 Law No. 94-007 of 21 March 1994.

25 Law No. 94-008 of 28 March 1994, which completes Law No. 94-007.

26 *Id.*

27 *La Région* or *Faritra.*

28 *Departement* or *Departemanta.*

29 *La Commune* or *Kaominina.*

30 *Commune Urbaine.*

31 *Commune Rurale.*

3.1 Specific Access to Genetic Resources Legislation and Policies

3.1.1 Policy Rationales Governing Genetic Resources

The policy rationale underpinning Madagascar's approach to access to genetic resources is to reconcile the Malagasy population with their environment via poverty alleviation. This is to be achieved through the sustainable management of biological resources, equitable sharing of the benefits from biodiversity, and the carrying out of further research and the building of local capacity, as well as the conservation of the unique biodiversity of the country. A priority is placed on conservation, but on a sustainable use basis; thus, the possibility of commercial access to genetic resources is of significant interest. The GELOSE approach would make it seem likely that benefits would accrue to all including local communities, however, it is yet to be seen whether this will be the case. In general, the approach of the Government of Madagascar could be described as intending to create a facilitating, non-restrictive, regulatory system that will generally encourage access to genetic resources within the limits of conservation concerns, including the uniqueness of the country's biodiversity and the dangers of extinction.

The primary motivation for introducing a regime governing access to genetic resources in Madagascar seems to be economic. There is a belief that the high levels of terrestrial and aquatic endemism found in the country may be of great interest to foreign researchers and companies. Bioprospecting, in conjunction with other biodiversity-related activities such as ecotourism, is seen as a potential contribution to the diversification of the national economy. Poverty alleviation through equitable benefit sharing with all citizens is cited as part of this motivation; however, this is part of a macroeconomic strategy, and only time will tell as to whether communities will really benefit in the sharing.

The economic motivation is based on two assumptions. The first is the intrinsic value of Madagascar's biodiversity and its potential for application in recreation, pharmaceuticals, industry, and agriculture. The cosmetic and pharmaceutical potentials of Madagascar's numerous medicinal and aromatic species are major driving forces behind this economic motivation. Given the high level of endemism and the relative lack of knowledge about the potential benefits of the majority of Madagascar's biodiversity, there may well be some potential for new discoveries and for ecotourism, but the actual financial flows that could be expected are unknown and highly speculative.

Conservation seems to be almost as important as economic issues in Madagascar's motivation. To some degree, the two are connected in that access to genetic resources could contribute financially to conservation activities, and receiving the results of others' research will provide valuable information at minimal cost. However, the main conservation motive is based on the premise that uncontrolled exploitation of threatened species, especially medicinal and aromatic plants, is leading to the decline of these species and their habitats. The introduction of a legislative regime, such as GELOSE, for access to genetic resources may prove useful here, particularly for information gathering and monitoring purposes as well as benefit sharing. Time will judge how effective this initiative will be, as emphasis here again is on commercial exploitation. Similarly, its condition that "only duly constituted and recognized Base Communities can be beneficiaries of the transfer of management scheme" appears to be complicating issues. This redefines the base structure of the Malagasy society.

It is unclear how many of the existing rural communities in the areas where the renewable natural resources are located know of this requirement of regrouping to form "duly constituted Base Communities." And if they get to do it at some point, are they going to be interested in and capable of regrouping into the new Base Communities? What is the capacity of rural communities to understand and become involved in the complex negotiations meant to lead to the issuance of the agreement for the transfer of management of, and management contracts for, the resources in their areas? Of course, the legislative regime gives these communities recourse to the services of environmental mediators; however, an extensive awareness program preceding the application of this legislative regime would be highly desirable. The economic incentive may be an important determining factor in motivating people to regroup, but what becomes of those who are not interested in the commercial exploitation of the resources in their areas? Careful consideration should also be given to the non-commercial exploitation of resources.

3.1.2 Participation

Madagascar's interest in developing and implementing a regime governing access to genetic resources emerged as a means to promote sustainable use of the biodiversity with the benefits reaching all stakeholders at the local, national, and international levels. In this context, processes for consultation and the gathering of opinions and information, such as workshops, have been and continue to be organized. Relations between the

lead agencies, NGOs, and communities are fairly good, and a variety of stakeholders have greatly influenced the government's perspective on the issue.

3.2 Legislation and Policies with Relevance to Access and Benefit Sharing

The current legislative framework and policies of the Government of Madagascar do not distinguish between biological resources in general and the specific case of genetic resources. Equally, there is no general distinction made on the basis of the relative economic significance of any biological resources. However, medicinal and aromatic plants as well as plants for industrial exploitation have special regulatory mechanisms, discussed section 3.2.4.3 below. Similarly, rare and endangered species are regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

3.2.1 The Constitution

In the preamble of the 1992 Constitution of Madagascar (revised in 1997), the Universal Declaration of Human Rights, the African Charter on Human and Peoples' Rights, and the Convention on the Rights of the Child are adopted as an integral part of the law of Madagascar. Similarly, the Constitution recognizes respect for and protection of fundamental liberties, individual and collective; the protection of national unity through the implementation of a policy of balanced development in all areas; and the application of effective decentralisation. The Constitution deems citizens to be equal under the law, enjoying the same fundamental liberties and protected by law[32] and prohibits all discrimination based on sex, education, wealth, race, religion, or opinion.[33] The Constitution also recognizes the right of everyone to participate in the cultural life of their district, in scientific progress and the resulting benefits,[34] and engages the state to assure the promotion and protection of the natural and cultural heritage, as well as artistic and literary production.[35] While not speaking directly to issues of genetic resources, these provisions address a number of the procedural and institutional challenges in Madagascar, particularly those faced by communities, which have thus far had little power or authority to shape institutions, laws, or activities relating to genetic resources. Minority rights are constitutionally recognized:

> The Fokonolona [the base unit of the composition of the Malagasy State] may take appropriate measures to prevent destruction of their environment, loss of their land, seizure of herds of cattle, or loss of their ceremonial heritage, unless these measures jeopardize the common interest or public order.[36]

Provision for the environment is contained in article 39, which states that "Everyone shall have the duty to respect the environment; the State shall assure its protection." These constitutional provisions are interpreted in Madagascar to apply to ownership, access to, control, utilisation, and the benefit sharing of genetic resources in the country. However, this interpretation has yet to be seen in practice.

3.2.2 Status of International Treaties

Madagascar is a member of the World Trade Organization (WTO), partially applies TRIPs, and is required to fully implement the provisions of TRIPs by 2005.[37] With regards to the compatibility of TRIPs with the Convention on Biological Diversity (CBD), Madagascar is in accord with the African Group position as presented at the Seattle Inter-Ministerial Conference in December 1999.[38] Madagascar has not yet ratified the UPOV Convention. However, discussions on ratifying UPOV have taken place in the country.

Madagascar is a signatory to the CBD and ratified it in 1995.[39] It also is party to many other international agreements regarding the environment including CITES, United Nations Framework Convention on Climate Change (UNFCCC), Convention on Fishing and Conservation of Living Resources on the High Seas, and the Conservation on Wetlands (RAMSAR). As an active party to the CBD and member of the FAO, the ongoing discussions under article 15 of the CBD and the adoption of the International Treaty on Plant Genetic Resources (ITPGR) are likely to have impacts on Madagascar's policies.

3.2.3 An Evolving Legal Framework

At the beginning of the 19th Century, Andrianampoinimerina announced provisions prohibiting deforestation, especially by forest fires. This initiative

32 Art. 8(1).

33 Art. 8(2).

34 Art. 26(1).

35 Art. 26(2).

36 Art. 35(1).

37 Personal communication from Malagasy Industrial Property Office (OMAPI) to Nat Quansah (2001).

38 See chapter 4 in this volume.

39 The Government of Madagascar authorised ratification by Law No. 95-013 of 8 August 1995, and formally ratified it by Decree No. 95-695 of 3 November 1995.

was the first attempt at conservation of forested areas in pre-colonial Africa.[40] The Codes of 101 Articles of 1868 and Codes of 305 Articles of 1881 were legislations relating to civil rights, penal rights, and procedures.[41] Of the articles of the codes, numbers 101-106 prohibited, among other matters, the burning of forests and the installation of homesteads in the forest. The rational behind this prohibition was to guarantee both internal and external security of the state.[42]

During the French colonisation of Madagascar, the Service of Water and Forests,[43] established in 1896, set up State Lands and Defended Zones in which clearing was forbidden. In 1900, the French authorities reaffirmed the declaration of all forests of Madagascar as state property, as set forth in the Codes of 101 Articles of 1868 and Codes of 305 Articles of 1881. In 1927, the first 10 Integral Nature Reserves were created in Madagascar. These reserves were closed to all human activities, even to access by inhabitants of nearby villages. The reserves were, however, accessible to research scientists, who were required to present their research proposals to central government for approval and authorisation.[44]

Laws to reinforce protection of the unique biodiversity and environment of Madagascar continued to be enacted after the country gained independence in 1960. These laws followed the same patterns as earlier ones, with the goal to protect the biodiversity of the country. Ordinance No. 60-126 of 3 October 1960 fixed the general modalities for hunting, fishing, and the protection of animals.

Decree No. 61-093 of 16 February 1961 authorised the issuance of hunting permits for scientific purposes. This decree eased restrictions to access to species by scientists. The Ministry of Water and Forests may grant a hunting permit to a scientist upon approval of a research proposal by the Ministry of Scientific Research.

In 1968, Madagascar adopted the World Conservation Union (IUCN) categories for protected areas in the creation of protected areas in the country, but with restrictive texts that prohibited visitors in order to better protect the country's plants, animals, and their environment. However, Decree No. 69-390 of 2 September 1969 enabled hunting permits for commercial purposes to be issued, thus increasing access to hunted species their habitats.

Decree 74-078 of 23 March 1974 regulates and authorises the exportation of forest products. Export authorisation is issued by the Department of Commerce, but delivered through the Department of Water and Forests and Soil Conservation[45] under the Ministry of Water and Forests. The exporter must request an exportation authorisation from the Director of the Department of Water and Forests. The following information must be contained in the request:

- source of the product to be exported,
- nature and quantity of the product,
- names and quantities of preservatives used to preserve the product,
- port of embarkation in Madagascar, and
- country to which the product is destined.

After investigation of the validity of the request, the Department of Water and Forests and Soil Conservation sends the request, with a certificate of origin and the price to be paid attached, to the Department of Commerce for the eventual issuance of the exportation authorisation.

3.2.4.1 Order No. 4249 (1976)

Inter-ministerial Order[46] No. 4249 of 11 December 1976 regulates the exploitation, commercialisation, and the protection of medicinal plants.[47] This order classifies medicinal plants as forest products. It gives authority to the minister charged with forestry administration[48] to issue permits for the exploitation of medicinal plants, principally for use in medicine and the preparation of pharmaceutical products or chemicals, upon request.

Communities have the right to obtain permits to exploit forest products occurring within their territories for commercial purposes unless they renounce this right. It is only after a community has renounced its right to obtain a permit for the medicinal plant resources in their area that a third party (physical or legal person) can request a permit for those resources. Communities have the right of traditional use of forest resources in their areas. However, materials collected or gathered for personal use must never be subjected to commercial transactions.

The order includes sections pertaining to phytosanitary requirements with regards to plant materials for trade or research purposes. Only quality, healthy, and

40 D.W. Gade, *Deforestation and Its Effects in Highland Madagascar*, 16(2) Mountain Research and Development 101-116 (1976).

41 Ratovoson, *supra* n. 22.

42 *Id.*

43 *Service des Eaux et Forêts*

44 J. Andriamampianina, *Nature Reserves and Nature Conservation in Madagascar*, *in* A. Jolly et al. (eds.), Madagascar: Key Environments (1984).

45 *Direction des Eaux et Forêts et de la Conservation des Sols.*

46 *Arrêté.*

47 Order No. 4249 of 11 December 1976.

48 *Ministre chargé de l'administration forestière.*

properly treated plants can be exported. Prior approval from the Ministry of Scientific Research is required for the exportation of all medicinal plants for scientific purposes, even sample specimens for the issue of exportation authorisation by the Department of Water and Forests. The approval needed from the Ministry of Scientific Research is meant to bring in the scientific and technical expertise of this ministry to complement that of the Department of Water and Forests and to confirm when a request for exportation authorisation is made "in the name of science." The order also prohibits the export of seeds, plant cuttings or other live plants. Similarly, the exportation of medicinal plants in their raw state is regulated and could be forbidden if the possibility of processing and transforming the medicinal plant locally exists, increasing its market value above that of the exported raw material. All this is aimed at adding value to, as well as preserving, the biological patrimony of Madagascar.

3.2.4.2 National Patrimony

The safeguarding, protection, and conservation of national patrimony—including nature, culture, buildings, and furniture—are made possible by Ordinance No. 82-029 of 6 November 1982. The authorisation of the ministry charged with the protection of national patrimony is necessary for the repair, sale, rent, and transfer to another locality of any item considered to be of value to the country and defined as a national patrimony, including prehistoric, ethnographic, scientific, and technical interests. Similarly, the management of any site or area that has a national monument requires the agreement of the Commission of Classification.[49] This ordinance also provides for the creation of commissions for the control of the exportation of objects of national patrimony[50] at national and regional levels to enable the effective control of national patrimony in the country. This ordinance is especially aimed at regulating tourism and tourist activities in the country.

Decree No. 83-116 of 31 March 1983 prohibits the exportation of rare specimens of plants and animals; deals with authorisation for the exportation of products from excavations as well as archaeological and palaeontological discoveries in the country. It also prohibits the exportation of rare specimens of plants and animals. However, specimens or collections for scientific or research purposes and objects for cultural and scientific events are exempted. These objects must have prior authorisation for exportation from the national commission of control, established by Ordinance No. 82-029. Decree No. 83-116 also fixed the modalities for the application of Ordinance No. 82-029 relating to national patrimony.

Concerned with the continued rapid degradation of the country's environment and the loss of its unique flora and fauna, the government of Madagascar adopted, in 1984, the World Conservation Strategy produced by IUCN as the basis of the National Strategy for Conservation and Development.

The policies and obligations of forest preservation are dealt with by the Policies of Reforestation.[51] The modalities for exporting forest products, including issuing permits to exploit and the right to use forest products are established by Decree No. 87-110 of 31 March 1987.

3.2.4.3 Use of Plants for Medicinal and Industrial Purposes

Updated regulations applicable to medicinal plants and plants for industrial purposes were established by Inter-ministerial Order No. 2915-87 of 30 June 1987. Under this order, the exploitation or collection of medicinal plants for commercial purposes cannot be carried out without an exploitation agreement or permit. This order requires that a "*convention d'exploitation*" (an exploitation agreement), valid for one year and renewable, be obtained for the exploitation of herbaceous plants (including specific parts) as well as fruits, leaves, or flowers of woody plants. Similarly, a "*permis d'exploitation*" (an exploitation permit), valid for two years and renewable upon request six months before it expires, is required for the exploitation of woody plants (including just specific parts) except the fruits, leaves, and flowers.

The order recognizes and defines three main types of medicinal plant users in terms of commercial interests:

> "*Exploitants*" (farmers): physical or moral persons possessing an agreement or an exploitation permit to collect and exploit medicinal plants for sale and/or use the plants as an industrial raw material for transformation;
> "*Collecteurs*" (collectors): physical or moral persons mandated to collect or assemble medicinal plants by a farmer; and
> "*Recolteurs*" (harvesters or gatherers): persons authorised to collect or gather medicinal plants for commercial purposes. The harvester/gatherer may be a freelancer or employed by a user or collector.

49 *Commission de Classement.*

50 *Commissions de contrôle d'exportation des biens du patrimoine national.*

51 Decree No. 85-072 of 13 March 1985.

All users must possess a valid title of exploitation (either an agreement or permit) to operate. The type of user and the motive for use determine where one obtains a title of exploitation.

An exploitation agreement or permit for a physical or legal persons utilising medicinal plants strictly for export purposes or for processing or alteration in a local factory is obtained from the Director of the Department of Water and Forests,[52] with approval of the Minister of Water and Forests.

An exploitation agreement or permit for someone collecting medicinal plants for sale to the public, to small resellers, or to a factory is issued and delivered by the Head of the Provincial Department of Water and Forests[53] with approval of the President of the Regional Executive Committee.[54]

The exploitation agreement or permit for someone collecting medicinal plants strictly for sale to the public or small resellers in local markets is issued and delivered by the Head of the District Department of Water and Forests,[55] with approval of the President of the District Executive Committee.[56]

In order to exploit medicinal plants on private property for commercial ends, the owner must inform and obtain a private-owner attestation[57] from the Head of the Forestry Station[58] of the area where the property is located. The plants from the private land can only be sold to someone with a valid agreement or exploitation permit.

This order also enables local people to benefit from the sale of plant materials originating from their areas. The decentralised territorial communities are meant to receive a one-time payment of a 3 percent share from income derived in the marketing of plants collected from these areas. The modalities of this, however, have not yet been worked out. Users must pay a forestry tax and agree to contribute to the sustainable management of the local biodiversity where they collect as well as the country's economic development

Failure to comply with the requirements of an exploitation agreement or permit (usually annexed to the permit or agreement) leads to a fine, imprisonment, or the cancellation and withdrawal of the agreement or permit.

The legislative and regulatory mechanisms in Madagascar have been evolving around protecting the unique fauna and flora of the country. To achieve this, emphasis has been placed on control of commercial exploitation of the country's forest products. As a result, access to genetic resources by ordinary Malagasies to meet their day-to-day needs—especially local people living in and around the biodiversity-rich areas—have been compromised.

3.2.4.4 Charter of Environment

The Charter of Environment of Madagascar defines the general legal framework with regards to all national environmental policies.[59] The principal objective is to reconcile the population with their environment through sustainable development taking into account ecological, social, economic, and cultural contexts. The need to decentralise and give responsibility to all actors involved with the environment is a principal theme of the charter. Everyone—from local communities to scientific researchers to economic operators—is responsible to the environment.

The charter seeks to redress the imbalance between commercial and local access by instilling a broad legislative framework that requires a balanced approach to conservation and economic development. It provides for the establishment of programs and activities meant to alleviate poverty while conserving biodiversity. Thus, the charter aims to facilitate access to biodiversity and give responsibility to all actors involved in the use of biodiversity at all levels, including individuals, local communities, NGOs, and private and public economic operators, in order to promote appropriate socio-economic development and conservation of biodiversity.

3.2.4.5 Animals

The exportation of endangered animal species as well as the importation of animals not present in Madagascar is governed by Law No. 91-008, as modified by Law No. 2000-022.[60] However, endangered or non-endangered species may be imported or exported for demonstrations or scientific purposes. Importing and exporting must have a prior authorisation, which is issued by decree upon proposal by the minister charged with animal breeding[61] and by approval by a cabinet meeting. This law also prohibits the importation and exportation of animals for breeding purposes and genetic materials for any purpose, except for those that have received prior authorisation from the Official Veterinary

52 *Directeur des Eaux et Forêts.*

53 *Chef du Service provincial des eaux et forêts.*

54 *Président du comité exécutif du Faritany.*

55 *Chef du circonscription des eaux et forêts.*

56 *Président du comité exécutif du Fivondronampokontany.*

57 *Une attestation de proprietaire-prive.*

58 *Chef du cantonnement forestier.*

59 The Charter of Environment Madagascar (*Charte de l'Environnement*), Law No. 90-033 of 21 December 1990.

60 Law No. 91-008 of 25 July 1991, as modified by Law No. 2000-022 of 09 November 2000.

61 *Ministre chargé de l'élevage.*

Services.[62] This law is meant to protect the health of animals so as to enhance the economic development, as well as preserving the national faunal patrimony. Authorisations are issued upon request by the person(s) concerned to the appropriate ministry or department. The terms and conditions for the issue of an authorisation is case-dependent but is always guided by the intended purpose for the requested resource (microorganism, plant, animal, and their parts).

Ordinance No. 93-022 of 04 May 1993 covering the regulation of fishing and aquaculture partially abrogated Ordinance No. 60-126 of 03 October 1960 with respect to fishing regulations. As such, access to fishing resources is somewhat easier.

3.7.4.6 GELOSE and Resource Management by Base Communities

GELOSE completes the regulations in place concerning forest exploitation and the commercialisation of forest products.[63] According to this law, a duly constituted base community[64] can become responsible for managing certain categories of renewable natural resources belonging to the state or decentralised territorial communities through a contractual transfer of management. The categories for the transfer scheme include forests, wild animals and plants (both aquatic and terrestrial), and water bodies. A base community is constituted by the voluntary groupings of individuals united by common interests and obeying common rules of life. It includes, depending on the case, the inhabitants of a hamlet, a village, or group of villages. A base community is endowed with a legal personality and functions like an NGO.

Only properly constituted and officially recognised base communities can participate in the transfer of management scheme. A base community wishing to be assigned responsibility for the management of a resource belonging to the state or a decentralized territorial community must apply for an agreement from the administrative authority responsible for the management of that resource. The application must be addressed to the mayor of the district for the base community.

The agreement from the administrative authority officially transfers management of the resource(s) indicated in the agreement to the base community. The agreement gives a base community the authority to manage the indicated resource(s) on the condition that the base community respects the stipulations, conditions, and clauses contained in the management contract.[65] The management contract must be negotiated, agreed, and signed by representatives of the base community, the district in which the base community is located, and the state or the decentralised territorial community prior to the issuance of the agreement by the responsible administrative authority.

The transfer of management does not denote the transfer of the property. As a result of the transfer, the base community becomes the manager while the state or the decentralised territorial community remains the owner of the resource in question. The extent to which a base community controls access or shares in the benefits of managing a particular resource depends on the negotiations and the ultimate management agreement.

3.2.4.7 Comprehensive Revisions to Forest Legislation

Law No. 97-017 of 8 August 1997 revised the forestry legislation. This law defines the forestry system as the total legislative arrangements and regulations established for protection and sustainable management of forest resources in Madagascar. All forests placed under the forestry system must be inventoried and have management plans for their exploitation. Depending on the particular forest product to be exploited, the forests are managed through a system of regular cuttings or permits. An exploitation permit is delivered under the condition that the permit holder carries out compulsory reforestation or pays the financial equivalent. This law provides for the creation of forestry commissions[66] to advise the Ministry of Water and Forests and its regional representatives on the appropriateness of placing a forest (natural or artificial), a land, or an area covered with woody plants—whether owned by the state, a decentralized territorial community or a private party—under the forestry system.

The procedures for the exploitation and cutting of state-owned forests are fixed by regulations proposed by the regional representative of the Ministry of Water and Forests. The decentralised territorial communities concerned with the intended resource must establish the procedures for the forests belonging to them.

All forest users must hold a certificate from a Forestry Training Center approved by the state or obtain an agreement from the Minister of Water and Forests under conditions fixed by decree taken at a cabinet meeting. All aspiring forest users must register at and follow a forestry training program in an approved Forestry Training Center to obtain a certificate. Forest users who

62 *Services vétérinaires officiels.*

63 Law No. 96-025 of 10 September 1996.

64 *Communauté de Base.*

65 *Contrat de gestion.*

66 *Commission Forestières.*

are experienced as a result of their on-the-job training may opt to apply to the Minister of Water and Forests for an agreement instead.

Regional representatives of the Ministry of Water and Forests can deliver a cutting permit[67] to individuals only for strictly personal use.

A 1997 Law acknowledges the traditional use rights of the *Fokonolon* (a sui generis Malagasy institution with a popular, democratic, mystic, and economic character). The *Fokonolona* is a cooperative regrouping of all the inhabitants of one or groups of villages into one community. It is the base unit of the state. This law authorises the *Fokonolona* to exercise this right of use, individually or collectively, in accessing resources in forests within their locality—including those state-, decentralized territorial community-, public establishment-, and private-owned—so long as this right has not been annulled. The goal of this authorisation is to ensure the effective participation of rural populations in the conservation of renewable natural resources of the country.

Law No. 97-017 abrogates provisions of all earlier legislation with which it conflicts. According to the implementing decree, a local forestry commission[68] is created for each region.[69] The forestry commission must include a representative from all parties involved in the forestry sector. The commission acts as a deliberating or consultating group and advises the government and the decentralised territorial community authorities on forestry matters, especially concerning whether to place a forest under the forestry system. The forests of the state, decentralised territorial communities, and state establishments are placed under the forestry system and the minister charged with forestry affairs is authorised to make a precise list of these forests later.

Rural populations' rights of use are acknowledged and the exercise of this right through the collection of forest products to assure traditional activities and to satisfy domestic needs is authorised. These collections, however, must in no case be commercialised, and the person or persons concerned must be ready to justify what the collection was used for when questioned by forestry agents.

Under this decree, permits for the collection of forest products for scientific purposes is issued by the minister in charge.

Decree No. 98-782 updates earlier decrees and provides the means for using and valuing natural resources placed under the forestry system. This decree considers forest exploitation as "all sorts of collection of forest products as well as all products from lands or areas defined under the Forestry Law for commercial purposes." Similarly the decree considers any person (natural or legal) carrying out exploitation and/or development of forest products as a forest exploiter. The exercise of any forest exploitation activities is subject to prior recognition and approval by the minister in charge of forests through registration and the acquisition of a permit or agreement of exploitation. The exploitation permit or agreement may be suspended if the forest commission, decides that the exploiter has not fulfilled the conditions laid out in the title of exploitation.

The state and the decentralised territorial communities, through management contracts, may transfer the management and the exploitation of their forests to base communities in accordance with stipulations of Law No. 96-025, relating to the management of renewable natural resources.[70] Private forest owners may also lease their forests to recognised registered forest exploiters.

To be a recognised and registered forest exploiter, the person (natural or legal) must display the necessary qualifications (training, title, or certificate), show proof of sufficient experience in the activity to be undertaken, or be assisted by another person with the necessary qualifications or experience.

This decree also requires the minister in charge of forests to establish by ordinance a list of trainings, titles, or certificates as well as the criteria for the experience needed to enable a person to become a recognised forest exploiter. The collection of products from forests placed under the forestry system can only take place if a collector has an exploitation agreement or permit, a cutting permit, a collection permit, or a management contract.

By 2004, this decree requires the exploitation of all forests placed under the forestry system to be pursuant to management plans. All economic activities in forests within the forestry system must be compatible with the environment.

Mining, craft, or industrial exploitation of forests placed under the forestry system is regulated. The ministers in charge of these activities can only issue authorisation for their exploitation upon prior agreement with the minister in charge of forests. The forestry administration must consult with the local rural population, professional organizations, and NGOs in the forest sector during the decisionmaking process relating to the management of a forest, in accordance with the forestry policy as defined by the government.

67 *Permis de coupe.*

68 *Commission Forestière.*

69 Decree No. 98-782 of 16 September 1998.

70 *Id.*

The control and follow-up of resources exploited from all forests is the responsibility of skilled agents appointed by the forestry administration. These activities are carried out in the forest concerned as well as during the transportation of the forest product. The controllers can carry out their activities of inspection and monitoring of resources collected from an area at any time. The exportation of forest products must be conducted in accordance with CITES requirements. Any one desiring to export a forest product must obtain prior authorisation from a representative of the forestry administration. The exporter must show a receipt for proof of the source of the product to be exported. The exporter must be in possession of a logbook, signed by a qualified forestry administrator indicating the nature, the quantity, the market value, the quality, the volume, the source, and the destination of the resource intended for export. The logbook must be stamped and initialed by all the departments concerned before exportation can take place. This is meant to reinforce the control and follow-up of exportation of the country's forest products. The terms and conditions for export are the same as for authorisation.

The exploitation of forest requires payment of a forestry tax. The forestry tax is calculated based on the maximum exploitable volume of the resource without putting in danger the continued availability of the resource. The minister in charge of forests is responsible for calculating the forestry tax. The forestry tax amount is revised at least once a year according to the evolution of market prices. The forestry tax may be modulated according to exploitation costs, distance of markets, the rarity of the resource, and its market value, as well as the management conditions of the forest.

The exportation of forest products is only possible after the payment of the exportation tax, the amount of which is calculated and fixed by an inter-ministerial order from the minister in charge of forests and the minister in charge of budget. The amount obtained from the payment of forest taxes is paid into forestry funds.

Decree No. 98-782 abrogated all earlier dispositions contrary to it: especially, the dispositions of the Decree of January 25, 1930 reorganising the forestry regime, the Order of 17 November 1930 regulating the application of the forestry decree, and Decree No. 87-110 of 31 March 1987 fixing the modalities of forest exploitation, cutting permits, and the right of use.

The Malagasy Forestry Policy[71] is based on the following six principles:

1. conformity with the national development policy of decentralisation, economic liberalisation, and the disengagement of the state in the productive sector;
2. conserving forest resources through appropriate sustainable management, balancing the satisfaction of the socio-economic needs with the overall preservation of the resources;
3. limiting ecological risks, taking measures to protect or reconstitute forest covers so as to ensure the ecological functioning of ecosystems, thus reducing or limiting ecological risks associated with the loss of forest (vegetation) cover;
4. contribution of the forestry sector into the economic development of the country, improving the levels of exploitation, transformation, and the commercialisation of forest products thus leading to job creation and revenue source for people as well as the state;
5. giving responsibilities to local actors for the management of forest resources through management contracts; and
6. adapting forestry actions to the realities of the country, including the need to search for effective forestry actions and focusing these actions to meet specific forestry needs of the diverse ecological regions in a cost effective manner.

The following four directives reflect the principles of the Malagasy Forestry Policy:

1. minimize, stop, and reverse the forest degradation process;
2. better management of forest resources in the context of sustainable development by searching for and attaining the best possible balance between resource use and needs satisfaction;
3. increase the surface area covered by forests in the country so that the forest can enhance its economic, ecologic, and social functions; and
4. direct the economic performance of the forestry sector so that it positively contributes to the economic development of the nation.

These directives are to be pursued in a complementary manner.

The SNGF[72] has the authority to control and conduct follow-up activities relating to phytogenetic resources, especially those concerning seeds, seedlings,

71 Decree No. 97-1200 of 2 October 1997.

72 *Silo National des Grains Forestiers.*

and plants in Madagascar.[73] SNGF assures the production of good quality seeds and seedlings of both exotic and indigenous species that are sold to public and private institutions involved with afforestation and reforestation programs in the country. Similarly, these products of SNGF are exported. Import and export regulations in the country also apply to these phytogenetic resources. These require authorization from the Ministry of Water and Forests, with prior approval of the Ministry of Scientific Research and the Ministry of Environment

Decree No. 2000-323 of 7 June 2000 governs reforestation. Reforestation efforts have focused heavily on exotic species, such as Eucalyptus and Pine, thus leaving a limited impact on the preservation of endemic biodiversity of the country. It is unclear whether this decree will help to ensure that indigenous species are considered for reforestation programs.

Inter-ministerial Decision No. 8372/2000 of 8 August 2000 gave approval to the National Strategic Plan on Phytogenetic Resources. It also confers the responsibility of coordinating research and production activities for quality materials pertaining to phytogenetic resources to SNGF. Inter-ministerial Decision No. 6833 of 28 June 2001 relates to forest taxes and license fees on commercial hunting permits, collecting, and exportation authorisation for plant and animal specimens.

3.2.8 In Situ and Ex Situ Conservation

The majority of the laws, regulations, and policies concerning the management of the biodiversity and environment of Madagascar are relevant to genetic resources issues. Some of the legislative framework can be traced as far back as the 19th Century during the reign of King Andrianampoinimerina. These have evolved over the years, leading to the country's environmental policies today, which are guided by the principles as expressed by the Charter of Environment of Madagascar.

Policy approaches to in situ and ex situ conservation of sources of genetic material, including access to those sites, have obvious implications for access to genetic resources. The main approach to in situ conservation in Madagascar consists of the network of protected areas. There are about 36 types of protected areas in Madagascar. These fall into one of six broad categories based on their respective levels of protection. The categories are: National Parks;[74] Complete Nature Reserves;[75] Special Reserves;[76] Classified Forests;[77] Areas of Tree Planting and Restoration; Zones of Action in Favour of Trees (ZODAFARB);[78] and Hunting Reserves.[79] Together, these areas cover about 6.4 percent of the national territory of Madagascar.[80] Since the 1990s, there has been a drive to establish more than 50 national parks and protected areas in the country in a 15-year period as part of the Environmental Program of Madagascar.[81]

The Botanical and Zoological Park of Tsimbazaza (PBZT)[82] in Antananarivo is a place where attempts are being made at ex situ conservation of some fauna and flora of Madagascar through captive breeding and nurseries. Grains, especially rice, are the subjects of research and development at FOFIFA (Agricultural Research Center) and these are kept at the FOFIFA storage facilities at Mahitsy. Foreign zoos and botanic gardens also harbor some of the unique plants and animals of Madagascar as part of their conservation activities. The policies regarding access to these collections and sharing of benefits are unclear.

3.2.9 Intellectual Property Rights

The existing legislation on intellectual property rights (IPRs) deals mainly with industrial property. The Malagasy Industrial Property Office (OMAPI),[83] a public institution,[84] is responsible for the administration of industrial property in Madagascar. OMAPI delivers, upon request by the person or institution concerned, patents or certificates regarding inventions; registers marks of manufacturing, commerce, or service; and registers designs, industrial models, and commercial names. OMAPI is also charged with registering technology transfers (patent licenses, marks, etc.). Similarly, OMAPI provides a public information service with regards to industrial property (publication of the Official Industrial Property Gazette (GOPI)[85]), disseminates publications, and promotes activities relating to inventions in Madagascar.

The procedure for granting patents for inventions is as follows:

73 Decree No. 98-003 of 8 January 1998.

74 *Parcs Nationaux.*

75 *Réserves Naturelles Intégrales.*

76 *Réserves Spéciales.*

77 *Forêts Classées.*

78 *Périmètres de Reboisement et de Restauration, Zones d'Action en Faveur de l'Arbre.*

79 *Réserves de Chasse.*

80 M.E. Nicoll & O. Langrand, Madagascar: Revue de la Conservation et des Aires Protégées (1989).

81 USAID, *supra* n. 2.

82 *Parc Botanique et Zoologique de Tsimbazaza.*

83 *L'Office Malgache de la Propriété Industrielle.*

84 Established by Ordinance No. 89-019 of 31 July 1989 and Decree No. 92-994 of 2 December 1992.

85 *Gazette Officielle du Propriété Industrielle.*

- The concerned (individual or institution) must request for a patent by submitting a formal request.
- OMAPI administratively examines the request.
- After this initial examination, a detailed examination is carried out.
- A patent is then delivered or denied.

For inventions, the patent protection is valid for 15 years non-renewable starting from the day the request was submitted, with an eventual supplement for five years for exceptional title.

The information on the delivery of the patent is finally published in the GOPI. The issuance of the patent gives the patent owner the exclusive right for the exploitation—including manufacturing, sale, and exportation—of the product patented, as well as the exclusive right for the utilisation of the process patented.

The patenting authority's, that is OMAPI's, jurisdiction does not currently cover providing patents to protect plants in general (including plant varieties), animals, and microorganisms. It is, however, planned for future legislative projects.[86] Special regulatory mechanisms are, however, in place to protect biological materials. An inter-ministerial order[87] prohibits the export of seeds, plant cuttings, and other live plants,[88] while another order regulates the exploitation and commercialisation of forest products by protecting medicinal plants.[89] There is no legislation in place addressing patenting of lifeforms.

3.4 Draft Laws, Regulations and Policies

Inter-ministerial Decision No. 6833 of 28 June 2001, relating to forest tax and license fees for commercial hunting and the collecting and exportation authorisation for plant and animal specimens, could be looked at as a model for future drafts relating to AGR. Texts of this decision pertaining to the exploitation of medicinal and aromatic plants and their extracts have been in discussion since early 2002. The discussions have been between the Ministry of Water and Forest, the Union of Professional Producers of Aromatic, Alimentary and Medicinal Extracts of Madagascar (SYPEAM),[90] and the Association of Operators in Agro-business of Natural and Biological Products (PRONABIO),[91] and have been supported by UNDP program MAG97/007 pertaining to private sector support. Similarly, ideas about revising the patenting system in order to enable botanical materials to be protected through patent mechanisms have been circulating among the Malagasy Industrial Property Office, researchers, members of government, NGOs, associations, and commercial and donor institutions.

Various initiatives affecting access to genetic resources in Madagascar at the national, regional, and international levels are underway. At the national level, discussions have been held between the Ministry of Water and Forest and representatives of SYPEAM and PRONABIO, with support from UNDP, regarding language to address exploitation of medicinal and aromatic plants and their extracts in Madagascar.[92] Similarly, revising the texts for the patent system in order to enable botanical materials to be protected by patents has been discussed and planned for the next new project of laws.[93]

The National Office of the Environment, through the MoE, has proposed a draft law relating to access to biodiversity resources. The proposal is under discussion by members of government but has yet to be presented to parliament for debate and eventual promulgation. If passed, this law would recognise the collective intellectual rights of local communities with respect to their knowledge, manipulation, and use of plants and animals for therapeutic, agricultural, and cultural purposes. This law would also recognise the possible use of communities' expertise of the biodiversity resources in association with contemporary knowledge for scientific, economic, and cultural interests. Should this occur, the community's rights must be recognised and duly rewarded. Similarly, the proposed draft envisages the importance of and the need for prior informed consent of local communities and local institutions as a requirement for authorising to the access the country's biodiversity.

There is no clear-cut mechanism for benefit sharing yet, and the notion of benefit sharing is difficult. The word "equitable" is often abandoned in the informal sector during resource exploitation. However, discussions have been taking place among the different stakeholders in Madagascar and have been directed toward finding ways to promote equitable benefit sharing that favors local communities. These stakeholders have been working to define the parameters and means of benefit sharing. The basis of this ongoing process is the GELOSE legislation. However, the following questions still have to

86 Personal communication from OMAPI to Nat Quansah (2001) (response to questionnaire).

87 *Supra* n. 47.

88 *Id.*

89 Order No. 5139-94 of 15 November 1994.

90 *Syndicat professionnel des producteurs d'extraits aromatiques, alimentaires et médicinaux de Madagascar.*

91 *Association des opérateurs en agro-business des produits naturels et biologiques.*

92 *Plantes Aromatiques et Médicinales: Vers la Mise en Place des Texts et Lois*, L'Express (de Madagascar), Aug. 31, 2001, at 8 (reporting on the workshop held at Anasy on Aug. 29-30); *Plantes Aromatiques et Médicinales: On Demande Également une Suspension des Redevances*, (Madagascar) Tribune, Sept. 14, 2001, at 5.

93 OMAPI, *supra* n. 86.

be addressed: Is the value of Malagasy genetic resources, whether actual or potential, really known? Is direct economic value the most important of the values accorded to the Malagasy genetic resources?

4. CONCLUSIONS

Many laws and regulations existing in Madagascar generally relate to the management of biodiversity, and concern with access to genetic resources in Madagascar is implied. The uniqueness of Madagascar's biodiversity coupled with threats of species extinction, has resulted in strong international pressure on the country to conserve its biodiversity. Conservation seems to have two main driving forces: the uniqueness and high level of endemism of the biodiversity of the country, and the assumption that through conservation ecotourism could be promoted, bringing in much needed hard currency to aid in the country's development. The drive to create more protected areas could be a problem, as the institutions mandated to oversee the already existing protected areas do not have the capacity to manage them satisfactorily. Further, Madagascar has placed a strong emphasis on economic development to alleviate poverty through local sustainable use of biodiversity, with conservation a strong second priority. International commercial interests in the country's biodiversity appear to be highly considered at the moment, especially for medicinal and aromatic plants. Discussions and the call for the suspension of the texts relating to the exploitation of medicinal and aromatic plants and their extracts[94] during 2001 reinforce this.

The scenario calls for rapid, concise, and viable regulatory and benefit-sharing mechanisms to be put in place so as to avoid wasting time and money. This will also help attain the goal expressed by the principles of the Malagasy Charter of Environment and the GELOSE legislation: sustainable use of the natural resources of the country for the benefit of all, people as well as the environment.

Could the dynamics witnessed be attributed to factors that may be distinct to the country? Madagascar is considered one of the poorest countries in the world with at least 70 percent of the population living below poverty line, despite the presence of rich and diverse natural resources and a strong influence from the international community. Planning and strategic thinking have been for short- to medium-term, although this is changing to medium- and fairly long-term due in part to influence by the international community.

There are numerous laws and decrees that are of relevance to access to genetic resources (AGR) and they continue to evolve. The major problem though is the apparent lack of awareness of the personnel at the mandated institutions and lead agencies to the existence and applicability of these laws. Personnel seem to know only what strictly concerns them. There appears to be no broad, lateral knowledge on AGR issues. It appears then that, for the moment, those who wish to evade the system could do so. Could this spell disaster for those who would like to follow CBD principles? The hope is that, sooner rather than later, real and practical solutions to the issues relating specifically to AGR, and more generally to conservation interests, will be found, established, and applied. Ten years into its existence, the principles as expressed in the Charter of Environment of Madagascar have not yet become real. The GELOSE legislation of 1996 is meant to help attain the goal of conserving Madagascar's unique biodiversity and alleviate poverty through sound economic development.

4.1 The Main Drawbacks of the Current Approach to Access to Genetic Resources

The main drawbacks of the current approach to access to genetic resources in Madagascar are not the absence of legislation (although specific legislation is lacking), but the lack of awareness of existing relevant legislation and levels of application, even among the personnel of the mandated and "competent" institutions. Since the country's environmental policies and legislation are evolving and devolving at the same time, communicating the changes that have been taking place across the board has not been easy. As a result, the majority of people, professionals and lay people alike, are not aware legislation relevant to genetic resources. Even personnel of the mandated institutions often do not know exactly what is required of them by law. Similarly, there is little understanding among government personnel of other institutional responsibilities regarding AGR. Moreover, the capacity to handle AGR issues is limited in the concerned ministries and lead agencies. The lack of associated skills, such as the ability to negotiate complex contracts, is also a problem. Therefore, in the near future, there will likely be ways around the system for those who want to take advantage of this lack of institutional capacity to illegally access, obtain, and export the country's biodiversity without Madagascar obtaining any benefit.

[94] Inter-ministerial Order No. 6833 of 28 June 2001.

CHAPTER 13
ACCESS TO GENETIC RESOURCES IN NIGERIA

*Kent Nnadozie**

1. BACKGROUND

1.1 Geo-Physical Context

The most outstanding features of Nigeria as a country in Africa are its sheer size and diversity. It has a population of over 120 million people with over 250 distinct ethnic groups speaking over 300 different languages. With a total land area of 910,770 km^2, the major ecosystems in Nigeria range from the mangrove and rain forests of the South, through the various savannas, to the semi-arid ecosystems of the North fringing the Sahara desert. The southern forests include narrow strips of coastal vegetation, mangrove and freshwater swamps, and lowland rainforest. From the forest zone northwards is the grassland or savannah that consists of the derived Sudan and Sahel savannas. The Sudan and Sahel savannas are semi-arid. Of the total land area, 34 percent is estimated to be used for farming, 23 percent for permanent pasture, 17 percent for settlements and infrastructure, 16 percent is forests and woodlands, and about 10 percent for other uses.[1]

With a population of over 120 million, Nigeria, like many developing countries, faces severe economic, social, and environmental challenges some of which relate directly to the environmental impacts of climate change, which in its extreme is the aggravating desert encroachment in the northern part of the country with phenomenal southward progression. Coastal erosion severely threatens the southern low lying mineral-rich Atlantic Ocean coastline that covers an area of about 153,000 km^2 and is abundant in natural resources, especially its virgin mangroves and marine life.

The threat to biological diversity by these natural elements is being significantly accentuated by a rapidly growing population and attendant human activities, including extensive logging, fuel wood exploitation, bush fire, forest destruction through oil exploration and pollution, gas flaring, large-scale agricultural projects, heavy infrastructural development, and construction projects. Wildlife is rapidly declining due to habitat loss and increased pressure from hunters, poachers, and bush burning. Animals that have recently disappeared from Nigeria include the cheetah, the pygmy hippopotamus, the giraffe, the black rhinoceros, and the giant eland. About 10-12 species of primates, including the white throated guenon species of primates and sclater's guenons, are under threat of disappearing from Nigeria. In addition, an estimated 484 plant species from 112 families are threatened with extinction in Nigeria because of habitat destruction and deforestation.[2]

There has not been any comprehensive assessment of the nation's biological resources although different sections have been inventoried at different times by different institutions for different purposes. Most of the data is probably outdated because of the rapid changes that are occurring in the landscape and ecosystems. The last concerted effort was in 1991,[3] but since then there has been no update or follow-up assessment.

However, a vast array of foods, drugs, timber products, fuels, fibres, spices, resins, gums, and other products are derived from the different ecosystems. Especially important are the medicinal plants, which provide a significant proportion of the health care needs for the majority of the population. There are more than 4,600 plant species recorded in Nigeria, of which 205 are endemic. Although Nigeria is numerically rich in proposed or gazetted (i.e., officially designated and formally recorded) wildlife conservation areas, wildlife in

* ***Director, Southern Environmental and Agricultural Policy Research Institute (SEAPRI), the legal and policy division of the International Centre of Insect Physiology and Ecology (ICIPE).***

1 Federal Environmental Protection Agency, Transition to Sustainable Development in Nigeria, Report to the United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, 3-14 June, 1992. Note, however, that with a rapidly increasing population and the concomitant increase in demand for resources and arable land coupled with the high intensity of logging and illegal exploitation of forest resources, there is expectedly severe reduction in the total areas now covered by forest, with the deforestation estimated at about 3.5 percent per annum.

2 Information provided by the Government of Nigeria to the 5th session of the United Nations Commission on Sustainable Development, 1997, *available at* http://www.un.org/esa/agenda21/natlinfo/countr/nigeria/index.htm (last visited June 10, 2003).

3 The Nigeria Environment Action/Study Team (NEST), an NGO, conducted the study and published a comprehensive report on the state of the country's natural resources —*Nigeria's Threatened Environment: A National Profile*.

many of these areas have been decimated almost to extinction as a result of poor supervision and enforcement policies.[4]

National policies concerning land and legal issues related to land ownership and land use have significantly contributed to destructive patterns of landscape change. Customary land tenure practices that were more appropriate to local conditions have often been ignored by the state or have been replaced by laws and policies that encourage deforestation and unsustainable patterns of development.[5]

1.2 Socio-Political Context

Nigeria is a federation comprised of 36 states and the Federal Capital territory, divided administratively into local government areas. This federal structure of the polity poses peculiar challenges in general political governance of the country as well as in the ownership and control of genetic resources and, by extension, the range of issues concerning the governance of access and benefit sharing. Nigeria's economy is heavily dependent on the oil sector, which accounts for nearly 80 percent of government revenues, 90-95 percent of export revenues, and over 90 percent of foreign exchange earnings. Other major exports include natural gas, cocoa, rubber, timber, and manufactured goods.

More than 70 percent of the population resides in the rural areas, deriving their subsistence and income from agriculture and natural resources. The rural poor are most exposed to the emergent dangers of climatic change, land degradation, deforestation, and habitat loss. They frequently are unable or unwilling to invest in natural resource management and conservation because they are driven by desperation to further plunder the available forests and other natural resources. This imposes profound crises for the most affected areas, especially as regards the welfare of its rural communities and the conservation of its natural resources. The demographic, agricultural, and environmental challenges in Nigeria are thus closely related in a nexus of mutually reinforcing cause-and-effects links.

Nigeria is a party to several international agreements related to or with potential impact on genetic resources, including the Convention on Biological Diversity (CBD), Convention to Combat Desertification, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Ramsar Convention on Wetlands, African Convention on the Conservation of Nature and Natural Resources. Nigeria also is a member of the World Trade Organisation (WTO). It has also signed but not ratified the recently concluded International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR).

1.3 Bioprospecting in Nigeria

Long before CBD came into effect, biotrade and bioprospecting activities for research and commercial purposes had been going on in Nigeria under a largely informal regime. These activities took place under a more or less open access system with little consideration of the intellectual property aspects. Activities related to access to genetic resources in Nigeria are being pursued by a broad range of actors, including individuals and researchers, government and public institutions, and international corporations and organisations. However, as a result of the largely unregulated state of affairs and the informal nature of the relevant activities, getting specific information and details of these activities is generally difficult.

There are no official records or data of private sector bioprospecting initiatives. However, there has been a long tradition of biotrade amongst the peoples of West Africa, and this is still going on across national borders, especially with respect to medicinal plants. This is invariable in a situation where a large proportion of the people still depend on traditional and herbal remedies for health care, coupled with the fact that a number of the tribal groups in the region are fragmented by the political boundaries that were created by the colonial authorities during the partitioning of Africa. This booming trade is largely sustained by an informal private sector and individuals who scour the forests for plants and herbs. Perhaps, because it is not regulated and no reliable records of the extent and volume are available, this trade is usually not captured in the national calculations of cross-border trade.

Although a few applications for permits have already been submitted to the Federal Ministry of Environment (which is the focal point for biodiversity matters), there are no formalised procedures for granting consent as of yet. These applications are dealt with on an ad hoc basis. Details of these applications are not readily available, although the Ministry of Environment has tried to involve other ministries as well as experts in developing modalities for assessing applications and granting permits. Several private corporations and individuals, both

4 M.B. Sarumi *et al.*, Country Report to the FAO International Technical Conference on Plant Genetic Resources (Leipzig, Germany, 17-23 June 1996).

5 Kent Nnadozie, *Access to Genetic Resources and Intellectual Property Rights: Regulatory and Policy Framework in Nigeria*, *in* Peter Drahos & Michael Blakeney (eds.), IP in Biodiversity and Agriculture: Perspectives on Intellectual Property, Volume 9 (2001).

national and foreign, are engaged in commercial exploitation of and trade in genetic resources especially across and with countries in the West and Central African sub-regions. In the absence of specific laws restricting or controlling these activities, they have continued to thrive unregulated. A significant volume of the commercial exploitation of genetic resources relates to natural plant products which broadly include plants, plant parts, and plant extracts that are used for culinary applications, natural dyes, and medicinal and health purposes. These activities are typified by the following features:

- Most commercial activities related to genetic resources are informal and localized, because apart from the cross-border trade, traditional herbal preparations, animal products, and plant parts are often locally sold in open markets;
- Outside of genetic resources for food and agriculture, there is minimal cultivation of natural products, and most plant collection involves small-scale wild harvesting, which is done "on demand";
- There is limited value-added processing (most products are sold in unprocessed or semi-processed forms), while raw plant materials are often exported elsewhere for value-added processing. There are, however, some examples of locally manufactured herbal or natural products, which are predominantly for medicinal, health, or personal care purposes. Recent studies substantiating these features also suggest that there is growing local demand for natural health and personal care products, leading to increased prospecting of genetic resources.[6]

One of the earliest private sector actors in bioprospecting activities, at least within the context of the CBD, in Nigeria was Shaman Pharmaceuticals, Inc., a U.S.-based company that focuses on deriving drugs from natural products. Most of its prospecting activities were based on ethno-medicine and, therefore, it worked very closely with herbal medical practitioners and university researchers. In its activities, Shaman Pharmaceuticals sought to abide by the tenets of the CBD, and it operated through or in collaboration with local Nigerian firms and institutions, which included the guild of herbalists, the Bioresources Development and Conservation Programme (BDCP), and the University of Nigeria, Nsukka. It sponsored collection expeditions and ethnobotanic surveys. Based on these surveys, Shaman Pharmaceuticals collects samples of medicinal plants for further screening. Some of the preliminary evaluation is done in the collaborating university and centres; although most of the time, the samples are taken back to the United States for advanced screening. Shaman Pharmaceuticals obtained plant research permits through the National Agency for Scientific and Engineering Infrastructure in Lagos, a unit within the Federal Ministry of Science and Technology.[7] The permits enabled it to undertake the ethno-botanic surveys and collection expeditions as well as to take out samples of materials collected.[8] In the course of its activities, Shaman Pharmaceuticals provided various forms of benefits, especially monetary and material, to collaborating individuals, institutions, and organisations. The specific details these benefits are, however, not generally available. Other forms of benefits included sponsoring individuals to participate in special programmes and training opportunities. One of the stated policies of the company was to provide immediate, medium and long-term compensation to the people and communities who collaborated with it. BDCP, for instance, received both cash and in-kind payments during the course of the bioprospecting activities of the company. However, no drug has been put in the market from these activities and it would appear that Shaman has suspended or terminated its drugs-related bioprospecting following a major failure in securing U.S. Food and Drug Agency approval of its most promising drug candidates. BDCP, however, is still carrying on its own activities in respect of other health care products.

2. INSTITUTIONS

Ideally, any party seeking access to genetic resources within Nigeria should first approach the Ministry of Environment which has the overall mandate over biodiversity matters in the country. However, the process is neither clear-cut nor simple. Several other ministries and

6 A.O. Adelaja *et al*., *Economic Growth and Trade in West Africa: Opportunities in Natural Plant Products*, presented at The Natural Products Round Table (6-8 Feb. 2002, Accra, Ghana).

7 The National Agency for Science and Engineering Infrastructure (NASENI) was established by Decree 33 of 1992. Under section 6(2)(d), its functions include the development of facilities and capabilities, inter alia, for "(*iii*) development-oriented research in agriculture and forestry environmental conservation, fisheries and animal husbandry, nutrition, human and veterinary medicine, pharmaceutical materials and building and construction materials; (*iv*) collaboration with higher educational institutions and other relevant Government institutions, organisations, agencies and commercial industries in the research and development of capital goods … ." While section 8 empowers the board of the agency to enter into research and production partnerships with any company, firm, or individual, as may be necessary, for the performance of the functions of the agency.

8 It may be argued that since there are no specific laws or regulations governing access in Nigeria, the power to grant the permit is read into the law establishing the agency, especially the provisions empowering it to collaborate with other entities. This organic law, however, did not distinguish between national and foreign collaborators and thus establishes another apparent situation of jurisdictional overlap with that of FEPA (Ministry of Environment) in terms of ABS issues.

agencies have overlapping mandates and could also serve as points of entry in the absence of any specific legislation governing access and benefit sharing in the country. These issues are discussed in further detail in section 3.6 of this chapter.

2.1 Public Institutions

Several public institutions as well as universities are engaged in some form of bioprospecting, though mostly for research and conservation purposes. There are about 17 agricultural research institutes in Nigeria. Each research institute has the mandate for the genetic improvement of specific crops. All of these institutes have plant breeding and variety development programmes and also engage in collecting activities, while some maintain gene banks or active in situ collections.

The National Institute for Pharmaceutical Research and Development (NIPRD) is one public institution that is engaged in active bioprospecting and related activities both for research and commercial purposes. It focuses on developing drugs and natural products from biological resources and works closely with traditional medical practitioners. While there are no established regulations for access and benefit sharing, NIPRD seeks to conform to the CBD objectives of sustainable use and equitable sharing of derived benefits with custodians of genetic resources and knowledge holders. As a government parastatal, NIPRD may not need any special permits to access the genetic resources it requires for its programmes, especially due to the absence of any explicit legislative regime to that effect. However, NIPRD has developed a standard agreement, which it enters into with herbalists and traditional healers that provide samples and materials to it for further research and development. The agreement provides an explicit and comprehensive framework for obtaining informed consent of the local herbalist for using his or her knowledge to develop commercial products. Under the agreement, NIPRD is also obliged to furnish to the herbalist, in writing, the results of every scientific test or analysis carried out on the material received from the herbalist and to pay the herbalist a specified proportion (at least 10 percent) of the net profits as royalty if the resulting product or drug is commercialised. The Institute can take out, and has in fact done so, patent protection (especially in the United States) on products resulting from its activities. NIPRD is also obliged under the agreement to include the relevant consultant herbalist's name in the patent application.[9]

The National Centre for Genetic Resources and Biotechnology (NACGRAB) was established to ensure the conservation, preservation, and maintenance of valuable germplasm for overall agricultural development.[10] It undertakes active germplasm collection and maintains a reasonably large genebank, which includes microbial cultures. It supports the activities of the National Committee on Registration and Release of Crop Varieties and Livestock Breeds and Fisheries. It also carries out crop improvement and propagation programmes and engages in the distribution of germplasm to other institutions or directly to farmers. However, its plant genetic resources collections have yet to be protected by any form of legislation and are significantly handicapped by inadequate funding.

Another public institution engaged in genetic resources activities is the Sheda Science and Technology Complex (SHESTCO), Abuja, which was established by Decree 95 of 1993. SHESTCO is a parastatal of the Federal Ministry of Science and Technology, and is comprised of a Nuclear Technology Centre and a National Advanced Laboratory Centre. The Advanced Laboratory includes a Biotechnology and Genetic Engineering Advanced Laboratory and a Chemistry Advanced Laboratory, amongst others. SHESTCO was established to provide high-technology facilities for research in the basic and applied sciences; train and develop manpower in research methodology and programme formulation; and develop results of research for application in the areas of agriculture, health, industry, and the environment. It is also engaged in basic technological activities such as tissue culturing and is currently making efforts to engage in high-level biotechnological research and development, including genetic engineering especially for food and agriculture. This naturally involves plant breeding and improvement activities and invariably implies that it would require having access to many genetic resources, which form the basic raw materials for such research. One of these efforts is a collaboration agreement with Cook College and the New Jersey Agricultural Experiment Station of Rutgers University (in New Jersey, USA). The Memorandum of Understanding (MOU) signed by Federal Ministry of Science and Technology (FMST) on behalf of the

[9] Article 8 of the standard agreement stipulates that "the INSTITUTE shall apply for and obtain or cause to be granted and obtained the letters of patent on the products IN THE NAME OF THE INSTITUTE after the same has been developed and processed PROVIDED THAT THE CONSULTANT HERBALIST'S NAME BE INCLUDED IN THE PATENT subject to the conditions hereinafter set forth."

A major issue with the standard agreement is that it personalises the knowledge and materials that an individual herbalist brings to the Institute even, as often is the case, where the knowledge is communal or received from others. Since there is also no obligation on the part of the herbalist to share benefits, if they accrue, with the herbalist's wider community or associates, there is a possibility that individuals could improperly appropriate knowledge and attendant benefits.

[10] It was established by Decree No. 33 of 1987.

Federal Republic of Nigeria, and the Cook College/New Jersey Agricultural Experiment Station (Cook/NJAES) on behalf of Rutgers, the State University of New Jersey, aims to assist Nigeria in developing "an initiative in science and technology based on biodiversity, biotechnology and information technology that incorporates research capacity and infrastructure development, venture capital development and public/private sector incubator development." This collaboration involves developing research infrastructure, technical assistance and capacity building. Also involved will be the exchange of genetic materials, both raw and processed, flowing both ways. Although joint activities have commenced under the framework agreement for collaboration, genetic products or materials have yet to be exchanged. SHESTCO, however, is carrying on its own research and development activities, working on and utilising genetic materials from local sources. As a government parastatal and in the absence of legislation, no specific requirements are needed for it to access these materials, although such critical policy issues as intellectual property, farmers' and local community rights as well as benefit sharing and related issues have yet to be fully addressed.

2.2 NGOs and Access to Genetic Resources

NGOs are also active in the development and management of genetic resources. Their activities fall into several categories including rural development, capacity building, and extension and outreach. The role and participation of NGOs in genetic resources issues is essential to implementation, as these parties are stakeholders, active participants, and watchdogs. The NGOs have been critical in information gathering and dissemination, as well as catalysts for grassroots participation. In Nigeria, there are several NGOs involved, to varying degrees, in genetic resources issues. Those that are most prominent include: the Nigeria Conservation Foundation (NCF), the Nigerian Environment Action/Study Team (NEST), and the Bioresources Development and Conservation Programme (BDCP). Most are involved in the conservation aspects, with few involved in bioprospecting activities and even fewer involved in the policy aspects of the issues.

Although there is no hard data as to their number and extent, some NGO bioprospecting projects are ongoing in Nigeria. One set of projects is led by BDCP, an NGO with offices in Nigeria, a few other African countries, and the United States. BDCP carries out bioprospecting activities in respect to medicinal plants. It combines conservation objectives with commercial activities and maintains a network of relationships, spanning government agencies, local and public institutions, international organisations, and the private sector. It is primarily focused on establishing integrated programmes for discovering medically active plants for drug development and the promotion of the conservation and sustainable use of biodiversity, both independently as well as under the International Cooperative Biodiversity Group (ICBG).[11] It involves traditional healers and local communities in its activities as collaborators and beneficiaries. For instance, it established a trust fund that serves as the channel through which the benefits and economic rewards are distributed to the areas from which source plants for drug or other product development are found, and, in accordance with stipulated modalities, compensate individuals, rural communities, and local institutions.[12] The specific terms and conditions differ from case to case, but an emphasis is placed on benefits that are communal or collective in nature. In the absence of specific regulations for obtaining permits, most of its collecting activities are carried out in conjunction with, or with the consent of, government agencies having particular mandates or jurisdiction in its areas of activities—for instance, the National Agency for Science and Engineering Infrastructure through which the ICBG also obtains permits for collection. The ICBG also works closely with or through some local universities.

So far, no pharmaceutical product as such has been commercialised under the ICBG project, and the overall success of the initiative as a bioprospecting venture is still under debate. The ICBG private sector partners and collaborators include Shaman Pharmaceuticals and Axxon Biopharm. It is possible that other international NGOs are also engaged in bioprospecting activities, but the author has no immediate record of their activities.

---

[11] The International Cooperative Biodiversity Group (ICBG) is a multi-institutional project involving the Walter Reed Army Institute of Research, U.S. National Institutes of Health (NIH), National Science Foundation (NSF), and U.S. Department of Agriculture. It is funded through an interagency agreement sponsored by U.S. organizations, the National Institutes of Health (NIH), National Science Foundation (NSF), and U.S. Agency for International Development (USAID). The main focus of the African ICBG project is the establishment of an integrated program for the discovery of medicinally active plants for drug development and the conservation of biodiversity, while ensuring that local communities and source countries derive maximum benefits for their biological resources and intellectual contributions. Selected plant products will be developed all the way to pre-clinical stages before negotiation with commercial partners. Future royalties from such products will presumably be distributed through an independent legal trust fund consisting of representatives from the United States, Cameroon, and Nigeria. Revenues generated by this project are also expected to be used solely for projects that promote conservation of biological diversity, drug development, and economic well-being of the communities which provided the resources.

[12] Nnadozie *supra* n. 5.

2.3 International Institutions and Access to Genetic Resources

The International Institute for Tropical Agriculture (IITA), which is one of the centres of the Consultative Group on International Agricultural Research (CGIAR), is based in Ibadan in the south-western part of the country and is actively engaged in plant genetic resources collection and breeding programmes in the country as well as throughout West Africa. It also assists the national agricultural programme in supplying promising and high yielding crop varieties for agricultural development and research programmes. Its Genetic Resources Unit (GRU), in addition to its breeding programme, maintains a collection of soyabean, local maize, a significant number of germplasm accessions of minor food legumes, and some trees and shrubs in collaboration with the International Centre for Research in Agroforestry (ICRAF) (another CGIAR centre with headquarters in Nairobi, Kenya). Multipurpose trees and shrubs species have been collected both for conservation and evaluation purposes.

As of the end of 1992, the GRU at IITA was maintaining about 40,000 accessions of germplasm, consisting of about 200 species. Cowpea has the largest accessions (over 15,000 accessions), followed by rice (over 12,000 accessions), yams (about 2,600 accessions), bambara, groundnut, cassava, and soyabean. The materials are largely available to researchers worldwide upon request[13] and free of charge under a standard material transfer agreement which contains, amongst other provisions, the stipulation that IPRs may not be taken out on the materials in the form they are received. Although collection and research activities are sometimes carried out in collaboration with government departments or other public institutions, there are no specific requirements for the permit of a government authority to be obtained before genetic materials or samples are collected or given to third parties unless otherwise specified at the time of collection.

Nigeria, as well as other countries in West Africa, benefits from the crop varietal development programme being conducted by IITA, especially those relating to maize, legumes, rice, root crops, plantain, and banana. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), another CGIAR centre with headquarters in Andhra Pradesh, India, is also engaged in sorghum and millet research at a Nigerian station in Kano. The International Centre for the Improvement of Maize and Wheat (CIMMYT), a CGIAR centre based in Mexico is a long-term collaborator with IITA on maize and is now working on wheat. The efforts of the National Research Institutes supported by the International Research Centres have resulted in the development and release of a large number of high yielding, disease- and pest-resistant varieties of major food and industrial crops.[14] The West Africa Rice Development Association (WARDA), with headquarters in Bouaké, Côte d'Ivoire, is also active in the country in close collaboration with, and through, IITA on rice collection, improvement, and propagation. Altogether, of the nearly 600,000 accessions held by the CGIAR centres worldwide, 14,694 were collected from Nigeria, the second largest from Africa after Ethiopia.[15]

3. LAWS AND POLICIES

3.1 Specific Legislation and Policies on Access to Genetic Resources

Nigeria has not enacted any laws or regulations that generally govern access to genetic resources or the associated intellectual property rights in line with either the CBD or the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), both of which Nigeria has signed and ratified. It has also signed, but not ratified, the International Treaty on Plant Genetic Resources for Food and Agriculture and has not enacted any legislation to implement any of its components.

However, several existing laws have some bearing on access issues or on biodiversity in general, while several different government departments and institutions have authority over different aspects of the issues under the various laws, including trade and intellectual property components. While most of these laws may contain provisions directly or indirectly affecting access to genetic resources, they contain virtually no benefit-sharing components or provisions that could serve as a basis for addressing the issue of benefit sharing.

3.2 Constitutional Context and Issues

The 1999 Constitution of the Federal Republic of Nigeria does not include any specific provisions with regard to genetic resources ownership or control, nor does it grant general right to a good and healthy environment. Nevertheless, by inference from some of its provisions, the constitution envisages the need to protect the country's environment, including its diverse ecosystems

[13] Sarumi et al., *supra* n. 4.

[14] *Id.*

[15] SINGER—the System-wide Information Network for Genetic Resources, *available at* http://singer.cgiar.org (last visited June 10, 2003).

and natural resources and utilisation of the same for the benefit of Nigerian citizens. Although specific references are made to the environment in chapter II of the Constitution, dealing with the Fundamental Objectives and Directive Principles of State Policy, the relevant provisions are not, per se, justiciable or enforceable. Section 17(1) states that the state's social order is founded on ideals of freedom, equality, and justice. Moreover, in furtherance of the social order, exploitation of human or natural resources in any form whatsoever, for reasons other than for the good of the community, shall be prevented.[16] Section 20 stipulates that the state shall protect and improve the environment and safeguard the water, air, land, forests, and wildlife of Nigeria. At the same time, it could be reasonably argued that the substantive provision that ensures the "right to acquire and own immovable property anywhere in Nigeria" could be construed to imply a right to own and control the natural resources found on it, including genetic resources.[17] This provision has yet to be tested, or interpreted in this sense, by any court of law.

While article 15 of the CBD recognises the sovereign rights of states over their natural resources, stipulating that the authority to determine access to genetic resources rests with national governments and is subject to national legislation, countries with a federal system of government, such as Nigeria, face peculiar challenges regarding administrative competencies and jurisdiction for regulating the access to genetic resources and biological resources more broadly. While reaffirming the sovereign rights of nation-states over genetic resources within their jurisdiction, article 15 does not necessarily confer on them a property right over these resources.[18]

The determination of ownership and control is a function of national and sub-national law,[19] which, in the case of Nigeria, means the law of the federation and the component states. However, the validity or extent of the powers of the component states to enact such laws remains uncertain especially as the national legislature has yet to enact any general laws on the matter and existing state laws already give significant authority to the states over natural resources within their respective territories. There has not been any definitive judicial pronouncement on that issue either.[20]

This federal predicament becomes even more apparent when considered in the light of some specific provisions of 1999 constitution. While intellectual property rights—copyright, patents, trade marks, industrial designs, and merchandise marks—and certain aspects of trade (inter-state and international) are under the exclusive jurisdiction of the federal authority, land, forestry, and forest resources are within state competencies. Federal powers regarding forest resources and wildlife are limited to federal reserves and national parks.[21] In fact, under the Constitution, the federal government can only designate an area as a national park with the consent of the government of the state or states in whose territory it is to be established.[22] The various forestry laws of the states empower the state governments to constitute as forest reserves any land at the disposal of the government or any land in respect of which it appears to the state that the forest growth on such lands should be protected or reserved or forest growth be established.[23] Based on these laws and provisions, it could be argued that the jurisdiction to adopt legislation on and control access to the physical biological materials resides primarily with state governments, while the protection of the associated knowledge and information through formal intellectual property rights is within the exclusive legislative competence of the federal government.

However, with regard to knowledge and information, further jurisdictional conflicts may arise, particularly with respect to the protection of local community rights based on their knowledge, innovations, and practices embodying traditional lifestyles. Issues of culture and tradition as well as customary laws are within the jurisdictional competence of the state governments, including the establishment of customary courts. State institutions and legislation govern issues such as customary marriage, property ownership, and inheritance. Whether these powers would by extension cover customary or community intellectual rights is yet untested. While the federal government may have the competence of adopting legislation on the protection of intellectual property rights by way of a formal regime (say, patents as stipulated in the exclusive list of the national Constitution), the determination of the components or whether such rights exist, in the case of local communi-

16 Sec. 17(2)(d).

17 This does not include any right to the mineral resources found on or under the land. This is specifically vested in the Federal Government of Nigeria by the constitution and several other laws, especially those regulating solid minerals, oil and gas exploration, and mining.

18 Olawale Ajai, Regulating Access to Nigeria's Genetic Resources: Issues in the Emergent Law and Implications of Article 15 of the Convention on Biological Diversity for National Legislation, Paper Presented at the Global Biodiversity Forum (4-5 Nov. 1995, Jakarta, Indonesia); Olawale Ajai, *Access to Genetic Resources and Biotechnology Regulation in Nigeria*, 6 REV. EURO. COMM. & INT. ENVTL. L. 42-46 (1997).

19 Lyle Glowka, A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources (1998).

20 Nnadozie *supra* n. 5.

21 See National Park Services Decree No. 46 of 1999.

22 See Item 40 of the Exclusive Legislative List in the Second Schedule to the CONSTITUTION OF THE FEDERAL REPUBLIC OF NIGERIA, 1999; see *also* National Park Service Decree No. 46 of 1999, 19(1)(c)(i) .

23 See, *e.g.,* Forestry Law of Lagos State, Cap 51 Laws of Lagos State, 1972, sec. 4(1).

ties, in accordance with customary laws and practice lies within the jurisdiction of the state governments. This will be especially so should any dispute arise as to what constitutes the traditional practices or customary laws of any given locality or community with respect to access to, or sharing of benefits from, genetic resources.

3.3 Legislation and Policies Affecting Genetic Resources

While there are laws that affect access and benefit sharing generally, the provisions in the existing laws are basically inadequate—either too vague or too narrow—to effectively address the full range of the relevant issues.[24] Some of the laws are only aimed at controlling excessive exploitation of the nation's natural resources, especially its wild fauna, rather than managing access to genetic resources and benefit sharing as envisaged by the CBD. The earliest examples include the Wild Animal Preservation Act, 1916 (federal) and the Wild Animal Preservation Laws, (Western & Eastern Nigeria, respectively, both enacted in 1959) all of which were modest efforts by the then-colonial government to protect a segment of the country's wildlife population. Since independence, the most significant laws relevant to conservation of wildlife in the country, mostly at the state or regional level, include the Wild Animal Preservation Law (Lagos State), 1972; Wild Animal Preservation Law (Amendment) Edict (North Eastern State), 1975; Wild Animals Law (Amendment) Edict (Kano State), 1978; and Endangered Species (Control of International Trade and Traffic) Decree, 1985. The only attempt so far at the national level—the National Park Service Decree, 1999 (discussed below in section 3.3.2)—seeks to incorporate the provisions of article 15 of the CBD with respect to access, but restricts its application to national parks and federal reserves only.

3.3.1 Federal Environmental Protection Act

The Federal Environmental Protection Act entered into force on the December 30, 1988.[25] It established the Federal Environmental Protection Agency (FEPA), stipulating its functions and giving it the powers for the effective implementation of those functions. FEPA is given virtually unlimited powers and functions for the protection of the nation's environment. Section 5 stipulates that "it shall be lawful for the Agency to establish such environmental criteria, guidelines, specific actions or standards for the protection of the nation's air and interstate water as may be necessary to protect the health and welfare of the population from environmental degradation." Also, FEPA is mandated to protect, restore, and preserve the entire ecosystem of the Nigerian environment.[26] In 1992, FEPA's mandate was expanded to cover specifically conservation of natural resources and biological diversity through an amendment of the act establishing it.[27] The Federal Environmental Protection Act repealed the National Resources Conservation Act and effectively transferred all of the function of the Natural Resources Conservation Council to FEPA. These included oversight of issues and activities relating to the conservation and sustainable development of natural resources. By 1998, each of the 36 states and the Federal Capital Territory had established their own environmental protection agencies with varied mandates. In 1999, in an apparent effort to give environmental matters top priority in its development agenda, the new civilian administration created, for the first time ever, a Federal Ministry of Environment. The Federal Environmental Protection Agency was absorbed and its functions taken over by the new ministry. Although the act, as amended, is still in force, the functions of FEPA have been effectively taken over by the ministry while efforts are underway to formalise the new structure as well as fully articulate its functions through a new legislation.

3.3.2 National Parks Service Decree, 1999

One of the major problems of the national parks and nature reserves is the continuous encroachment by people through farming activities, illegal collection of materials, and illegal hunting of wildlife. These activities are largely carried out without the permission or prior knowledge of the relevant authorities despite the existence of laws prohibiting or restricting those activities. In these circumstances, access is mostly obtained without consent and definitely no returns are made to the authorities either materially or by way of information. This persistent problem, as well as the emerging global developments on conservation and sustainable use of genetic resources, calls for a review of existing laws that govern national parks and reserves.

The National Parks Service Decree of 1999[28] sets a trend in light of other efforts to formulate a more comprehensive national approach to access and related issues. The decree, in addition to general provisions for desig-

24 Nnadozie, *supra* n. 5.

25 Decree No. 58 of December 1988, now Chapter 131 Laws of the Federation of Nigeria, 1999.

26 Secs. 16-17.

27 Federal Environmental Protection Agency (Amendment), Decree No. 59 of 1992.

28 Repealing the National Parks Decree of 1991.

nating and managing of national parks, establishes an access regime for bioprospecting in any national park, incorporating the concepts of prior informed consent (PIC), benefit sharing, mutually agreed terms, and access to technology. The legal issues with respect to ownership, access, and benefit sharing are clear cut in the case of national parks because the governing law explicitly vests "ownership of every wild animal and wild plant . . . and anything whatsoever, whether of biological, geomorphological or historical origin or otherwise, existing or found in a National Park" in the federal government, subject to its control and management for the benefit of Nigeria and mankind generally.[29] Unique in the law is the full incorporation of the basic principles of the CBD with respect to access—prior informed consent, mutually agreed terms, and equitable sharing of both monetary and other benefits. These provisions cover not only the biological materials but also the associated knowledge[30] and envisage sharing of benefits with local communities within and around the national parks.[31] The National Parks Service is responsible for administering the provisions of the decree, which includes issuing the permits for bioprospecting activities in any national park and negotiating benefit sharing arrangements. However, since its enactment into law, there has been no record of any bioprospecting activity being carried out in any of the national parks or federal reserves in accordance with the provisions of the decree and the author is not aware of any formal applications to do so. As a result, it is not possible to determine the effects or efficacy of the provisions.

3.3.3 National Crop Varieties and Livestock Breed (Registration, etc.) Decree, No. 33 of 1987

The National Crop Varieties and Livestock Breed (Registration, etc.) Decree essentially establishes the National Register for Crop Varieties and Livestock Breeds in which the names of old and new crop varieties and livestock breeds in Nigeria shall be inscribed in a permanent form.[32] This decree is discussed in greater detail in sections 3.3.4 and 3.4.2.

3.3.4 The National Agricultural Seeds Decree, No. 72 of 1992

This legislation establishes the National Agricultural Seed Council (the council) and governs the sale and distribution of seeds and complements Decree No. 33 of 1987 (regarding crop varietal registration and release). The objectives of Decree No. 72 of 1992 are generally to stimulate the development of a dependable seed industry, to regulate and control the registration of released varieties, to protect farmers from the sale of poor quality seeds, to facilitate the production and marketing of high quality seeds in Nigeria, and to provide legal backing for official testing, certification, sale, importation, exportation, and use of seeds. The council is charged with the responsibility of establishing overall policy guidelines and ensuring the development of the national seed system. The council analyses and proposes programmes, policies, and actions with respect to seed development and the seed industry in general, including issues relating to seed testing, registration, production, marketing, certification, quality control, and use of seeds in Nigeria, as well as importation and exportation of and quarantine regulations relating thereto. The council is further empowered to "encourage the formation or establishment in Nigeria of seed companies for the purpose of carrying out research, production, processing and marketing of seeds."[33]

The decree further establishes the National Seed Services Unit which has the responsibility for, inter alia, the development, certification, and quality control of seeds; planning and monitoring of the National Seed programme and use; and the publication of the list of registered, released, or notified seed varieties approved for commercialisation in the Nigeria, etc.[34] This unit operates under the supervision of the council. The council is further empowered to supervise and approve the activities of the Crop Variety Registration and Release Committee.[35] As is apparent from its provisions, its objectives are limited to establishing a viable national seed system and ensuring that, for commercial purposes, good quality seeds are available for farmers. It does not cover local varieties or landraces with local farmers, use in their farms, or exchange between themselves, nor does it stipulate any benefit sharing arrangements where those varieties are utilised for the development of the commercial varieties.

3.3.5 Sea Fisheries Decree, 1992

This decree[36] provides for the control, regulation, and protection of sea fisheries in the territorial waters of Nigeria. Under the decree, no person shall operate or navigate any motor fishing boat for the purpose of fishing within the territorial waters of Nigeria or its exclusive

29 Sec. 20(1).
30 Sec. 36.
31 Sec. 49.
32 Sec. 1.
33 Sec. 3(g).
34 Sec. 6(1).
35 Sec. 3(d).
36 Repeals the Sea Fisheries Act via sec. 16.

economic zone, unless that boat has been dully registered and licensed.[37]

Two regulations have been made pursuant to the decree: the Sea Fisheries (Licensing) Regulations, 1992 and the Sea Fisheries (Fishing) Regulations, 1992. Under the Sea Fisheries (Licensing) Regulations, 1992, the Federal Ministry of Transport is charged with the registration of vessels intended for fishing or shrimping purposes, while the Minister of Agriculture is charged, under the latter regulations, with issuing licences authorising a vessel to carry out fishing or shrimping in Nigerian territorial waters.

Under the former, an application for licence must be accompanied by a feasibility report on the proposed fishing venture, particulars, documents, information, and such fees as may be required to be paid for such a licence. In deciding whether to issue a licence, the minister must be satisfied that (a) the fishing vessel is constructed and equipped to such a standard and dimension as to be fit for the particular purpose intended; and (b) the applicant is (i) capable of complying with such conditions as may be imposed or attached to a licence, and (ii) in all respects a suitable person to be granted a licence.

Under the Sea Fisheries (Fishing) Regulations, all fish caught within Nigerian territorial waters or its Exclusive Economic Zone must be landed at a Nigerian port. No part of it may be exported or shipped at sea. It further stipulates the size of fish to be caught, landed, or sold and the size of the mesh openings of trawl nets, and prohibits trawling by night. These provisions have the effect of regulating access to marine genetic resources by enabling the designated departments and officials to determine the modalities for who can have access and to what extent the resources can be exploited. Although the law and its regulations were not made within the context of the CBD's concept of access and benefit sharing, they could be used, albeit to a limited extent, to provide for a regime which enables the government to grant permits in a systematic manner and on terms that will ensure the sustainable utilisation of the marine resources. They could also ensure that reasonable benefits are derived through taxes, royalties on catches, or other payments in addition to access to technology by, for instance, requiring some level of local participation where foreigners are involved and access is required for other purposes, say for scientific research.

[37] Sec. 1(1).

3.3.6 Endangered Species (Control of International Trade and Traffic) Decree, No. 11 of 1985

In compliance with Nigeria's obligations under CITES, the federal government promulgated the Endangered Species (Control of International Trade and Traffic) Decree providing for the conservation and management of the country's wildlife and the protection of some of the endangered species in the country. The hunting of, capture of, or trade in animal species that are threatened with extinction, as specified in the first schedule to the decree, is absolutely prohibited. Trade in animal species listed in the second schedule to the decree is subject to a license approved by the relevant minister. Other regulatory aspects of the decree provide that: "in an attempt to capture, fish, take or hunt wild animals specified in this Act, the following methods are prohibited, that is—(a) any method liable to cause mass destruction of wild animals; (b) the use of drugs, poisons, poisoned weapons or poisoned baits; (c) the use of mechanically vehicles for hunting; (d) the use of fire; (e) the use of fire arms capable of firing more than one round at each pull of the trigger; (f) hunting or capture at night; or (g) the use of missiles containing detonators."[38]

Any person wishing to hunt, trade in, or export any species must apply using the prescribed forms to the minister charged with responsibility for matters relating to wildlife, currently the Minister for Environment, who would consider it and determine whether to refuse or grant the permit upon such conditions as the minister considers appropriate. It is expected that in granting permits now, the minister will take into account the objectives of the CBD to ensure the conservation and sustainable use of biodiversity. The minister has a duty to maintain records of trade in any specimen in the first and second schedules to the decree and such records must include: (a) the names and addresses of exporters and importers thereof; (b) the number and types of permits and certificate granted; (c) the countries with which such trade occurred and the number, quantities, and types of specimens concerned; and (d) where applicable, the size and sex of the specimens in question.[39] Although the primary objective of this law is the protection and conservation of wildlife by prohibiting or restricting hunting and trade, it has the effect of regulating access, though with no stipulation as to benefit sharing, except perhaps as is derived from the licensing fees charged on persons wishing to hunt, trade in, or export wildlife. Although not specifically stated, the provisions of this law apply to

[38] Sec. 5(6).

[39] Sec. 6.

all species specified in the schedules whether they are located in public land or in private property since no geographic limits were stipulated.

3.3.7 Forestry Laws

Practically every state in the federation has its own forestry law, and these laws are largely similar in their provisions. Under the state forestry laws, the governor of the state is required to designate specific forest lands as government forest reserves and protected forests. The forestry laws empower the state government to designate forests (including individual trees or species) or land areas as communal or state reserves, subject only to provisions for notice, appeals, and compensation. Notwithstanding that the focus in the enforcement and implementation of existing forestry laws has been primarily on timber products, their scope can easily be extended to cover access to other biological resources found in state-designated forest areas or reserves, especially in view of the broad definition of "forest produce."[40] Having been enacted long before the CBD, no references are made to terms "genetic" or "biological resources" per se, especially in their current conceptual interpretation, nor is the actual legal status or these resources defined. Nevertheless, these laws have the effect of restricting and controlling access to and utilisation of biological resources in designated lands or forests, because they empower the relevant state commissioners to make regulations, inter alia:[41]

- Prohibiting or regulating the taking of forest produce or of any specified kind of forest produce on lands at the disposal of the government, or communal or other land;
- Prohibiting the sale and purchase of forest produce or of any specified kind of forest produce by any person other than the holders of licences and permits granted under the law;
- Regulating the grant of and prescribing the form that any licence or permits may take in any particular case to take forest produce in forest reserves or on lands at the disposal of the government, or on communal or other lands, and to sell and purchase forest produce;
- Providing for the collection, payment, and disposal of fees, royalties, tolls, and costs, etc.

While permits have been and are being granted for logging and hunting purposes, to the knowledge of the author, there has yet to be granted any permits for bioprospecting per se by any state government especially as understood under, or within the context of, the CBD. Nevertheless, these laws may well be used to grant permits for bioprospecting activities in that regard.

3.3.8 Land Use Act, 1978

Under section 1 of the Land Use Act (LUA) of 1978, all land in the territory of each state is vested in the governor of that state, and such land shall be held in trust and administered for the use and common benefit of all Nigerians. The governor can grant as well as revoke either a certificate of occupancy or rights of occupancy to individuals or groups for use and enjoyment.[42]

Although no specific reference is made to biological diversity, provisions of the LUA, as well as those of other laws, especially the forestry laws, suggest that the states control all the biological diversity within their territories. Effectively, the combined effect of these laws defines the rights and determines how, when, and by whom biodiversity can be utilised either for commercial or subsistence purposes. The governor also has the power to allocate state lands either for industrial or agricultural purposes coupled with the power to compulsorily acquire privately or communally held land and reallocate it in the public interest.[43] In the exercise of this power, allocation is often made with a view to maximising short- or medium-term revenue or for political reasons. Sometimes, too, misguided policies have led governments to acquire from local communities and grant extensive tracts of land for large-scale farming, which are then subjected to clear-cutting and the attendant loss of biodiversity.

These factors have, in many instances, removed any real sense of ownership by local communities and as a result reduced their commitment to invest fully in conservation efforts based on traditional practices with respect to such land. As "occupiers," they are constrained to attempt to maximise use in the short-term and, as a result, over-stress the land. The further concomitant of all these is the abandonment of traditional lifestyles and loss of cultural diversity. Although the LUA removes absolute ownership of land from the citizens, it does recognise communal and family forms of tenure that are derived from customary rights of occupancy and which confer control, the right to use and enjoy land, or otherwise alienate the same in accordance with custom-

40 "Forest produce" is, for instance, defined in section 2 of the Forestry Law of Lagos State, as including timber, wood oil, fruits, fibres, bark, lac, trees and all other parts or produce of trees, plants and all parts or produce of such plants, and all produce from animals when found in or brought from the forest.

41 Forestry Law of Lagos State, sec. 36.

42 See secs. 5, 28.

43 See secs. 1, 5, 9, 28.

ary laws and practices. Under this regime, nonetheless, communities can only have customary rights of occupancy, which are subject to the overriding title of the state.

From the provisions of the act, it follows that in seeking access to genetic resources, the issue of consent may need to be addressed at four levels—the individual, family or communal, state, and national—depending on who possesses, has custody, or owns the territory within which access is being sought. The issue of who is entitled to payment or provision of compensation or sharing of benefits must, as a matter of necessity, also be addressed at these levels. If the person seeking access is a foreigner, he or she would presumably have to seek the consent of a federal establishment first in accordance with the CBD.[44] The rest would depend on where the resources are located, whether on federal, state, community, or private land.

3.4 Intellectual Property Rights

3.4.1 General Context

Nigeria is a member of the WTO and the WIPO and a signatory to the ITPGR, though it has yet to ratify it. For the purposes of the WTO, Nigeria is classified as a developing country, meaning that it had until 2000 to comply with the provision of article 27.3(b) of the Agreement on TRIPs. Nigeria has not complied with its obligations under TRIPs to provide for the protection of plant varieties either by patent or effective sui generis legislation or a combination of both. Nigeria has not acceded to any of the Acts of UPOV and has no immediate plans of doing so. Instead, it subscribes to the African Union Model Law as an option for regulating of access to genetic resources and for protecting of plant breeders' rights as well as the rights of local communities. Nigeria aligns fully with the African Group positions at the relevant international negotiations, especially on the relationship between the CBD and TRIPs. One of these positions is the outright opposition to the granting of patents on life forms.

There is currently a draft bill for Plant Variety Protection,[45] which is undergoing stakeholder review and will hopefully be presented to the National Assembly for consideration and enactment into law (discussed further below). This draft bill is based to a large extent on the Model Law with relevant modifications to adapt it to the institutional and legislative framework of the country. However, the major focus of the draft bill is on intellectual property rights aspects and is geared towards fulfilling the obligation to provide for plant variety protection as stipulated by article 27.3(b) of TRIPs. It also contains a part on farmers' rights, but none on access to genetic resources or benefit sharing generally except the formal recognition of the entitlement to share the benefits from commercial exploitation of farmers' varieties as a component of farmers' rights. This is understandable because the bill is being sponsored by the Ministry of Commerce which has a mandate over trade and, therefore, WTO-related issues, while issues concerning genetic resources use and conservation are under the general authority of the Ministry of Environment.

3.4.2 Patents and Protection of Plants

The principal law governing the protection of intellectual property as it may relate to biodiversity is the Patents and Designs Act.[46] It expressly prohibits the granting of patents in respect of "plant or animal varieties, or essentially biological processes for the production of plants or animals other than microbiological processes and their products."[47] Also, patents cannot be issued for inventions for which the publication or exploitation would be contrary to public order or morality.

Even though patent protection is not currently available for plant varieties, no other sui generis protection has been provided for them as would be required by article 23.3(b) of TRIPs. There is also no formal recognition nor legal protection accorded to the knowledge and innovations of local communities and farmers in respect of biodiversity because no law has yet been enacted in that regard as envisaged by article 8(j) of the CBD.

On the issue of ownership of plant varieties, existing plant protection laws primarily seek to protect only domesticated crop plants from pests and diseases. These laws are not meant for the protection of wild or uncultivated varieties which constitute a primary source of medicinal plants and food crops. They deal with the quality of seeds and plants used in the agricultural sector to prevent the introduction of destructive or exotic strains and, at best, only establish very limited plant

[44] This is, however, not definite especially in the absence of any specific national legislation governing access under the CBD. It is presumed that since the CBD reaffirms the sovereignty of nation states over their resources and their power to regulate access, especially to other parties or their citizens, a national authority would be the first point of call for a foreigner seeking access.

[45] A Bill for an Act to Provide for the Protection of Plant and Animal Breeders and Farmers Rights and Matters Related Thereto.

[46] Laws of the Federation of Nigeria, Cap 344.

[47] Laws of the Federation of Nigeria, sec. 1(4)(a) and (b) of the Patents and Designs Act, Cap 344, (1990).

breeders' rights because of the requirement for the registration of new varieties. The National Crop Varieties and Livestock Breeds (Registration, etc.) Decree, 1987 establishes the National Crop Varieties and Livestock Breeds Register "in which shall be inscribed in a permanent form the names of old and new crop varieties and livestock breeds in Nigeria." It provides for the registration, naming, and release of old and new crop varieties or livestock breeds that meet the distinctiveness, uniformity, and stability requirements. It does not provide any specific mechanism for protecting farmers' varieties or landraces, though it does require maintenance of a national register for all crop varieties and livestock breeds and it requires monitoring of the effects of exotic plants and animals on them. The decree also creates the position of the registrar and establishes the National Crop Varieties and Livestock Breeds Registration and Release Committee which is expected to operate under the Genetic Resources Unit of the Department of Agricultural Resources in the Ministry of Science and Technology and is charged with general responsibility for crop varieties and livestock breed validation, registration, naming, and release in Nigeria. The law does not cover wild fauna and flora and gives limited coverage to domesticated fauna and flora. The main focus of the law is on crops and livestock that are meant for commercial purposes and to keep proper records of new varieties or breeds as they are being developed or bred. In other words, it is only varieties or breeds that are registered that can be marketed or commercially distributed for cultivation or rearing.

The law does not cover landraces, local varieties, and animal breeds that are traditionally cultivated or reared or exchanged by local farmers, since they are usually not cultivated, bred, or distributed in commercial scales. The law might have the effect of encouraging the displacement of these landraces, local varieties, or breeds by creating the impression that only registered varieties or breeds can be legitimately cultivated or kept, or are of better quality than the local varieties or breeds. However, such an effect is not yet discernible because local farmers, by and large, still cultivate, keep, and exchange their local varieties and breeds. They may switch to other varieties or breeds ostensibly for other reasons than the effects of this law, including availability of seeds or cultivars and the advice or influence of experts in the field.

The decree also establishes the National Crop Varieties and Livestock Breeds Registration and Release Committee. This committee is expected to operate within the Genetic Resources Unit of the Federal Ministry of Science and Technology and is charged with general responsibility for crop varieties and livestock breed validation, registration, naming, and release in Nigeria. Section 19 of the National Agricultural Seeds Decree No 72 of 1992 stipulates that:

> No person shall for the purpose of sowing or planting by any person (including himself) export or import or cause to be exported or imported any seed of any notified kinds or variety, unless—
> a) it conforms to the minimum limits of germination and purity specified for that seed subject to subsection (1) and (2) of section 18 of this Decree;
> b) its container bears in the prescribed manner the mark or label for the correct particulars thereof specified for that seed under sections 14, 15 and 16 of this Decree.

Section 22 of Decree No. 72 further stipulates that "no person other than a person registered under this Decree shall produce or be engaged in the production, processing and marketing of seeds for commercial purposes." The combined effect of these provisions affords some form of plant breeders' rights. However, the decree also provides what could also amount to a farmers' exemption—to exchange and replant seeds under section 30—"Nothing in this Decree shall apply to any seed of any notified kind or variety grown by a person and delivered by him on his own premises direct to another person without monetary consideration for being used by that person for the purpose of sowing or planting." These provisions fall far short of what is envisaged by article 27.3(b) or the protection of farmers' rights however defined. This is also understandable because the decree does not seek to provide for or protect the intellectual or other proprietary rights of the breeder, while article 27.3(b) expects the provision of patent and or other sui generis protection for plant varieties that will require that specific conditions such as distinctness and stability be met before it is granted.

3.4.3 Plant Varieties and Animal Breeds Protection Bill

As part of the comprehensive review of intellectual property legislation in Nigeria, the new bill for the Protection of Plant and Animal Breeders and Farmers Rights is nearing completion. The bill provides for the establishment of a Plant and Animal Breeders and Farmers Rights Registry to be headed by a registrar. Its provisions essentially seek to fulfil the obligations under TRIPs while at the same time provide, recognise, and

protect farmers' rights. These provisions are largely based on the elements of the African Union Model Law, especially with respect to breeders' and farmers' rights, while the administrative and institutional structures are based on the peculiarities of the Nigerian situation. The bill provides that for breeders' rights to be granted for a particular variety or breed, the variety or breed must meet the criteria of distinctiveness, uniformity, and stability (as defined in the bill). It must also have been approved for registration and release by the National Crop Varieties and Livestock Breeds Registration and Release Committee. It further provides that breeders' rights for a plant variety (annual crops) or an animal breed shall be for a period of 10 years and in the case of trees, vines, and other perennials, 15 years, commencing on the day on which the successful application for breeders' rights was accepted.

A certificate of registration for a variety or breed issued under the act, once the bill is enacted and subject to other provisions especially farmers' rights, compulsory licensing, etc., shall confer an exclusive right on the breeder or the breeder's successor, agent, or licensee to produce, sell, market, distribute, import, or export the variety or breed.

With respect to farmers' rights, the bill stipulates that farmers' varieties and breeds are recognized and shall be protected under the rules of practice as found in, and recognized by, the customary practices and laws of the concerned local farming communities, whether such laws are written or not. Farmers' rights are defined to include, inter alia, the rights to:

a) the protection of their traditional knowledge regarding to plant and animal genetic resources;
b) obtain an equitable share of benefits arising from the use of plant and animal genetic resources;
c) participate in making decisions, including at the national level, on matters related to the conservation and sustainable use of plant and animal genetic resources; and
d) save, use, exchange, and sell farm-saved seed and propagating materials.

As stated, the bill is still undergoing review and is expected to be sent to the national legislature for enactment soon afterwards.

3.5 Policy and Strategy

3.5.1 National Policy

Nigeria's national policy on the environment stipulates that the country is committed to a policy that ensures sustainable development based on proper management of the environment and natural resources to meet the needs of the present and future generations based on the principle of optimum sustainable yield in the use of living natural resources and ecosystems. In addition to the conservation agenda, it proposes to promote the rational exploitation of forest resources to meet domestic consumption and export needs on a long term basis.

The federal government, by and large, realises that genetic resources constitute valuable assets with great potential for contributing to the food and health security of its citizens as well as yielding significant economic benefits and has sought to promote research and development in this regard. Major aspects of the access and benefit sharing policy are still under development, but the prevailing thinking is that access regimes should facilitate institutional and human capacity development as well as serve as an avenue to enhance infrastructure rather than deriving direct monetary benefits.

3.5.2 National Biodiversity Strategy and Action Plan (NBSAP)

The federal government is in the process of instituting an NBSAP which is currently undergoing stakeholder reviews. The review process involved the organisation of a series of national workshops in different parts of the country involving different stakeholders including civil society organisations. It also involved the examination of the draft document and invitation of comments and observations from experts from several related sectors. The programme is intended to review the status of biodiversity conservation in Nigeria in an attempt to fill policy gaps and develop strategies and action plans to bridge the gaps in the conservation effort. The inputs from the review process are expected to be incorporated into the draft NBSAP to be presented to the government for approval and adoption.

Under the draft NBSAP, the Nigerian government recognizes the need to conserve its diverse biological resources and plans to make a commitment to conserve 25 percent of Nigeria's total land area. Projected administrative and policy reforms contained in the plan will provide the vehicle for achieving the biodiversity conservation goals and objectives which will include elements of sustainable use.

The draft NBSAP recognises that legal regulation of access to genetic resources is relatively undeveloped in the country and proposes to facilitate the institution of necessary legal instruments in that regard and to meet the objectives of the CBD. This will involve developing legislation to control access to shared resources such as fisheries, water, and wildlife, and putting in place an appropriate benefit sharing regime that will be both equitable and promote the conservation objectives of the country by, for instance, returning some proportion of the proceeds from development of these resources to the region or community where the resources are found for conservation efforts. Such a regime will provide for the prior informed consent of all relevant stakeholders to an access and benefit sharing agreement reached on mutually agreed terms before a prospecting licence will be granted.

Finally, the action plan makes concrete provisions for access, research programme, extension, and education that will enhance sustainable development of Nigeria's biodiversity, using a combination of policy reforms, new legal instruments, institutional collaboration, and a responsive financial mechanism. The overriding goal is to conserve Nigeria's biodiversity and enhance its sustainable use by integrating biodiversity considerations into national planning, policy, and decision-making processes

3.6 Institutional Framework

The institutional framework for the control and management of Nigeria's biological resources is largely fragmented with significant overlap in the mandates of different tiers of government and different sectoral departments and ministries. In the country as whole, assigning institutional mandates for multisectoral problems has always been a significant challenge because, just like the civil administrative structures found in most countries, government departments and agencies are organised along classical sectoral lines without effective mechanisms for handling complex issues that overlap agency jurisdictions.[48] Part of the problem is also traceable to the fact that there are currently no defined modalities for coordination among the relevant tiers, departments, and agencies as well as the competition for power and resources between them. Also, different ministries oversee activities related to different aspects of biological diversity and the actual negotiations in the different relevant international fora: the Ministry of Environment is the focal point for CBD and CITES, Agriculture for the FAO and ITPGR, and Commerce goes to the WTO and WIPO meetings.

The Federal Environmental Protection Agency (FEPA)[49] is primarily responsible for the protection and development of the environment, biodiversity conservation, and the sustainable development of Nigeria's natural resources, thereby making it the focal point for biodiversity issues. It is in the final stages of formalising the country's biodiversity action plan and relevant regulations, including access and benefit sharing. While FEPA, now the Federal Ministry of Environment, is empowered by law with overall responsibility for environmental issues, a number of relevant activities concerning access and benefit sharing fall within the mandates of other ministries or agencies. These other ministries and agencies include:

- Federal Ministry of Agriculture and Rural Development.
- National Agency for Science and Engineering Infrastructure, under the Federal Ministry of Science and Technology (FMST), whose mandate covers such areas as applying science to enhance food and health security. It currently has a centre devoted to traditional medicine development.[50]
- National Centre for Genetic Resources and Biotechnology under the FMST. Established to act as the centre of focus for research, data collection, and dissemination on matters relating to genetic resources utilisation, genetic engineering, and biotechnology.
- National Parks Service whose duty is, among others, to promote the preservation, enhancement, protection, conservation, and management of vegetation and wild animals in the national parks and federal reserves. It regulates access and collection of materials from national parks and federal reserves.
- States' forestry departments, whose mandates include the administration of designated forest areas and the control of access to those areas and regulation of the collection or removal of materials and components from them.
- The Patent and Trademarks Office under the Federal Ministry of Commerce, which administers the intellectual property rights issues which might relate to genetic resources, including patents and plant variety protection.

48 Nnadozie, *supra* n. 5.

49 *See* Federal Environmental Protection Agency Decree No. 58 of 1988 (as amended).

50 Established by Decree No. 33 of 1992.

As indicated, the issues and approaches to access and benefit sharing are not sufficiently integrated or articulated, resulting in a confusing and often contradictory policy environment. Government and enforcement officials are poorly equipped and ill-informed about the problems, dynamics, and complexities of genetic resources and related issues vis-à-vis intellectual property rights as well as the importance of drawing linkages between the different departmental and sectoral areas. In addition, one of the greatest challenges facing the management of the genetic resources in Nigeria is the dearth of comprehensive, adequate, and reliable information on the state of biodiversity and the related trends and activities to instruct decision-making with respect to law and policy on biodiversity use and conservation. The amount of available information is diffusely scattered in different institutions, most of it outdated, in various scales, and for different purposes. Added to this, as stated, is the lack of clarity as to the scope of mandates of different government agencies and departments.[51]

4. STRENGTHS AND WEAKNESSES OF THE CURRENT APPROACH TO ACCESS TO GENETIC RESOURCES IN NIGERIA

4.1 Major Drawbacks of the Regulatory System

Although the federal government may have the undisputed powers to regulate intellectual property rights and international aspects or transactions involving foreign parties, the actual physical entry onto land and collection of biological materials cannot be carried out except through or with the consent of the individual state authorities in whose territory the materials are located and/or the individuals in possession or control of the land. Nevertheless, individual rights and the customary rights of local communities either to land or the natural resources are, as already stated, subject to the powers of a state governor who may appropriate the same on the basis of "overriding public interest."[52] Also, under the FEPA Act as amended, FEPA or the Ministry of Environment has the mandate to establish a national framework governing access especially by foreign bioprospectors, in cooperation with the state authorities and incorporating requirements for prior informed consent and benefit sharing at the state and community or individual levels. How this potential framework would relate to the existing access and benefit sharing provisions for bioprospecting in national parks would also need to be taken into account since the National Park Services Decree has already established the procedures and terms for accessing genetic resources within the national parks. It also gives exclusive jurisdiction to the National Parks Service over all the resources and materials contained within the parks. The Ministry of Environment will expectedly consider all these issues, as well as adopt some of the provisions of the National Park Services Decree, as it is now in the process of setting up the national framework for access and benefit sharing.

As can be deduced from the foregoing, one of the major drawbacks to the system is the lack of a nationwide legal framework dealing specifically with ownership, access, and benefit sharing issues. Because the issues are evolving rapidly at the international level, there is an urgent need to begin to commence setting the framework that would begin to address them. Lack of capacity for negotiation at the international level is critical, and such capacity needs to be enhanced. Currently available officials are stretched because the issues are being discussed in a multiplicity of fora and are difficult to keep up with. Beyond that, there is also limited capacity for implementation and enforcement of existing regulations, let alone proposed laws and regulations. There is also a palpable lack of awareness even among government officials of the dimensions and debates surrounding genetic resources use and conservation, especially at the international level. The public is also not generally aware of the issues which may explain why many of individuals engaged in biotrade do not appreciate the wider implications of their activities.

4.2 Major Weaknesses and Strengths

Nigeria has immense ecological diversity spanning from the mangroves of the coast through the tropical rainforests, to the savannas and to the semi-arid zones in the North almost bordering the southernmost fringes of the Sahara desert. Nigeria's geographical size and the variability in climate and geographic features endow her with rich biodiversity and substantial potential for interesting genetic materials.

With a population of over 120 million, there is certainly some strength in numbers. Strength to the extent that the potential market for bioproducts is immense and serves as veritable source of skill and capacity. The large but rapidly increasing population is also a weakness in sense of the increasing demand for natural resources and the concomitant stress on the resources, especially in light of the fact that more than 60 percent of the popu-

51 Nnadozie, *supra* n. 5.

52 Land Use Act, 1978, sec. 28.

lation reside in rural areas and depend on those resources for subsistence and survival. The net effect is the rapid loss of biodiversity.

Despite the considerable population, there is a serious dearth of capacity and expertise, especially in the law and policy, concerning genetic resources. Even though there is a reasonable level of scientific expertise in the country, it is also being lost at rapid rate because of "brain drain" due to the adverse economic context. Certainly, the need to build more capacity as well as enhance the capability of existing expertise should be and appears to be a major priority of the government.

5. CONCLUSIONS

The fact that the country is already in the process of making provisions recognising and protecting farmers' rights also underscores the need to ratify the ITPGR as soon as possible. The earlier the ITPGR comes into force the easier it will become to argue for the international regime to implement those rights. The need for the development and implementation of a nation-wide legal framework dealing specifically with ownership, access, and benefit sharing issues is also absolutely imperative if the country is to effectively conserve its enormous biological resources as well as derive significant benefits from their sustainable utilisation. This will streamline and clarify the currently fragmented approaches and ad hoc nature of accessing genetic resources and make access easier and more equitable.

Such a framework must be arrived at through cooperation and the participation of all the concerned parties, especially through the involvement of the different tiers of government and relevant ministries. The current effort of the Ministry of Environment to enhance the participation of diverse stakeholders and other relevant ministries in issues of access to genetic resources and benefit sharing is commendable but needs to be strengthened. Doing so will ensure a coherent access regime that guarantees proper management, promotes the conservation and sustainable utilisation of genetic resources, and ensures adequate protection of local community knowledge and innovation. Finally, to the extent that there is substantial cross-border movement and trade in genetic resources in West Africa, which make national borders irrelevant, any national access and benefit sharing regime must take these activities into account in order to be comprehensive, effective, and meaningful. This is one of the reasons why a regional or sub-regional approach is pertinent in addressing some aspects of the issues relating to genetic resources use and conservation.

CHAPTER 14
ACCESS TO GENETIC RESOURCE IN SENEGAL

*Ibrahima Ly**

1. BACKGROUND

In Senegal, experience in conservation of and access to genetic resources (animal and plant) is relatively recent. For an introduction to the biophysical, socio-economic, political, and institutional context of the country, this study relies on the *Annual Report on the Environment and Natural Resources of Senegal*, produced by Senegal's Ministry of Environment and Protection of Nature.[1]

1.1 Biophysical Context

Situated at the extreme west of the African continent, between latitudes 12° and 17° North and longitude 11° and 18° West, Senegal covers a surface area of 196,720 km². It is bordered in the north by Mauritania, in the east by Mali, in the southeast by Guinea, and in the south by Guinea-Bissau. The Republic of the Gambia, in colonial times a British territory while Senegal was French, creates a 300 km long, 20 km wide enclave through the middle of the country along the Gambia River.

1.2 Relief and Soils

The relief is generally flat with an altitude of less than 50 m on 75 percent of Senegal's territory. The highest point (518 m) is situated at the extreme southeast, in the Fouta-Djalon highlands.

The soils present a pedological gradient of decreasing quality from west to east: sandy and dry soils in north, ferruginous in central regions, and lateritic in the south. In general, they are sensitive to hydraulic and Aeolian erosion, considered the main causes of degradation. Almost half of the soils (47 percent) are mediocre or inappropriate to agriculture, and 36 percent are relatively poor, offering meagre production.[2]

1.3 Climate

Senegal's latitude allows for the influence of alternating air masses of different origins and characters throughout the course of the year. Two principal seasons characterise the climate: the dry season from November to April/May, marked by the predominance of maritime (from the northwest) and continental (from the interior) winds and a rainy season from May/June to October, dominated by the monsoon resulting from the Sainte-Hélène anticyclone. The maximum rainfall occurs in August/September.

Temperatures follow the rhythm of the seasons. Their evolution and distribution results from meteorological and geographic factors. Minimum temperatures are reached in January and are the highest during the rainy season. The general pattern of isotherms is from north to south with a significant influence from the sea. In the northern littoral, temperatures are moderate (16-30° C). They reach more than 40° C in the central zone—St. du Ferlo (Linguère-Matam)—and are approximately 39°C in Tambocounda.

The most significant element of the climate is the great spatial variability of precipitation, which, on average, fluctuates between more than 1,000 mm in the south and less than 300 mm in the north. The spatial division of precipitation allows the country to be divided into two major climatic regions on either side of the 500 mm isohyte:

- The Sahelian region to the north of this isohyte has two rainfall regimes—the northern Sahelian region with less than 300 mm rain and the southern Sahelian system with rainfalls between 300 and 500 mm; and
- The Sudanese region to the south of the 500 mm isohyte includes the northern Sudanese (between 500 and 800 mm) and southern Sudanese (more than 800 mm) systems.

There is significant yearly variability as well as spatial variations. This is accompanied by persistent

* ***Full Professor of Public Law and Political Science, Head of the Department of Public Law, Cheikh Anta Diop University, Dakar.***

[1] Ministry of Environment and Protection of Nature of Senegal, *Annual Report on the Environment and Natural Resources of Senegal* 15-20 (1st ed. 2000).

[2] Ministry of Economics and Finance, National Land Management Plan (PNAT) (1994).

drought, illustrated by a sliding of isohytes toward the south by more than 120 km between 1971 and 1990.[3]

1.4 Vegetation

The distribution of vegetation largely follows the pattern of rainfall. Three phytogeographic regions can be identified from north to south:

- The Sahelian region characterised by open vegetation dominated by *Acacia raddiana*, *Acacia senegal*, *Acacia seyal*, *Balanites aegyptiaca*, *Commiphora africana*, and annual grasses that form a more or less continuous carpet;
- The Sudanese region characterized by a vegetation of wooded savannah/dry woodland with *Bombax costatum*, *Cassia sieberiana*, *Combretum sp.*, *Cordyla pinnata*, *Daniella oliveri*, *Pterocarpus erinaceus*, and *Sterculia setigera*, and a grass carpet dominated by hardy grasses; and
- The Guinean region characterized by a dense semi-dry forest with two layers consisting of *Alfezia africana*, *Detarium microcarpum*, *Elaeis guineene*, *Erythropheleum guineene*, *Kyala senegalinsis*, *Parinari curatellifolia*, and a dense undergrowth consisting of rambling shrubs, creepers, and herbs.

In addition to the plant communities characterising the phytogeographic regions are:

- Gallery forests along waterways and the Guinean region;
- Mangroves of *Avicenna africana* and *Rhizophora racemosa* on river banks and in estuaries; and
- The *niayes*.

The evolution of vegetation is linked to changes in land use resulting from anthropological factors, such as clearing and exploitation of forests for fuelwood and construction.

1.5 Water Resources

Senegal has important surface and ground water resources, which, despite their unequal spatial distribution, mitigate the limited precipitation. The principal surface water resources consist of the Senegal and Gambia rivers (1,770 km and 1,150 km in length, respectively), the Casamance and Kayanga waterways, and Lake Guiers. However, the country's hydro-potential suffers from high seasonal and inter-annual variations, lowering of the piezometric level of soils, and high mineral content of water from certain subterranean layers as well as their depth.

1.6 Socio-Economic Context

In 1993 Senegal's population was estimated at 7,931,090, with an annual demographic growth rate of 2.9 percent. Forty-five percent of the population is under age 14. The distribution of the population across the country is unequal, marked by high concentrations in the west and central regions of the country. The urban population represents 39.5 percent of the total, with 52.6 percent in Dakar and 64.7 percent west of Dakar's longitude. Thiès, Fatick, Kolda, Tambacounda, and Lounga have high rural populations. Since 1970, the urban population has seen strong growth, essentially due to a rural exodus. If this trend continues, by 2021 the urbanisation rate will be 56.4 percent (approximately 10,235,800 people), compared to 40.4 percent in 1998.

The Senegalese economy relies principally on a primary sector (agriculture), dominated by the cultivation of groundnuts. The relatively important secondary (industry) and tertiary (commerce and services) sectors are, in large part, tributaries of the primary sector.

The contribution of different sectors to the gross domestic product (GDP) has slowly shifted in favour of the secondary and tertiary sectors. The primary sector proportion of GDP fell from 26.5 percent in 1960-1966 to 21.3 percent in 1985-1989. Between 1997 and 1998, the contribution of the secondary sector rose from 19.8 percent to 20.6 percent, and that of the tertiary from 50.4 percent to 51.3 percent.[4] In the same period, the primary sector registered a slight drop, from 19 percent to 17.8 percent. The oil industry makes up a large part of the secondary sector, while 30 percent of raw materials used in Senegalese industry come from the agricultural sector.[5]

Senegalese external trade, principally oriented towards France and other European Union countries, is in deficit. For its consumption and equipment, Senegal must import high-priced, value-added products, while it only exports semi-processed products (such as groundnut oil, groundnut flour, fish, and green vegetables) or raw materials (such as phosphates).

This brief survey shows that the Senegalese economy is largely dependent on the country's natural resources.

[3] UNDP & Ministry of Water (Senegal), Bilan-Diagnostic des Ressources en Eau (Sept. 1994) (describing the decline in annual average rainfalls between 1950 and 1990).

[4] Direction de l'Environnement (DENV), Ministry of Environment and the Protection of Nature, National Implementation Strategy for the United Nations Convention on Climate Change (1998).

[5] USAID, Analysis of the Agricultural Sector (1991).

Consequently, their conservation by rational exploitation is necessary to ensure the well-being of the population and future generations within the context of a sustainable development.

1.7 Potential for Bioprospecting

To implement provisions of the Convention on Biological Diversity (CBD), a national strategy and a national conservation plan on biodiversity were adopted in 1998. In the process of implementing the strategy, botanical gardens were inventoried and gene banks created. Scientists from diverse institutions[6] evaluated Senegal's potential value as a centre of bioprospecting. They found Senegal to be a key area for development of bioprospecting. While such an assessment has been conducted, the legislative and regulatory framework is lacking. Thus, in the abscence of an applicable law in thie domain, no bioprospecting activity can be undertaken legally.

Internationally, Senegal has adhered to a number of international environmental treaties and conventions. These include instruments addressing: climate, atmosphere, oceans, fauna, toxic waste, assistance, civil responsibility, and natural resources. Senegal ratified the CBD on June 14, 1994.

2. INSTITUTIONS

2.1 Implementing Agencies

Three years before the CBD, Senegal had established a National Committee of Genetic Improvement.[7] Since its establishment, however, this committee has not fulfilled the hopes placed in it. The committee had a broad mandate, including both plant and animal genetic resources. That aspect has been probably its handicap. Legislation adopted in December 2002 addresses the genetic improvement of domestic animal species by creating a National Consultative Committee on Animal Genetic Improvement.

The consultative committee has a role in formulating ideas and recommendations on the conservation and improvement of genetic patrimony of domestic species. The consultative committee is composed of the representatives of ministries and socio-professional organisations, including:

- The ministry in charge of cattle rearing,
- The ministry in charge of agriculture,
- The ministry in charge of the national education,
- The ministry of economy and finances,
- The ministry in charge of the higher education,
- The order of veterinary doctors of Senegal (OVDS),
- The association of zoo-technicians of Senegal, and
- The farmers' organisation.

Other professional organisations can also contribute to the consultative committee. The representative of the ministry in charge of cattle rearing is president of the committee. The committee may use, as necessary, the resources of the public and the specialised commission. Once it starts operation, the committee will meet every three months or as needed. The competent technical services of the Ministry of Livestock Breeding exercise control over all genetic improvement projects. These controls are imposed by the renerwal or revocation of authorisations, agreements, and licenses. The modalities of the committee regarding the genetic improvement of domestic animal species are established by the rule of the ministry in charge of the cattle rearing.

The recent creation of a National Biodiversity Committee should also be noted,[8] as well as the National Technical Committee of the Marine and Coastal Biodiversity Project. These two committees have the technical and consultative mandates in the framework of implementing the CBD.

In Senegal, there is no single agency responsible for managing biological resources. The creation of the Superior Counsel on Natural Resources and the Environment (CONSERE) has provided Senegal with a coordinated framework allowing for the harmonious and efficient direction in natural resources planning and management "in synergy with macro-economic concerns." However, the management of genetic resources is shared among a number of devolved and decentralised structures: offices of state ministries and local authorities, as well specialised structures (namely, companies and enterprises).

In general terms, and according to the legal codes in force, control over access to biological resources and authorisation for collection are within the mandates of specific government agencies. These are the offices in charge of fisheries, water and forests, national parks, agriculture, breeding, and plant protection.

There are several specialised research institutes in the fields of agriculture and fisheries. These include the Senegalese Institute of Agricultural Research (ISRA), the Oceanographic Research Centre of Dakar-Thiaroye

[6] These institutions include the Environmental Sciences Institute (ISE), the Department of Plant Biology in the Science Faculty of Dakar, and the Senegalese Agricultural Research Institute (ISRA).

[7] Rule No. 1764 of 7 February 1989.

[8] Ministerial Order No. 6021 of 11 September 2002.

(CRODT), and the Environmental Sciences Institute (ISE) of Cheikh Anta Diop University in Dakar. These institutes and centres provide support to the state in the fields of training and scientific and technical research relating to biological resources.

To the extent that the state has full regulatory authority over its national territory, the regulation of access to genetic resources has always been centralised. In some cases, authority has been devolved to line agencies, for example to the directors of parks, water and forests, agriculture, and breeding. Since 1996, local authorities have also had powers and have shared in the creation and implementation of regulations with the state. Thus, there is both devolution and decentralisation.

Generally, the relevant governmental authorities with responsibility for the core environmental laws are:

- The Water Code: Office of Water (Ministry of Water);
- The Forestry Code: Office of Water and Forests (Ministry of Environment and the Protection of Nature);
- The Hunting and Protection of Fauna Code: Office of Water and Forests and Office of National Parks (Ministry of Environment and Protection of Nature);
- The Maritime Fishing Code: Office of Oceanography and Sea Fishing;
- Decentralisation texts (Local Communities Code and texts for the transfer of powers): Ministry of Internal Security and Local Authorities (regions, communes, and local communities);
- Environment Code: Office of the Environment and of Classified Institutions (Ministry of Environment and Protection of Nature);
- Texts on seeds and plants: Office of Agriculture (Ministry of Agriculture); and
- Texts on breeding (health and animal products): Ministry of Agriculture and Breeding.

2.2 Decentralisation to Local Authorities

The procedures for obtaining authorisation to collect are set forth in the relevant laws and regulations. These procedures take into consideration the transfer of competences to local authorities since 1996. Two structures have a mandate to coordinate and harmonise overall activities and to follow the legal aspects: the Office of the Environment and Regulated Institutes and CONSERE.

The texts on regionalisation proceed to an extension of local authorities by adding regions in the same manner as communes and rural communities. The legal texts include a significant transfer of competences to these authorities. Only the mandates of local authorities were reorganised; those of public and private companies have not been submitted to any substantial modifications concerning access to resources since 1990.[9]

The new powers of local authorities are significantly expanded, and they have direct implications for access to genetic resources. However, the state maintains some of its traditional powers to ensure a measure of stability. Two legal texts specify the new powers of local authorities: Law No. 96-07 and Decree No. 96-1134. Law No. 96-07 relates to the transfer of competences to regions, communes, and rural communities, while Decree No. 96-1134 addresses the implementation of this law in the particular context of environmental and natural resource management.[10] Article 28 of Law No. 96-07 establishes the powers of regions to:

- Manage, protect, and maintain forests, protected areas, and natural sites of regional interest;
- Implement rules and other local measures for nature protection;
- Manage terrestrial waters, except for national or international watercourses;
- Create woods, forests, and protected areas;
- Establish firebreaks and set pre-emptive fires to combat wild fires;
- Protect fauna;
- Distribute regional quotas on forest exploitation between communes and rural communities;
- Provide authorisation for leasing hunting concessions, with the advice of the rural council. This decision must be submitted to the representative of the state for approval;
- Elaborate, implement, and follow-up on regional environmental action plans and schemes;
- Elaborate specific regional plans for urgent intervention in risk management;
- Create brigades of volunteers for intervention in case of damage to the environment, particularly in the fight against poaching; and
- Provide authorisation to clear land for cultivation, on the advice of the rural council.

Articles 29 and 30 of the law establish the powers of communes to:

9 It is possible, however, that the implementation of the new Petroleum Code could change the regulation of such companies.

10 Law No. 96-07 of 1996 of 22 March 1996; Decree No. 96-1134 of 27 December 1996.

- Provide prior permission for any cutting inside the communal perimeter;
- Reforest and create communal woods;
- Impose fines envisioned by the Forestry Code;
- Manage waste, pollution, and nuisances;
- Protect ground and surface water resources; and
- Elaborate communal action plans for the environment.

Article 30 of the law establishes the powers of rural community to:

- Manage forests located in their areas, based on development plans approved by the competent state authority;
- Provide prior permission for any cutting inside the perimeter of the rural community;
- Impose fines envisioned by the Forestry Code;
- Establish and operate vigilance committees with a view to fighting wild fires;
- Provide opinions on the authorisation of land clearance for cultivation by the regional council;
- Provide advice on the authorisation of leases for hunting areas by the president of the regional council.
- Manage natural sites of local interest;
- Create woodland and protected areas;
- Create and maintain artificial ponds and seasonal water reserves for agricultural or other purposes;
- Manage waste; and
- Elaborate and implement a local action plan for the environment.

This transfer of powers does not signify that the state has abandoned jurisdiction over these particular issues. Rather, in addition to the central and devolved authorities, regional authorities, communes, and rural communities also have responsibility in implementing environmental and natural resource laws. Thus, central and devolved government services continue to act in the transferred sectors.

The Forestry Code of 1998 highlights some of the ways in which the state remains involved in managing biological resources, notwithstanding the significant commitments it has made to decentralisation. For example, the right to exploit forests and lands designated for forestry within state land remain with the state.[11] Similarly, no forest product may be admitted to circulation if it is not accompanied by a circulation permit, issued by the Water and Forests Service on presentation of the exploitation or warehousing permit.[12] A professional forestry exploitation card provided by the Water and Forests Service Commercial is required to exploit a forest for timber or gum.[13] Cultivation contracts for regulated forests can be concluded between the Water and Forests Service (representing the state) and neighbouring local authorities. If it is deemed necessary, the state can regulate forests to conserve natural resources. It may also deregulate forests to transfer them to communities without the deregulation leading to a surrender of the state's rights over the deregulated plots.[14] Devolved services, particularly regional governors, continue to preside over regional ecosystem conservation commissions (previously regional commissions on soil conservation).[15] These examples from the forestry sector demonstrate that the state remains the master in managing natural resources and, therefore, in access to genetic resources.

The state maintains control over local authority activities. It is now an after-the-fact control, which is exercised in principle; a priori control remains the exception. This control is exercised by a state representative for activities enumerated in article 336 of the Local Authorities Code. With regards to the environment, natural resource management and related issues, the state representative exercises control over

- regional, communal, and rural development plans and regional land management plans; and
- issues of land ownership and urbanisation.

These activities are mandated to the state representative. The approval of the state representative is imputed if it has not been communicated to the local authority within one month of the date of receipt. However, at the request of the local authority, the state representative may reduce this one-month period.

Other acts not submitted to the state representative for prior approval enter into force within 15 days of notification, unless the state representative requests a second reading. At the request of the local authority, the state representative may also reduce this delay (in conformity with article 334 of the Local Authorities Code).

Finally, all other regulatory and individual decisions taken by the chairman of the regional council, the mayor, or by the chairman of the rural council within their police powers or daily management activities undertaken in the name of local authorities other than

[11] Law No. 93-03 of 8 January 1998, art. L.2.

[12] Decree No. 98-164 of 20 February 1998, art. R.22.

[13] *Id.*, art. R.26.

[14] *Id.*, arts. R.43, R.39.

[15] *Id.*, art. R.43.

those mentioned above[16] enter into force upon their publication or notification to the concerned parties, after transmission to the state representative.[17]

A number of sectors have not been transferred to local authorities, such as mining, quarrying, and exploitation of hydrocarbon resources. Thus, the state remains the owner of all subsurface resources, and is responsible for managing those resources.[18] Moreover, only freshwater fishing was transferred to local authorities: maritime fishing remains within the competencies of the state. A new maritime fishing code has been in place since 1998.[19]

2.3 National and International NGOs

There are numerous local and national NGOs in Senegal that participate in national policy debates and intervene in the genetic resources sector. For example, the NGO Coordination of Senegal (CONGAD) is a group of several Senegalese law NGOs.

Foreign NGOs and bilateral aid agencies are more reserved and do not take part in policy debates. In many cases (e.g., IUCN, ENDA, and GTZ), they have signed a host agreement with the government and thus have diplomatic status. Their principal role is to advise on the technical aspects of development assistance. Numerous international organizations do participate in research activities relating to genetic resources in Senegal. The best known are Environment and Development Action —Third World (ENDA), IUCN, GTZ, and WWF, amongst others. The International Development Research Centre (IDRC) also provides assistance to a number of different research programmes relating to access to genetic resources. As a Canadian centre, IDRC participates in development cooperation and also in the transfer of technologies.

As a general matter, though, these civil society and charitable organizations function without an operative legal framework to guide any bioprospecting activities, and no legal or policy initiative appears to be emerging.

2.4 Private Sector

The situation is similar with the private sector, which, despite its financial possibilities, awaits the implementation of a legal framework as a prerequisite for its bioprospecting activities. All currently ongoing activities are likely to be illegal.

3. LAW AND POLICY

3.1 Specific Access and Benefit Sharing Legislation and Policies

At the time of writing, there are no laws or official regulations in force specifically addressing bioprospecting. The only applicable legal framework relates to biological resources in general. A biosafety project initiated in November 2002 by the Ministry of Environment and Nature Protection to implement the Biosafety Protocol may constitute a significant long-term advance, by responding to multiple questions posed by bioprospecting. Nevertheless, developing and implementing a regulatory system governing access to genetic resources and benefit sharing seems necessary.

3.2 Laws and Policies Relevant to Access and Benefit Sharing

Numerous legal texts have been adopted over decades and their implementation could affect ownership, access, use, and benefit sharing with regards to genetic resources. These include:

- Law No. 86-04 of 24 January 1986 (the Hunting and the Protection of Fauna Code) and its implementing Decree No. 86-844 of 31 July 1986.
- Law No. 98-03 of 8 January 1998 (the Forestry Code) and its implementing Decree No. 98-164 of 20 February 1998.
- Law No. 2001-01 of 15 January 2001 (the Environmental Code) and its implementing Decree No. 2001-282 of 12 April 2001 (discussed in section 3.2.6 below).
- Law No. 64-46 of 17 June 1964 (relating to national property) and its implementing Decree No. 64-573 of 30 July 1964.
- Law No. 76-06 of 2 July 1976 (the Code on the Property of the State).
- Law No. 98-34 of 14 April 1998 (the Maritime Fishing Code).
- Law No. 82-13 of 4 March 1981 (the Water Code).
- Law No. 96-07 of 22 March 1996 (the Local Authorities Code) and its implementing Decree No. 96-1134 (discussed in section 2.2 above).

16 Local Authorities Code, art. 334.

17 *Id.*, art. 335.

18 This is in accordance with the State Property Code, Law No. 76-66 of 2 July 1976. *See also* Law Embodying the Petroleum Code; Decree Establishing Conditions for the Implementation of the law Embodying the Petroleum Code; Law No. 88-06 of 26 August 1988 (the Mining Code); Decree No. 89-907 of 5 August 1989 Establishing Application Modalities for Law No. 88-06 of 26 August 1988.

- Law No. 94-81 of 23 December 1994 (related to the registration of plant varieties, seeds, and plants, discussed in section 3.2.2 below).
- Decree No. 62-0258 of 5 July 1962 (related to the animal sanitary police).
- Decree No. 65-557 of 21 July 1965 (the Contraventions Code).
- Decree No. 86-320 of 11 March 1986 (regulating the breeding, introduction, transhumance, and the use of camels).
- Decree No. 93-885 of 4 August 1993 (on the creation of the CONSERE).
- Decree No. 97-602 of 17 June 1997 (instituting a catalogue of species and varieties of cultivated plants in Senegal).
- Decree No. 97-603 of 17 June 1997 (creating the CNCSP).
- Decree No. 97-616 of 17 June 1997 (regulating the production, certification, and trade in seeds and plants) (discussed in section 3.2.2 below).
- Numerous legal texts have been adopted regarding pesticide use.[20]

3.2.1 Constitution

Senegal adopted a new Constitution by Law No. 2001-03 of 22 January 2001, which was adopted by referendum. No constitutional provision specifically addresses the ownership of genetic resources, nor the questions of access, control, use, or benefit sharing regarding these resources.

The right to property is provided for by article 12 of the Constitution, which is drafted in a sufficiently broad manner to be invoked and applied in numerous sectors that make up property. This article provides that:

> The right to property is guaranteed by this Constitution. It may only be cancelled in the case of legally established public necessity with a just and fair compensation.

Men and women have equal rights in the possession and ownership of land within the conditions determined by law.

The right to property is also recognised in article 8 of the Constitution as a public liberty under the same title (II) as the rights to a healthy environment, to health, and economic freedom. According to article 8,

> The Republic of Senegal guarantees to all citizens the fundamental individual liberties, economic and social rights as well as collective rights. Those rights and liberties are:
> – Economic freedom.
> – The right to property.
> – The right to health.
> The right to a healthy environment…
> These freedoms and rights shall be exercised within the conditions established by the law.

Article 9 of the Constitution seeks to ensure that these freedoms are enforceable, providing that "All violations and voluntary hindrances to the exercising of a freedom are punishable by law …."

Considering that numerous provisions related to access to genetic resources are found in certain international agreements (notably the CBD), it is important to note the provisions of title IX of the Constitution (articles 95 to 98) regarding international treaties. In accordance with international law, treaties or agreements that are legitimately ratified or approved are, from their publication, a superior authority to that of national laws, conditional, for each agreement or treaty, upon its implementation by the other party(ies). In other words, within the hierarchy of norms, treaties are found between the Constitution and legislation. In the context of genetic resources, these provisions are significant because they can import standards and requirements from international agreements such as the CBD and the ITPGR.

3.2.2 Seeds and Plant Variety Protection

In Senegal's legal framework for implementing the CBD, there are as of yet no laws or regulations specifically relating to the ownership of genetic resources in general. The only legislative and regulatory texts that could be considered as important in this field relate to plant varieties, seeds, and plants. In particular there are four relevant texts (one law and three sets of regulations):

- Law No. 94-81 of 23 December 1994 relating to the registration of varieties and to the production, certification, and trade in seeds or plants of whatever species or genera;
- Decree No. 97-602 of 17 June 1997 instituting a catalogue of plant species and varieties cultivated in Senegal;

[19] Law No. 98-34 of 14 April 1998.

[20] Law No. 84-14 (control of agrochemical and similar products); Decree No. 84-503 of 2 May 1984 (implementing Law No. 84-14); Rule No. 5381 MDR/MSP of 20 May 1985 (fixing the composition and the organizational rules of the National Registration Commission for agrochemical and similar products); Inter-Ministerial Rule No. 7780 of 19 July 1990 (applications for registration of agrochemical and similar products); Inter-Ministerial Rule No.10,015 of 13 September 1990 (authorization for two years for

- Decree No. 97-603 of 17 June 1997 on the creation of the National Consultative Committee on Seeds and Plants (CNCSP); and
- Decree No. 97-616 of 17 June 1997 on the regulation of the production, certification, and trade of seeds and plants.

The law defines seeds or plants as plants or plant parts of all kinds intended for production or multiplication. To be registered in the catalogue, varieties distributed in the country must be the object of a census by the Ministry of Agriculture. For a new variety to be registered, Article 3 of Law no. 94-81 establishes the following conditions: testing must prove that a variety is adapted to the pedoclimate of Senegal; is superior to the most commonly cultivated varieties; and is distinct, homogenous, and stable. Decree No. 6 of the same law (No. 94-81) defines certification as

> the end of a process of field and/or laboratory testing, allowing for assurance that the seeds or plants presented conform to the norms of varietal purity and specifics and the germination or humidity detailed in the technical regulations established by decree.

According to the article 7 of Law No. 94-81, the tests envisaged consist of verifying the application of production norms and of collection, conditioning, and the conservation of seeds and plants. The conditions of commercialisation and sanctions are found in articles 9 to 11.

The National Consultative Committee on Seeds and Plants (CNCSP) provides its opinion and recommendations on all questions relating to conditions for the production and commercialisation of seeds and plants.

Decree No. 97-616 regulates the production, certification, and trade in seeds and plants. This decree provides the conditions of admission for testing (chapter II), organization of production (chapter III), testing and certification of cultures and plots (chapter IV), trade in seeds or plants (chapter V), and the differentiation of shares and accounting of plots and material compatibility (chapter VI). Sanctions are provided for violations of Decree No. 97-616: a fine of between 50,000 and 2,400,000 CFA Francs[21] or a ban on trading in plants and seeds. These sanctions are independent of those established by the Penal Code and by Law No. 66-48 of 27 May 1966 relating to fraud and the testing of food products.

the sale of agrochemical and similar products).

3.2.3 Biodiversity Country Study and National Biodiversity Strategy and Action Plan

In 1998, Senegal developed two major documents: the National Biodiversity Country Study, and the National Strategy and Action Plan for the Conservation of Biological Diversity. These two foundation documents implement the decisions of the 1994 African Ministerial Conference on Biodiversity.

3.2.4 The Broader Policy Context

In order to fight environmental degradation and to better manage human activities, Senegal has adopted a number of development policies since independence. These policies are set forth in several guiding documents and national plans, among them:

- Senegal Prospective Study, 2015;
- National Land Management Plan (PNAT);
- General Orientation Document from the Ministry of Environment and Nature Protection: 1994-1998; and
- National Environmental Action Plan (NEAP).

The first two documents define the general direction of government policy, whereas the Orientation Document from the Ministry of Environment and Nature Protection refers to major environmental concerns: pollution and nuisances, rapid degradation of natural resources, state of protected natural reserves, and policy implementation.

Adopted in 1997, the NEAP constitutes a strategic framework that seeks to harmonize different sectoral policies regarding the management of natural resources and the environment. One of the principal objectives is consideration of the environmental dimension in economic and social development planning. It has been approved by a national forum and adopted by an interministerial council. The National Strategy and National Action Plan for Biodiversity Conservation are derived from the NEAP. The same is true of the National Action Plan to Combat Desertification (NAP/CD), which has been adopted.

Apart from the planning tools, diverse sectoral policies having an environmental component have been implemented, among them the Water Sector Project, the Long Term Water Project; a Programme for the Reform of the Energy Sector; an Adjustment Programme for the Transport Sector; Tourism;[22] and Education.

21 As of August 25, 2003, this fine is approximately US$ 70-3,360.

22 Tourism is the second largest source of foreign exchange earnings, after fishing. The ecotourism and integrated rural tourism are addressed by Senegal's strategy for the development of this sector.

In the field of biological diversity, Senegal adopted its National Strategy on Biodiversity in 1998. With regards to endemic species, this strategy focuses on wild animals. Domesticated animals are rarely considered. Traditional in situ conservation methods, such as parks or protected areas in general, are prioritised.

It is in practical terms that animal breeding is an important activity in Senegal, and cattle constitute what might be termed a "savings account." In the context of Senegal, access to genetic resources should be interpreted broadly, integrating all aspects of biodiversity. African countries generally, and West African nations in particular (especially Senegal), prioritise the implementation of sustainable development strategies by emphasising all aspects relating to access to genetic resources.

3.2.5 Biosafety

Apart from the texts discussed above, the November 2002 launch of a project to establish a national framework for biosafety in Senegal, implementing the Biosafety Protocol bears mention.[23] The project seeks to implement measures regarding responsibility for environmental questions linked to the utilisation of genetically modified organisms (GMOs) in Senegal. The project is expected to:

- Implement a national regulatory framework;
- Harmonise national legislation at the sub-regional and regional levels; and
- Create a national institutional mechanism largely consisting of a database of GMOs.

It is noteworthy that concerns relating to the norms of quality, security of products, and genetically modified foods are not new to Senegal.

In fact, in the sense of article 2 of the CBD,[24] biotechnology is a relatively old practice in Senegal. In the domains of agriculture, energy, food, and medicine, Senegal has developed biotechnology.[25] Senegal's signature and ratification of the CBD is an important step for developing a national policy on biotechnology. In fact, article 19 of the convention authorizes contracting parties to take legislative, administrative, or policy measures to ensure effective participation in biotechnological research activities. Such provisions may offer opportunities related to accessing and researching genetic resources. Senegal has attempted to regulate biotechnology in the agri-food sector in a number of particular instances;[26] however, there is no national legislation specifically governing GMOs or food products containing GMOs.

Genetic modification has numerous applications in a wide variety of fields such as human health, for example, the cloning of the coding gene for human insulin in the bacteria Escherichia coli. Notably, this ingenious genetic process allowed for the development of a vaccine against Hepatitis B. However, it is in the field of agriculture where the most applications have taken place, for example, by producing transgenic plants (such as rice, soybean, potato, and wheat) that are capable of withstanding insects or other pests without the use of strong doses of pesticides.

3.2.6 The Environmental Code

Law No. 2001-01 of 15 January 2001 establishes a new Environmental Code. This new code indirectly governs animal genetic resources. Harkening back to the CBD definition, article 2.3 defines biotechnology to include all technological applications that use biological systems, living organisms, or derivatives thereof to produce or modify products or specific procedures for their use. The definitions of in situ conservation and biological diversity are also similar.

The Environmental Code requires all development projects implemented in the country to consider the principles of conservation and sustainable use of biological diversity.[27] All development projects or activities that might harm the environment; all policies, plans, and programmes; and all regional and sectoral studies must be the subject of an environmental evaluation. Thus, all projects related to access to genetic resources might be the object of environmental impact assessment (EIA) under the framework of environmental evaluation.

The implementing decree of the Environmental Code—Decree No. 2001-282 of 12 April 2001—devotes title II to the procedures for EIAs. It considers effects on ecosystems (flora and fauna included) and effects on the use of natural resources. Article R.42 particularly addresses EIAs for categories of projects related to biotechnology and biological diversity. The list of projects that are subject to an EIA include those "projects

23 Global Environment Facility project GEF/2716-02-4388.

24 Defining biotechnology as "any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use."

25 See A.T. Ba & A.T. Ndoye, Status of Biotechnology and Biosafety Research in Senegal, Presentation at the "Biosafety Seminar for West Africa," Abidjan, Ivory Coast, June 10-14, 1996.

26 *E.g.*, Decree No. 69-891 of 25 July 1969 (regulating the testing of milk and dairy products intended for human consumption); Law No. 94-81 of 23 December 1994 (plant varieties, seeds, and plants); Law No. 94-63 of 22 August 1994 (consumer protection); Decree No. 68-507 of 7 May 1968 (control of products meant for human or animal consumption); Law No. 83-20 of 28 January 1983 (advertising); Decree No. 95-79 of 23 January 1995 (production and commercialisation of tomato concentrate); Decree No. 89-543 of 5 May 1989 (slaughtered animals, meat, and by-products meant for the human consumption).

27 Art. L.4.

that risk producing noxious effects on endangered species of fauna and flora or their critical habitat or produce prejudicial effects on biological diversity." While biological diversity is a concern of the decree, a number of other projects affecting biological diversity only require an initial impact assessment. This is the case, for example, with the intensive breeding of cattle (more than 50 animals) and is also the case with protected areas and the conservation of biological diversity. There would thus appear to be some contradiction.

3.2.7 Animals

Senegal has adopted many legal texts in the field of animal health.[28] The question of animal health has some limitations, particularly given the lack of institutional and technical capacity, as well as a lack of implementing legal texts.

The migration of animals between neighbouring states is regulated by a number of national texts. The migration of camels is regulated by Decree No. 86-820 of 11 March 1986, providing that camels can only migrate through certain regions of the country. A marking system has been established and if an animal is beyond a pasture perimeter, it is captured and killed in about a week if nobody claims it. Generally, all roaming animals are addressed by Decree No. 86-275 of 10 March 1986, which provides for the capture of roaming animals: if they are deemed dangerous, they are killed on the spot.

Two recent legal texts in the area of biodiversity focus on genetic improvement of domestic animals, highlighting the importance of animal genetic resources in Senegal: Law No. 2002-24 of 9 December 2002 and its implementing decree. Law No. 2002-24 seeks to establish conditions for the genetic improvement of species of domestic animals, notably cows, goats, sheep, poultry, horses, and pigs. The law considers genetic improvement methods to include:

- Selection within a breed, defined as a process that consists of accumulating the favourable genes in a specific population.
- The crossbreeding between two or more breeds, defined as the combination in a new population of favourable characteristics coming from two or more breeds.

The implementing decree for the law provides:

1) The norms applicable to the choice, introduction, and diffusion of breeding animals used in public breeding programmes.
2) Guarantees, particularly in zoo-technology and sanitary requirements, for the importation and the exportation of breeding animals and of their semen and embryos and their exchange at the national level.

The diffusion of breeding animals, as well as their semen and embryos, on a large scale is subject to the prior authorization of the ministry responsible for livestock breeding. Licensed institutions or individuals can undertake activities involving breeding, importation, storage, distribution, and the use of semen and embryos. The conditions of licensing are established by decree.

Penalties of imprisonment from 6 months to 2 years and fines of 1 to 10 million CFA Francs (US$1,400 to 14,000) are imposed for either of the following two offences:

1) Whoever would deceive or attempt to deceive their contractual partner on an element facilitating the appreciation of the value of zoo-technology or the health status of an animal presented for sale, sold, or used for natural or artificial breeding or on the value of zoo-technology and the sanitary status of semen and embryos.
2) Whoever would, by fraudulent means, either sell or attempt to sell, for financial gain, the use or attempted use of semen or embryos without, because of their origin or storage, fulfilling the established norms.

All offences under the provisions of the law, and the provisions of the implementing decree, are punishable by a fine of 500,000 to 5,000,000 CFA Francs (US$700 to 7,000).

Offences can also be punished by the confiscation and, if necessary, the destruction of the genetic material used. The competent administrative authority oversees these measures.

To implement this law, a decree was promulgated to establish the conditions for the genetic improvement of domestic animal species. This implementing decree focuses on public breeding and on the National Consultative Committee for the Genetic Improvement of Animals.

[28] The most important are: Decree No. 62-0258 of 5 July 1962 (animal slaughter regulations); Decree No. 2002-1094 (superseding Decree No. 62-0258 with regards to the animal sanitary police); Ministerial Rule No. 855 MDRH of 27 January 1976 (provisionally regulating animals from neighbouring countries entering the country); Decree No. 65-557 of 21 July 1965 (on Contraventions, in particular title II relating to harm to animals); Decree No. 74-1003 of 30 October 1974 (feed for breeding animals);

With regards to public breeding, the decree establishes that the animals used in public breeding should be:

1) where the male and the female are not normally kept in the same place; and
2) when the mating implies the transport of one of the breeding animals, semen, or embryos from the place where that animal is normally kept.

Natural breeding consists of a direct mating between the breeding animals. Artificial breeding consists of every activity that could ensure reproduction by complementary means, or those different from normal mating such as artificial insemination or the transfer of embryos.

Imported breeding animals can only be accepted for public breeding when they are accompanied by recognised documents attesting to their identity, the registration of their civil status, the results of performance tests, their genetic evaluation, and the publication of information on their genetic value.

Institutions licensed by the ministry responsible for livestock breeding undertake the distribution of these breeding animals, semen, or embryos. The distribution of breeding animals consists of direct use of the animal in natural breeding, or use of semen or embryos in artificial breeding.

The process of distribution of breeding animals in artificial breeding consists of successive stages production, distribution, and use of semen and embryos.

Animals used in a programme of genetic improvement must be identified. This identification consists of a collection of indicators that permit the precise establishment of the distinctive elements and their zoo-technological qualities, as well as those of their ancestors so as to be able to predict the qualities of their descendants. The indicators are: the number of the animal, the breed, and its civil status (the numbers of the father and of the mother, the date of birth, the identity of the herd of birth, the name of the locality, and the name of the animal). Complementary indicators such as the blood type, a genetic fingerprint, or other distinguishing characteristics can be added to the identification.

All animals to be used in public breeding are subjected to advance performance testing and a genetic evaluation. Performance testing consists of evaluating and recording productivity and quality characteristics. The characteristics measured depend on the selection objectives defined by the programme of genetic improvement in question.

The genetic evaluation consists of a statistical analysis of performance test parameters to determine the genetic value of the animals. The method of evaluation depends on the improvement programme in question. The results of the genetic evaluation are published after concluding an agreement established by the ministry responsible for livestock breeding.

The breeding animals identified and selected for public breeding have to be judged negative after the required sanitary examinations to attest to their good health and the absence of any genetically transmissible disease. A health certificate has to be issued by the competent veterinary authority after examination of the breeding animal by a veterinary official or by a mandated private veterinarian.

Breeding animals imported by foot with the prior authorisation of the ministry responsible for livestock breeding are accompanied by an individual international zoo-sanitary certificate, attesting that they do not have any contagious disease and that they are in good health.

Semen and embryos imported with the prior authorisation of the ministry responsible for livestock breeding are accompanied by an international zoo-sanitary certificate attesting that they come from a healthy breeding animal and from an artificial insemination centre recognised by the authorities of the country of origin.

To implement government policy on genetic improvement, the ministry responsible for livestock breeding will create, by an order, a National Centre of Animal Selection and Improvement that will be responsible for organising and regulating the production, importation, packaging, storage, and distribution of semen or embryos. The organisation, functions, and powers of the centre will be defined by the ministry's order. The centre may be taken over by private entities where these are judged to be in accordance with the policy defined by the public authority in terms of genetic improvement. The ministry's order regarding the creation, organisation, and functions of the centre will define the relationship between the centre and private entities.

Centres of production of semen and embryos may engage in activities relating to the: acquisition of breeding animals; accommodation of breeding animals; and the collection, conditioning, storage, and distribution of semen and embryos. The opening of a centre for the production of semen and embryos is subject to the prior authorization of the ministry responsible for livestock breeding, following a favourable opinion from the National Centre of Animal Selection and Improvement. A centre for the production of semen and embryos must have adequate infrastructure for the accommodation of breeding animals; the collection, conditioning, and stor-

age of semen and embryos; and qualified personnel. The law includes further detailed requirements for centres, including the information that they must keep on file, processes for distributing the semen and embryos, staffing, and operational procedures.

3.2.8 Land Management

Starting at the time of independence in 1960, Senegal developed a series of legal texts governing land management and forming the foundation of the tenure system. Law No. 64-46 of 17 June 1964 relating to public land is the basic land law. It splits public land into four zones: the rural zone, the protected zone, the pioneer zone, and the urban zone.

The rural zone is largely composed of pastureland and forest regularly used by surrounding villages. Rural councils administer rural communities. They have powers over the modalities of all user rights within rural communities. They also make decisions on the allocation of land to farmers, particularly if the land contains endemic animals or pasture. The councils set the modalities for access to and use of water sources as well as the creation, delimiting, and implementation of animal paths within the rural community.

The pioneer zones are areas managed by development companies, with the SODESP[29] managing several of them.

A review of Law No. 64-46 has been underway for some years since it does not provide genuine security of tenure. This law and its implementing texts[30] do not place great value on pastoral use. This is confirmed by judicial decisions in which administrative authorities refuse to consider animal husbandry as way of using land. The absence of some actions by local authorities – such as the establishment of boundaries of local communities and the delimitation of routes—complicates the regulation of certain problems.

Law No. 96-07 of 22 March 1996, discussed in section 2.2 above, permits communities to create protected areas. To this extent powers over public and state lands, governed by Law No. 64-46 and Law No. 76-02, have been transferred to local communities. Local communities can take appropriate measures to develop natural resources, particularly to protect animal species.[31]

Decree No. 80-268 of 10 March 1980 supplements the land laws in trying to implement precise regulations to avoid conflicts between farmers and herdsmen. It does so by fixing the rules of organization and exploitation of pastureland and pastoral water sources. Pastureland consists of open spaces used, or appropriate, for grazing. Four types of pastures are recognised:

- Natural pasture or animal migration routes, which make up the open spaces used for traditional grazing and intended to be animal pastures;
- Fallow land, cultivable land that has been left to recover its fertility, or non-exploited cultivable land;
- Artificial pastureland or artificial meadows managed for the production of fodder or reserved for this purpose; and
- Post-harvest pastures, which are open to pasture after the harvesting of crops.

It is prohibited to clear areas for cultivation within a natural pasture and in the areas delimited around pastoral forages, animal markets, vaccination parks, gathering places, or watering places.[32]

All classification and declassification of natural pasture is done according to a long procedure requiring the intervention of a departmental commission on the conservation of pastureland, a regional commission on the conservation of pastureland, a national commission on soil conservation, and a decree from the president.

3.2.9 Intellectual Property Rights

Senegal is a developing country, and it has been a member of the World Trade Organisation (WTO) since the entry into force of the Marrakech Agreement in 1995. WTO membership means that it adheres to the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs). The implementation of TRIPs is complicated because of the provisions of article 27.3(b), which addresses the patenting of life forms. However, certain requirements have been met, such as the creation of the Industrial Property Office in the Ministry of Industry. But Senegal has not yet fulfilled all of the objectives of TRIPs.

Senegal adopted the position of the African Group, adhering to TRIPs but demanding revision of article 27.3(b) to be in harmony with articles 8(j) and 15(1) of the CBD. In fact, article 27.3(b) of TRIPs allows states to grant patents on lifeforms (animals and plants) and obliges them to protect the intellectual property rights (IPRs) of inventors. In being required to do so, however, Senegal is concerned about risks of industrial monopolies on seeds, genes, and medicines and, above all, the

29 In French, *Société de Développement de l'Élevage dans la Zone Sylvo-Pastorale*.

30 Especially Decree No. 64-573 and Decree No. 72-1288 of 27 October 1972.

31 Decree No. 96-1134 of 27 December 1996, art. 9.

32 Art. 2. Similarly, animal migration routes must be clearly identified; paths must be established on either side of the main roads regularly used for the transport of cattle by foot; exclusion ditches should be around urban areas; and security zones should surround vaccination parks and animal markets.

misappropriation of local community resources. As part of the African Group, Senegal is seeking to harmonize the TRIPs article 27.3(b) obligations with the protections of CBD articles 8(j) and 15(1), which emphasise the preservation of traditional lifestyles and sovereignty of states over natural resources. There is no law, regulation, or policy in Senegal that addresses the rights of indigenous people or local communities in this field. Furthermore, there is as yet no legal recognition of farmers' rights. The draft bill on the direction of agricultural development is unclear on this point.

The primary change to note in implementing TRIPs is with regards to institutions: the creation of the Industrial Property Office. No other legal measures have been taken for the implementation of Article 27.3(b) because of the controversy noted above. There are no patents on plant varieties. However, Senegal ratified the revised Bangui Accord in 1999 and is a member of the African Intellectual Property Organization (OAPI). This Agreement (in article 6) allows for the patenting of products derived from microbiological processes.

In ratifying the Bangui Accord, Senegal committed to adherence to the 1991 text of the International Convention for the Protection of New Varieties of Plants (UPOV). For the moment, there is no proposal for the development of a sui generis protection of plant varieties. Annex 10 of the Bangui Accord addresses new plant varieties and botanical genera. Article 3 protects all the botanical taxa, with the exception of wild species (meaning those which have not been cultivated or improved). The Bangui Accord is legally enforceable in Senegal.

For product inventions, Annex II of the Bangui Accord is applicable. Article 2 of this annex establishes three criteria for a product to be patented:

- the invention has to be new,
- it has to be innovative, and
- it has to be industrial applicable.

However, certain inventions are not patentable for reasons of public order and morals.[33] Similarly, plant varieties and animal breeds are not patentable, although microbiological processes and products obtained by these processes are patentable.[34] The only distinction to note is that article 6 of the Bangui Accord excludes patents on lifeforms (plant varieties and animal breeds) but authorises patents on microbiological processes and the products thereof.

Senegalese public authorities have not excluded the patentability of biotechnological inventions. Ethical and moral concerns notwithstanding, consideration is underway for a new national project on biosafety initiated by the Ministry of Environment and the Protection of Nature to implement the Biosafety Protocol. The future results of this project will allow for improved knowledge of the risks of GMOs to human health in particular and on the environment in general.

For the time being, there is no barrier to the patenting of biotechnological inventions in Senegal; and hence the importance of the expected results of the project on the biosafety undertaken by the Ministry of Environment and the Protection of Nature.

3.4 New Initiatives

There have been tentative attempts to regulate genetic resources in Senegal. For the moment, they are limited to the establishment of the National Committee of Genetic Improvement by Rule No. 1764 of 7 February 1989. The texts relating to the certification and testing of seeds and plants[35] have enlarged the developing legal framework. The National Action Plan and Strategy for biodiversity conservation also addresses genetic resources by indicating the ways and means of their protection and their improvement.

It is in the context of the policy framework for managing biodiversity that access to genetic resources can be addressed. Apart from the fact that existing committees participate in defining and implementing a policy on access to biological resources, research also continues in the specialised institutions and centres, even if there is no law on genetic resources as yet. There is currently anticipation of the coming regulations, based on the CBD. This anticipation allows the regulation of poverty alleviation problems, or to realise the value of research in some sectors. It is not illegal because it is also based on the existing framework.

The government appears to be seeking to improve management of genetic resources by controlling access and use. From this perspective, capacity building is a priority. At the same poverty reduction is also a priority, in so far as more than 70 percent of Senegal's population is agricultural.

The Government of Senegal recently opened debate on a proposed bill on agricultural policy. The National Assembly has not yet accepted the text, and discussions so far have focused on the processes of governmental

33 Art. 6(a).

34 Art. 6(b).

35 Law No. 94-81 of 23 December 1994; Decree No. 97-602 of 17 June 1997; Decree No. 97-603 of 17 June 1997; Decree No. 97-616 of 17 June 1997; *see also supra* sec. 3.2.2.

coordination. In effect, state policy regarding agriculture and livestock breeding is based on the following priority objectives:

- Reduce poverty in rural areas, increase the standard of living of farmers, and maintain the maximum possible number of farmers on the land;
- Increase production volumes to reduce food insecurity and establish food sovereignty;
- Improve the competitiveness of agriculture compared to imported agricultural products;
- Diversify and increase agricultural production and exports, while meeting requirements for quality;
- Sustainably manage natural resources, in particular soil ,water, and forests; and
- Improve livelihoods in rural areas and favour the balanced development of the country.

The reduction of poverty in rural areas is the principle priority of State agricultural policy. It consists of assuring all the farmers of a livelihood that allows them to satisfy all their essential needs as well as those of their families. The realisation of that objective requires an increase, diversification, and improvement in the quality of production, as well as a pricing policy that allows farmers and herdsmen a sufficient profit. This policy of poverty reduction should also minimise the negative consequences of climatic and economic hazards on the income of farmers and herdsmen.

The agricultural policy bill foresees the creation of agricultural enterprises. For the purposes of the bill, agricultural enterprises are defined as units of production whose primary economic activity is agricultural cultivation (such as edible plants, forage crops, and textile plants) or animal breeding. Apart from the dimension of production, agricultural enterprises also provide space for the management of natural resources.

Family agricultural enterprise is defined as a fundamental socio-economic structure, made up of women and men from the same family or related families, whose first motive is to feed themselves, and only secondarily sell to provide income to meet other family needs. It contributes to the balanced management of the land. Family agricultural enterprises are intended to benefit from improved methods of production.

Commercial and industrial agricultural enterprises are characterised by the use of salaried employees and by modern means of production. Salaried employees of commercial and industrial agricultural enterprises benefit from a particular social regime. Commercial and industrial agricultural enterprises may use land subject to conditions established by the law.

The proposed bill also foresees the elaboration of a National System of Agricultural and Agri-food Research (SNRAA) adapted to the Senegalese situation. This system considers the objectives of the national plan for the diversifying agricultural production and livestock breeding embodied in the law. This research system would be elaborated and conducted under the joint responsibility of professional agricultural organisations and the state, in particular through the Senegalese Institute of Agricultural Research (ISAR), the Institute of Food Technology, and national and international research universities. The SNRAA allows for organisation and cooperation among all bodies with mandates and research capacities in the agricultural and food sectors. This system is financed by the National Fund for Agricultural and Agri-food Research (FNRAA). The FNRAA is a public institution with a scientific and technical character placed under the financial supervision of the Ministry of Economics and Finance with technical supervision of the Ministry of Agriculture and Livestock Breeding.

The application of modern agricultural and livestock breeding techniques is ensured by the National Agency of Agriculture and Rural Advice (ANCAR). ANCAR bring together the state, professional agricultural organisations, and the private sector. It has a mandate to provide agricultural and rural advice, taking into account rural needs, and to institute a framework for coordinating the programs of different bodies providing agricultural and rural assistance.

Demonstration stations for the results of agricultural research were created throughout the country. ISAR, ANCAR, professional agricultural organisations, and producer training institutions are responsible for establishing programs for implementing and disseminating new techniques of agricultural production.

A National Fund for Rural Development (FNDR), intended to finance agricultural and rural assistance, has been established. The principles and the modalities for the donation of funds, as well as modes of operation, are provided for by decree.

In Senegal, priority is given to the empowerment and development of communities, as well as equity in access to genetic resources. Commercialisation is important, but it is secondary to the empowerment of the communities, who are the principle beneficiaries.

Senegal has not yet engaged in a significant debate or discussion on benefit sharing. The sharing of benefits is not legally defined and clarified. One initial step is to develop provisions on benefit sharing within the new

legal and regulatory framework, which is established in conformity with international conventions. However, it is very evident that for a developing country like Senegal, benefit sharing will have to consider the fundamental needs of local communities above all else. Nevertheless, benefit sharing should also consider the needs of public and private institutions, and where possible, the needs of other participants in bioprospecting. Bioprospecting will then be well regulated in the respect of the national laws and international conventions.

4. CONCLUSIONS

It should be noted that the principal problems identified largely result from the absence of a legislative and regulatory framework that clearly establishes the rights and obligations of different parties with interests in access to genetic resources. In effect, it appears that the legal texts on biological resources—in particular, forests, fisheries, hunting, livestock breeding, seeds, and plants—are not suitable because they do not address access to genetic resources, limiting themselves to ecosystem and species management. It is therefore necessary to promptly develop and implement a legislative and regulatory framework that clearly addresses implements the CBD and governs access to genetic resources in Senegal.

Senegal faces certain weaknesses in regulating genetic resources. The absence of a legislative and regulatory framework on access to animal and plant genetic resources is the principal weakness. It also lacks the financial resources necessary for genetic research. Finally, there is a lack of communication between institutions that do not combine their efforts to reinforce their capacities in genetic research

Risks of overlapping activities exist. Coordination is indispensable to avoid isolation and duplication of efforts. This is one of the rationales for creating the genetic resource committees.

The transfer of powers to local communities since 1996 also should allow for the genuine participation of local communities in policy debate. The decentralised institutions, regions, communes, and rural communities act through their locally elected representatives, but have the opportunity to be more involved in the decisionmaking process.

However, due to the scientific and technical character of the debate on access to genetic resources, the popular debate remains—at least for the moment—very limited in this field. Much training and public awareness raising remains to be done.

In contrast, the existence and functioning of a number of research institutes constitutes a strength for Senegal. Despite the weakness of the synergy between these institutes (indicated in the previous section), they provide a base of experience upon which to build.

CHAPTER 15
ACCESS TO GENETIC RESOURCES IN THE SEYCHELLES

Rolph A. Payet* & Robert J.L. Lettington**

1. BACKGROUND

1.1 The Particular Conditions of Small Island States

While all nations have, at least to some degree, varying circumstances, both physical and political, small island states face an unusual array of constraints. In physical terms, they tend to be made up of a pattern of small ecosystems, whether in terms of their individual islands or, frequently, of a complex pattern of ecosystems within individual islands. Both types of ecosystem structure are found in the Seychelles archipelago. For example, in the low-lying coralline islands the ecosystem is relatively homogenous, and the islands are often grouped in clusters, such as the Aldabra group and the Amirantes group. On the other hand, the granitic islands consist of far more complex ecosystem patterns, principally as a result of their age (which exceeds 700 million years, as compared to a few thousand years for the coral islands). The ecosystem complexity is also related to the various microhabitats created by the steep topography of these islands. However, in both instances, ecosystem fragility is a priority for any conservation effort in the islands.

Another problem common to all small island states inhabited by people is the difficulty of setting aside sufficient land to preserve viable ecosystems. This is not generally a problem in sparsely populated islands but creates pronounced conflicts in the more heavily populated granitic islands. In the case of the Seychelles, population pressure is considerable and, since colonization in the 1770s, people have slowly modified much of the terrestrial habitats. This situation also exacerbates associated problems of species isolation. Finally, for island archipelagos such as the Seychelles, the highly dispersed nature of their territory means that enforcement of any system for the conservation and sustainable use of their resources is extremely difficult. One simply cannot be everywhere at the same time. This is particularly true of the marine environment, especially within the coastal lagoons of many of the coral atolls and island groups.

The physical constraints facing small island states are mirrored by socio-economic constraints. Small island states tend to have small populations and thus a limited skills base to draw upon: there are only so many taxonomists and other scientists, lawyers, and park rangers in the nation. Tied to this problem is the fact that while some small island states are considered to be relatively wealthy in per capita terms, their economies are based upon one or two highly vulnerable sectors, such as tourism and fisheries. They also do not have a very high total GDP and thus government expenditure options, particularly in terms of flexibility and economies of scale, are limited. This can be true even in comparison to some of the world's poorest states.

1.2 The Republic of the Seychelles

1.2.1 Physical

The Republic of the Seychelles consists of 115 small islands making up an archipelago with an Exclusive Economic Zone (EEZ) of 1.4 million km^2. Forty of these islands are granitic, making up 57 percent of the Seychelles's 452 km^2 total land area, while the remaining islands are low-lying and of coralline origin. The climate is humid tropical with an annual mean temperature of 27°C and rainfall on the main island of Mahe varying from 1700 mm in the south to 3,000 mm in the hills. In general, the outer islands receive less rainfall.[1]

The Seychelles archipelago is known to be the repository of more than 1,000 endemic species, despite the fact that only limited cataloguing has been undertaken and new species are regularly being discovered.[2] Populations of microorganisms—particularly bacteria, viruses, and fungi—are assumed to run into the millions of species but are mostly undescribed, and the true pic-

** Director General, Policy, Planning and Services Division, Ministry of Environment, Seychelles*

*** Southern Environmental and Agricultural Policy Research Institute (SEAPRI)*

[1] Personal Communication from Ehsan Dulloo, IPGRI, to Robert Lettington, 2001.

[2] N.J. Shah, R.A. Payet & K. Henri, National Biodiversity Strategy and Action Plan – Republic of Seychelles 5, 43 (1997).

ture is unclear at best.[3] The situation is somewhat similar for lower plants, although the level of documentation is higher and one can be more certain of a high level of diversity, particularly in marine plants.[4] Higher plants are generally well-documented and seem to indicate levels of endemism ranging from about 10 percent of the species found on the highly diverse granitic islands to about 15 percent on the less diverse coralline islands such as Aldabra.[5] Equally important to the natural world are the many, and as yet not understood, symbiotic and cooperative relationships developed over many thousands of years among plants, insects, and fauna. Modification or threats to these delicately balanced ecosystems may not only wipe out species but also entire habitats.

As a result of intense cultivation for spices and other commodities in the early days of colonization, such as coconuts for copra, the majority of endemic higher plants are considered threatened on both the granitic and coral islands in the Seychelles. Limited and dated studies that have been conducted thus far on amphibians, reptiles, and a number of invertebrates indicate very high levels of endemic diversity; up to 75 to 85 percent for spiders—among the highest for small islands globally. On the other hand, avian species, found mainly on the granitic islands, are well-studied with over 13 endemic species of birds. Intensive conservation efforts over the last 10 years have brought many of these bird species back from the brink of extinction. The only indigenous mammals are bats, with two of five species being endemic.[6]

The native vegetation is most apparent on the granitic islands and tends to consist mainly of several types of forest varying with altitude and rainfall. These forests contain a rich diversity of endemic species, highest at intermediate altitudes. Much of the forest was historically dominated by hard woods, which were exploited during the days of the colonial naval wars, primarily for ship repair. There has been intensive conversion of forestland, especially on the coastal plains, to agricultural uses over the last 200 years. Currently, fragmented patches of these forests exist and many face pressure from invasive creepers and encroachment from human development. Wood is not currently commercially exploited, although there is a small artisanal furniture-making market and a growing interest in medicinal plants. Seychelles is also home to several endemic palm species, including the enigmatic Coco-de-Mer, *Laodicea maldivica*. While conservation measures have been introduced, much of the remaining forestland at lower and intermediate altitudes is now threatened by alien invasive species[7]—a threat that local authorities have little capacity to manage and overcome in a sustainable manner. Reafforestation efforts have tended to focus on imported exotic species,[8] but a recent change in government policy has led to the creation of a nursery for endemic plants. These endemic seedlings are now widely distributed to the public for planting, and the nursery is an important component of a new biodiversity centre being created on the main island of Mahe.

1.2.2 Political

In 1994 the population of the Seychelles was 72,500, with an annual population growth rate estimated at approximately 1 percent. Population distribution is uneven with the majority living on the three largest granitic islands, particularly Mahe and Praslin, and the majority of the coralline islands being uninhabited. Education is effective, with a ratio of 15.3 pupils for each teacher and an overall literacy rate of 83 percent in the population aged 15 years and above. Politics and the economy are both stable with a democratic government and a gross national product estimated at US$7,800 per capita, and a real growth rate of about 2 percent in 2000. Despite the relative wealth of Seychellois in per capita terms, it is important to note that the small population still leaves a gross domestic product (GDP) of only US$631 million (1999), with total government expenditure reaching US$270 million (1999).[9] Tourism dominates the economy, providing two-thirds of all hard currency earnings and employing 18 percent of the workforce. In contrast, agriculture is severely restricted by the physical situation of the islands, providing 3.2 percent of GDP in 1999 and employing less than 5 percent of the workforce. There are 270 registered farms and approximately 700 part-time farmers. Despite the fact that agricultural development is almost exclusively in the hands of the private sector, farmers are still heavily dependent on the Ministry of Agriculture for goods such as seeds, tools, and fertiliser. Historically the islands had an agro-economy based on copra, cinnamon, vanilla, and clove exports but in recent times local agriculture has shifted more towards import substitution, producing approximately 60 percent of domestic fruit and vegetable needs

3 *Id.* at 38.

4 *Id.* at 39.

5 *Id.*

6 *Id.* at 45-47.

7 Ehsan Dulloo, Conservation and Sustainable Utilization of Plant Genetic Resources in Indian Ocean Islands: Sub-Regional Synthesis Report 5 (1995).

8 *Id.*

9 Ministry of Information Technology & Communication, Management and Information Systems Division (MISD), Seychelles in Figures, *available at* http://www.seychelles.net/misdstat/ (last visited Aug. 14, 2003).

and the balance being imported, and attempting to become self-sufficient in poultry, eggs, and pork, whilst beef is restricted due to space constraints.

Internationally, the Seychelles is classed as an upper middle-income developing country with one of the highest human development indices in Africa. However, the Seychelles has a high vulnerability index as a small island state due to its very small economy. The Seychelles applied for membership of the World Trade Organisation (WTO) in 1995 and although a working group was established for the negotiation of its entry it has yet to complete the necessary formalities.[10] The Seychelles was the second country to sign the Convention on Biological Diversity (CBD) in 1992, ratifying the agreement in the same year,[11] and became a member of the UN Food and Agriculture Organization's Commission on Genetic Resources for Food and Agriculture (CGRFA) in 1997.[12]

2. INSTITUTIONS

There is a range of genetic resources activities that has historically taken, and is currently taking, place in the Seychelles. The most easily identifiable of these activities are governmental and international activities, the former mostly involving agriculture but expanding into new fields, and the latter consisting primarily of conservation initiatives with the possibility of scientific application and commercialisation under consideration.

2.1 Public Sector Activities

The Government of the Seychelles has primarily been active in the field of access to genetic resources in two ways: agricultural development and medicinal plants.

In agriculture, the majority of genetic resources used to maintain and improve existing collections come from three sources. The first is the national collection, which is ultimately of foreign derivation.[13] The second is from the Consultative Group on International Agricultural Research (CGIAR) collections,[14] either via the national collection or more directly through the Ministry of Agriculture and Marine Resources. The third, and by far the smallest source, is the direct importation of improved seed from international seed firms by the government.[15] The Ministry of Agriculture and Marine Resources is undertaking local collecting activities aimed at maintaining a representative sample of landraces in the national collection. This activity is more likely to be of domestic rather than foreign interest given the relative small scale of agriculture in the Seychelles and the recent foreign origin of the majority of germplasm in circulation.

The Seychelles has a long history of contacts with the CGIAR, particularly the tropical agriculture research centres and more recently the International Plant Genetic Resources Institute (IPGRI). As of yet, no formal framework exists for these contacts,[16] and it seems that most contacts have been based on the Seychelles's desire to develop its tropical fruit and root crop collection for domestic purposes. There is no record of the Seychelles contributing to the CGIAR collections to date, and there seems to be only limited understanding by either of the other's needs and interests.[17] The Ministry of Agriculture and Marine Resources directly establishes and manages contacts and agreements between the government of the Seychelles and the CGIAR, private sector seed companies, and other agricultural organisations.

Public sector interest and activity regarding medicinal plants has largely been prompted by the initiative of the Indian Ocean Commission (IOC, or COI in its Francophone acronym), a sub-regional intergovernmental body established by the Indian Ocean island states. The IOC project was conducted in the mid-1990s, with support from the European Union (EU), and sought to evaluate the properties of medicinal plants throughout the sub-region.[18] The project collected and maintained a number of local plants with the intention of extracting their active ingredients.[19] A CD-ROM—containing the taxonomic data and traditional medicinal properties of the plants collected was produced—the information rights to which belong to the government of the Seychelles and the IOC jointly. The results of the project are with the Seychelles Bureau of Standards (SBS) awaiting publication. The IOC has not indicated whether it wishes to continue with the project. The project activities were conducted under the terms of an ad hoc agreement between the Government of the Seychelles, represented by SBS, and the IOC.

The government of the Seychelles has built upon the activities conducted under the IOC project by, for exam-

10 See http://www.wto.org.

11 See http://www.biodiv.org.

12 See http://www.fao.org/ag/cgrfa.

13 In many cases, this ultimately means the CGIAR collections since the majority of the national collection has been accessed via the centers. Dulloo, *supra* n. 1.

14 *Id.*

15 *Id.*

16 *Id.*

17 *Id.*

18 *Id.*

19 *Id.*

ple, screening its medicinal plants for pharmaceutical properties such as anti-cancer agents and anti-viral agents. A key aspect of these activities has been an effort to establish nurseries for the propagation of indigenous species. The Ministries of Agriculture and Marine Resources, Environment, and Culture are the most active agencies in this field. However, most of this activity is relatively recent and limited. The government maintains the resulting information, and no commercialisation has yet occurred. This is possibly due to the lack of adequate experience and the absence of an effective legal or policy framework governing such interests, and in particular protecting local interests in this context. There is a clear interest in further developing similar activities, but the extent to which this intention may influence any regulatory developments is unclear.

A third aspect of genetic resources in which the public sector is active in the Seychelles by collaborating with relatively large-scale foreign initiatives, in particular the Eden Project and the Shoals of Capricorn. The Eden Project is a private initiative based in the United Kingdom that receives substantial public financial support. The Shoals of Capricorn Marine Research programme is a two-year research project managed by the Royal Geographical Society in the UK. Negotiated through the Ministry of Environment, the agreement covering the collection of plant material for the Eden Project is an example of a formal agreement for access to genetic resources in the Seychelles,[20] and it has highlighted the lack of capacity, especially in terms of legal know-how, in the islands to negotiate such agreements. It is not yet clear what effect the promulgation of access to genetic resources legislation might have on this project, or vice versa. For the Shoals of Capricorn Project, which is focused on marine research, a memorandum of understanding (MOU) negotiated on behalf of the government by the Ministry of Industries and International Business (the parent ministry of SBS), provides the government of the Seychelles all rights to any intellectual property derived from the project. However, both agreements are based upon the law of contract and, despite their nature, do not address issues specific to access to genetic resources. In both cases, mandates for negotiating those agreements were given on an ad hoc basis by the Government of the Seychelles. The specific terms and conditions of these agreements include joint ownership of any discovery, use, or other derivative of the resources in question, as well as rights to negotiate any commercial agreement that may arise from the research in the Seychelles.

[20] Personal communication from Claudia Cantarella, consultant, FAO Development Law Division, to Robert Lettington, Sept. 5, 2001.

2.2 Private Sector Activities

There is no official record of private sector activity in bioprospecting in the Seychelles, but it is possible that expeditions in the past may have had some commercial motive, and numerous incidences of undeclared and illegal activity are believed to currently occur.[21] The lack of information in this area is due largely to lack of an appropriate legal framework and weak enforcement, despite the official belief in undeclared and illegal activity. The surveillance programs periodically mounted by the Marine Parks Authority illustrate the problems in enforcement. Very few cases of undeclared or illegal activity identified by these programs have been prosecuted due to poorly collected evidence, court delays, and weak sentences. At a broader level, the implementation of Convention on International Trade in Endangered Species (CITES), which is reflected in strict legal provisions, has also proved problematic in terms of implementing adequate penalties for identified poachers. Efforts to address the problems in enforcement have focused on a system of spot checks by various agencies on compliance with the regulations and standards for which they are responsible. Spot-checks are seen as a cost-effective means of enforcement, enabling enforcement authorities to maintain a virtual presence in many areas and target numerous conservation issues.

2.3 Legal, Policy, and Institutional Frameworks Governing Current Activity

The nature of public sector activities in access to genetic resources and the lack of information regarding private activities highlight the absence of specific regulatory provisions for access to genetic resources—a fact that is noted in the Seychelles National Biodiversity Strategy and Action Plan (NBSAP). The NBSAP emphasises that action on genetic resources is a priority,[22] an issue that is discussed later in this chapter. The sectoral legislative instruments that currently govern access to genetic resources in the Seychelles contain no provisions relating to benefit sharing and have not been har-

[21] NBSAP, *supra* n. 2 at 58. The collecting activities of foreign expeditions, particularly involving marine organisms, are believed to have been going on since the 1960s. *Id.* at 78. Although given the history of the region, the history of bioprospecting is considerably longer than this, probably dating back at least to the colonial era and the activities of Victorian naturalists. This is likely to mean that many species are already held in botanic gardens, particularly the Royal Botanic Gardens at Kew in the United Kingdom.

[22] *Id.* at 58.

monised, while the lead agencies are generally poorly coordinated on the matter.[23]

The broadest mandate of the sectoral agencies is that of the SBS,[24] which, through its parent the Ministry of Industries and International Business, is empowered to authorise scientific research projects in the Seychelles. These powers cover research conducted by foreigners in either public or private areas, in the latter case those with rights over the area being consulted during the approval process.[25] As in a number of other countries, this is a generic approval process that does not contain any mechanisms specific to access and benefit sharing. The SBS processes research applications, obtains comments from relevant government and non-governmental agencies, and then conveys a final approval or rejection of the researcher's application. This process allows for ad hoc conditions. For example with benefit sharing, the payment of a fee has been required in some instances involving academic researchers, and joint ownership of research results between the researcher and the government of the Seychelles is routinely required; although the exact mechanics and limits of this joint ownership are not specified. However, lack of capacity, a legal framework, or a mandate to enforce mean that it is difficult to apply such conditions consistently or effectively. In particular, there are no legal provisions providing for fines in the event of a violation of a permit issued by SBS, and the permits rarely contain any penalty clauses. Permits are, in fact, only letters of approval issued by SBS that depend on an expectation of compliance with relevant regulations, such as quarantine or CITES restrictions, but are not based on any statutory powers or formal requirements for the provision of information, conditions of access, or fees or other benefits.

The fluidity of the SBS permit process combines with a number of other factors to create a situation that suggests that the Seychelles may be missing an opportunity to reap benefits associated with its genetic resources. Chief among these other factors is that SBS does not have any particular expertise to oversee genetic resources-related activities, leading to recent discussions that responsibility for the field should be moved to a more appropriate agency,[26] and that the Government of the Seychelles has only limited ability to monitor activities in its jurisdiction and no ability to monitor or track activities outside its borders.

A number of ministries and lead agencies have some level of responsibility for access to genetic resources in specific sectors. Principal among these are the Ministry of the Environment (MoE) and the Ministry of Agriculture and Marine Resources. The Ministry of Agriculture and Marine Resources is one of the most active institutions with the main ex situ collection and the Forestry Section's nurseries of indigenous and exotic species for propagation.[27] This ministry oversees the import and export of agricultural genetic resources, although the flow is almost exclusively inward. Since the ministry also oversees quarantine issues, it is largely able to, and does, operate independently of other agencies in terms of access to genetic resources. It has been reasonably able to fulfil its mandate, despite limited manpower and relevant skills, due to a consistency in staff assignments that has allowed for some understanding of the issues and thus informal skills development.[28] The Ministry of Local Government, Sports and Culture is in the process of developing a medicinal plants nursery, and thus is the third ministry with direct involvement in genetic resources issues. As a relative newcomer to the matter, it is not yet clear what authority it will have over access to the material held in the nursery; although, since its stated intention is to provide public access to the accessions held in the nursery, any measures implemented presumably will not be highly restrictive. The jurisdiction of the MoE, including a broad environmental management mandate, seems to overlap with the activities of the other ministries physically controlling genetic resources, but with the MoE having only recently been raised from a department, no clear lines have been drawn.

The situation with lead agencies is as fragmented as it is at the ministerial level. There are the obvious sectoral agencies, such as the Seychelles Center for Marine Research and Technology, the Marine Parks Authority, and the Seychelles Fishing Authority,[29] with direct control over the management of particular geographical areas and thereby controlling access to them. However, SBS still manages all foreign access to genetic resources while there are few or no controls on local access except with regard to specific species, such as those covered by CITES-related law.

The majority of bioprospecting activity in the Seychelles to date either has been conducted on an ad hoc basis or the government has not been aware of its occurrence. There are no established mechanisms for

23 Dulloo, *supra* n. 7 at 25.

24 See http://www.seychelles.net/sbs/ (last visited Aug. 14, 2003).

25 Given that there are no specific legal provisions underpinning the SBS process, it is not clear to what degree a private landowner could veto research, and there is no precedent to guide actions in this context.

26 Cantarella, *supra* n. 20.

27 Dulloo, *supra* n. 1.

28 *Id.*

29 NBSAP, *supra* n. 2 at 55

benefit sharing, and there is no clear idea of the value of Seychellois genetic resources, whether actual or potential.[30] At an institutional level, a number of agencies have overlapping mandates, both in the geographical and technical senses. This is largely the result of the absence of any specific legal framework and harmonised structure for access and benefit sharing. The mechanisms that are in place tend to be prompted by spontaneous sectoral initiatives rather than through any coherent guiding policy.[31] In some instances, activity concerning access to genetic resources is purely based on the interest and initiative of particular government officers.[32] No national workshops have been held, and there is no formal system of consultation between ministries or agencies on issues of access and benefit sharing. There is no lead agency with both technical capacity and a mandate to handle all aspects of the management of genetic resources. SBS, the current primary lead agency dealing with foreign applications for access, has no technical capacity in the field, no mandate to address conservation issues, and no actual legal powers to grant permission for access. The MoE has the potential to become such an agency, but it will need significant enhancements of both its capacity and resources to undertake this role effectively.

2.3 Non-governmental Institutions

A number of national and international non-governmental organisations (NGOs) are active in the Seychelles. National NGOs that are active in genetic resources management, predominantly indirectly due to conservation interests, are: the Seychelles Island Foundation, Nature Protection Trust of Seychelles, the Marine Conservation Society, Birdlife (now Nature Seychelles), the Wildlife Clubs of Seychelles,[33] and the Island Conservation Society. International and foreign national NGOs include the Royal Society for Nature Conservation and the International Union for the Conservation of Nature (IUCN). These international NGOs are also largely interested in access to genetic resources for reasons tangential to their main objectives. The exception to this is IUCN, which has been more directly involved due to its developing the National Biodiversity Strategy and Action Plan (NBSAP).

30 Dulloo, *supra* n. 1.

31 FAO International Technical Conference on Plant Genetic Resources in Indian Ocean Islands: Sub-Regional Synthesis Report (1995), at 10.

32 Cantarella, *supra* n. 20.

33 NBSAP, *supra* n. 2 at 55.

2.4 International Institutions

The Seychelles is a longstanding member of the UN Food and Agriculture Organization (FAO) and has recently become a member of FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA). The CGRFA is an intergovernmental forum with a broad mandate relevant to access to genetic resources for food and agriculture. The negotiations for the revision of the International Undertaking on Plant Genetic Resources (as of its adoption in November 2001, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)), the Intergovernmental Technical Working Group on Plant Genetic Resources, and the Intergovernmental Technical Working Group on Animal Genetic Resources all fall under the CGRFA and have potential impacts on access and benefit sharing strategies. The Seychelles recent request for assistance from FAO's Development Law Division in the drafting of specific legislation on access to plant genetic resources is discussed in section 3.4.1 of this chapter. The Seychelles has also been active in the CBD negotiations on access and benefit sharing both at its conferences of the parties and at meetings of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA).

3. LAWS AND POLICIES

3.1 Specific Access and Benefit-Sharing Laws and Policies

The Seychelles currently has no legislation or policies specifically addressing the issues of access and benefit sharing within the context of the CBD. However, there are a number of pieces of legislation designed to control access to and use of particular species, such as the Breadfruit and Other Trees (Protection) Act (1917) and the Coco-de-Mer (Management) Decree (Declaration of Coco-de-Mer Nut Notice 1995). The case of the coco-de-mer nut, which is endemic to the Seychelles, is governed by particularly stringent regulation. Historically, this regulation has been the result of the cultural significance attached to the nut by Seychellois rather than for any genetic value in the species, and, despite the specific legislation, it has been treated in a manner similar to that of other protected species. In recent years, the levels of poaching of coco-de-mer have led the MoE to create a permit system for trading in the nuts and to impose a certification system for exports. To avoid tracking each nut, all harvested coco-de-mer must be sold at a fixed

price to the MoE, which is then responsible for the issuance of an accompanying certificate and for the sale of the nut to licensed vendors, again at a fixed price. Once a certificate has been issued for a nut and it is placed on the market, there are no further restrictions imposed, except that the certificate should always follow the nut. At this present stage, there is no embargo on the export of certified coco-de-mer nut itself, although an embargo on its kernel has recently been put in place due to an increase in poaching.

While there is currently no specific legislation relating to access to agriculturally useful genetic resources, the Seychelles has developed relatively sophisticated policies and practices in this area. These policies are specifically directed at the enhancement of the Seychelles base of agriculturally useful genetic resources, particularly tropical fruits and root crops. However, as the Seychelles is almost exclusively dependent on foreign sources of germplasm, particularly the CGIAR centres, these policies focus more on the Seychelles need to access, maintain, and improve exotic germplasm than on access to germplasm maintained in the islands. Thus, they are considered in more depth in the following section on laws and policies of direct relevance to access and benefit sharing.

3.2 Laws and Policies with Direct Relevance to Access and Benefit Sharing

3.2.1 International Framework

There are a number of Seychellois laws and policies that indirectly address or affect the management of genetic resources of all types. These fall in a number of sectors but some of the most obvious, whether currently implemented or consisting of stated intentions, are derived from the international framework within which the Government of the Seychelles operates. The Seychelles actively participates in a number of international forums, particularly in the environmental sector. These include the CBD, CITES, the World Heritage Convention, the African Convention for the Conservation of Nature and Natural Resources, and the Lusaka Wildlife Protocol of the Southern African Development Community (SADC). While these agreements do not specifically address issues of access and benefit sharing, they do generally provide for broad conservation and management systems that indirectly govern access to particular areas or species and thereby the genetic resources within them. A number of initiatives, which are discussed later in this chapter, have been conducted to implement the state's obligations under these agreements. Of particular relevance is the completion of the Seychelles's biodiversity assessment under the auspices of UNEP and the CBD[34] and the establishment of a complex network of protected areas, divided into twelve principal categories[35] and including at least 50 percent of the surface area of the islands.

The Seychelles is less active in the international trading regime and, despite applying for membership and achieving observer status in 1995, is yet to conclude entry negotiations for the WTO. A working group on the Seychelles's entry was established in 1997 but the required reports on key legislative regimes have not been submitted and almost no progress appears to have been made. Given that the WTO system requires that application procedures be completed within five years of the granting of observer status, the current situation is unclear at best. At the national level, the prevailing attitude seems to be that membership is somehow inevitable, but there does not seem to be significant awareness of what is required or what the likely implications are and there is no current activity aimed at completing application procedures. If application procedures were completed in the near future, the Seychelles would not be able to avail itself of any grace period for the introduction of the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPs), unless it were to receive a special dispensation. This would require a radical overhaul of its legislation in intellectual property, discussed later in this section.

While, as a non-member of the WTO, TRIPs is of limited relevance to the Seychelles, the government generally endorses the African Group's positions at the WTO and, as an active party to the CBD, is particularly supportive of the position that the interpretation and implementation of TRIPs should be achieved in a manner compatible with the provisions of the CBD. Similarly, the Seychelles has stated its support for the Organization of African Unity's Model Law on Access to Genetic Resources, Community and Plant Breeder's Rights. However, except within the context of the CBD negotiations, there is no implementation of these positions at the national level, which is to be expected given the absence of intellectual property laws in the Seychelles and only limited understanding of their implications.

3.2.2 Environment

The Seychelles has a complex environmental legislative framework with over 100 acts, some almost a century old, relevant to biodiversity. Most of these are sectoral

34 NBSAP, *supra* n. 2 at 17.

35 *Id.* at 49.

and relatively self-explanatory due to their basic necessity, such as the Forest Reserves Act (1955, as amended 1959) and the Coast Reserves and Foreshore Leases Act (1907), while some are highly subject specific, such as those discussed in section 3.1 hereinabove. A major element of this body of law is legislation relating to protected areas, which is discussed in section 3.2.3 hereinbelow. A point to note is that, in line with the absence of any specific legislative or regulatory measures addressing genetic resources, none of these laws distinguish the genetic characteristics, value, or potential economic significance of any resource from its general characteristics, value, or economic significance.

In recent years, the Seychelles has been seeking to replace its older, highly fragmented, legislation with a more-harmonised, broader environmental framework, including the Environment Protection Act (1994), Environment Protection (Standard Regulations 1995), Environment Protection (Marine Parks Authority Order 1996), and the Environment Protection (Impact Assessment Regulations 1996).[36] This legislative framework is implemented through a variety of policies, in particular the Seychelles Strategy for Sustainable Development, the National Development Plan and the Environmental Management Plan for Seychelles, 1990-2000 (EMPS), the Environment Management Plan 2000-2010, the Environment Guidelines, the Forestry Sector Master Plan, and the Marine Parks Management Plans.[37] The overwhelming focus of this regime is conservation of the natural resource base and, as a consequence, more detailed issues such as the question of access to genetic resources are only referred to in the NBSAP and the new Environment Management Plan 2000-2010 but are not as yet addressed in any specific terms.[38] Restrictions on access to marine resources are governed under the Fisheries Act, which has a mandate for licensing fisheries and the establishment of fish reserves. Access to fish reserves can be limited to local communities to the exclusion of commercial fisheries. Some fisheries, in particular lobster, are controlled with short fishing periods opened per year. Endangered species protection mechanisms, primarily in line with CITES, are also in place, in particular for marine turtles and a number of bird species. A latest addition to the list is the whale shark protection legislation. All of these laws take the same basic approach of either directly limiting access and harvesting of particular species, or creating powers to impose such restrictions as and when administrative authorities may deem necessary.

Several institutions are undertaking environmental initiatives of direct relevance to access and benefit sharing at the policy level. The Ministry of Education and Culture's National Heritage Section is in the process of establishing a public medicinal plant nursery that will serve both as a direct conservation initiative but also as a means to encourage the population to integrate and propagate indigenous medicinal plants in domestic landscaping, a tradition that has declined in recent years.[39] The organisers of local environment programmes are supporting this effort by promoting public awareness of the value of medicinal plants. As discussed in section 2.1 hereinabove, information on the nature and utility of a range of medicinal plants from the archipelago has been developed under the IOC project. These projects have been developed pursuant to a domestic agenda and thus access and benefit-sharing issues have not featured in their development. At this point in time, it would appear that any foreign interest in the nurseries would have to be channelled through the SBS process, or perhaps negotiated directly with the Ministry of Education and Culture. The Ministry of Agriculture and Marine Resources is also implementing or developing initiatives of direct relevance to access to genetic resources, and these are examined in section 3.2.4 hereinbelow.

Despite the implementation of broader environmental legislation, the Seychelles has determined that its legal framework is still too complex and sectorally fragmented, creating both overlaps and loopholes. For example, the Environment Guidelines alone consist of 12 volumes. When this situation is considered in the context of limited technical capacity, the overall effectiveness of such a complex regime is questionable, something that has been a subject of debate within the Seychelles. The NBSAP highlights the government's intention to address this problem by developing a modern and flexible framework in the shape of comprehensive biodiversity legislation that will harmonise sectoral legislation and define clear responsibilities.[40] This activity was initiated in 2001, with a stakeholder workshop that generated a first working draft of the proposed umbrella legislation. The draft has now been through government review and comments, and is currently being reviewed externally. External assistance to assist in this process has not been forthcoming. The Environment Management Plan[41] will

36 *Id.* at 56-58.

37 *Id.* at 15.

38 Dulloo, *supra* n. 7 at 11.

39 NBSAP, *supra* n. 2 at 157.

40 *Id.* at 65.

41 Government of Seychelles, The Seychelles Environment Management Plan (EMPS), 2000-2010.

provide a broader context for the proposed Biodiversity Act as it contains significant biodiversity focused components[42] harmonised with a wider conservation framework.

However, although the NBSAP highlights the need for a policy addressing access to, control of, utilization and benefit sharing, and formal protocols for the export of genetic resources; these are yet to be developed in any substantive form.[43] As noted in section 2.3 hereinabove, there are still no provisions for fees, conditions, or information provision requirements associated with access and benefit sharing—there is not even a legal basis for the current ad hoc system beyond general executive authority.

3.2.3 Protected Areas

In policy terms, approaches to in situ conservation have obvious implications for access to genetic resources, providing the source of most material that can be accessed. The management of protected areas as repositories of genetic diversity is an important element in determining the modalities of access and benefit sharing. There are various aspects to in situ conservation in the Seychelles, some formal and some informal in the sense of their statutory recognition. The formal approach consists of a network of protected areas. There are 12 terrestrial protected areas covering some 50 percent of the archipelago's total land area and an extensive network of marine protected areas (MPAs).

In the Seychelles there are at least five different types of MPAs, as defined by the numerous regulations: (i) Marine National Parks (National Parks and Nature Conservancy Act (Cap 141)); (ii) Shell (Mollusc) Reserves (Fisheries Act (Cap 82)); (iii) Special Reserves (National Parks and Nature Conservancy Act (Cap 141)); (iv) Protected Areas (Protected Areas Act (Cap 185); and (v) Strict Natural Reserves (National Parks and Nature Conservancy Act (Cap 141)). Protection of certain areas of the marine environment may also take the form of exclusion zones for some types of fishing gears or fishing vessels, and may also include the entire island ecosystems. At least 14 areas are legally established as Marine Protected Areas, with a total area of 2,772 hectares, the management of which is the responsibility of six agencies. The Marine Parks Authority is responsible for six, and the Seychelles Fishing Authority is responsible for four. Nature Seychelles and the Island Conservation Society, both NGOs, manage Cousin and Aride islands, respectively, while their adjacent waters are afforded protection under the National Parks and Nature Conservancy Act (Cap 141). The Seychelles Island Foundation (SIF) manages the World Heritage sites of Aldabra Atoll and the Vallee de Mai. The management of the outstanding MPA is being reviewed with a view to improve effectiveness. Access to these islands and conservation areas is either through the payment of fees or by permission. While some islands are privately owned through trusts, the natural resources found on these islands are legally part of the natural heritage of the people of the Seychelles. In legal terms, this vests ownership and control of natural resources in the government but does not obviate the requirement for the government to consult with private landowners on the utilisation of any resources found within their property. Presently, there is no policy or body that is responsible for overseeing the sharing of any benefits arising from the use of any resources, including genetic resources, that might be identified; but it is expected that the MoE will play a leading role.

For two partially related reasons, it is not clear that this extensive network, particularly the terrestrial, is as effective in preserving the integrity of the genetic resources and managing access as one might imagine. The first is the question of enforcement and monitoring. This is problematic in marine and isolated terrestrial protected areas due to their remoteness. However, more complex problems face some of the terrestrial protected areas, in particular forests on granitic islands, as these are sometimes found within close proximity of residential areas. When the forest protected areas were established, their boundaries were not clearly demarcated and many fell alongside, or often within, the confines of private property. In terms of enforcement and monitoring, this means that controlling the illegal extraction of plants and animals is a formidable challenge, and in some cases conflicts and pressures for land have also led to encroachment on protected areas. The second problem is that, where protected areas encompass private property, the owners have, within limits established by the Town and Country Planning regulations and the Environmental Impact Assessment regulations, the legal right to develop the property, leading to frequent problems of management.

To address these problems, the government has been examining a number of options for rationalising the establishment and management of protected areas. The boundaries of two of the largest forest national parks have now been precisely demarcated and are in the process of being gazetted into law. In addition, the concept of multiple use zones was proposed during the forest sec-

42 Dulloo, *supra* n. 1.

43 *Id.*

tor study, but has yet to become a practical tool in the management of the forest parks. This concept allows for the establishment of various levels of protection within a given protected area, such as the complete exclusion of human activity ("parks within parks") in particularly sensitive areas and acceptance of some activities, such as informal wood extraction, in others depending upon their ecosystem significance or role as buffer zones. In principle, such a multiple use approach has come to be recognised as a potentially useful conservation tool in many parts of the world, but it is also recognised that it must take place within some form of agreed framework, whether developed by the local community itself or otherwise.

In addition to physical problems, there are also resource and management difficulties with the current network of protected areas, some of them not existing in any more substantive form than on paper.[44] This situation is primarily due to a lack of resources to implement wide-scale activities without compromising levels of activity in other areas. In an effort to address these problems, an effectiveness study of marine protected areas was completed by UNEP in 1999,[45] and another for the World Heritage site of Aldabra Atoll is currently being undertaken in a project between the government and IUCN. The results of these studies have revealed a number of weaknesses, primarily within the sphere of enforcement capacity as well as financial sustainability as key concerns. Cooperation with well-established NGOs and private trusts is becoming one promising means of extending the effectiveness of management to previously neglected protected areas.

The informal aspect of in situ conservation in the Seychelles is actually more of a fact of life than a strategy. For example, a large number of the remote islands in the Seychelles are uninhabited. Inevitably, the biodiversity of these islands and their surrounding marine environments have been relatively safe from human encroachment, particularly as they are currently under the management of government institutions that receive guidance from lead agencies and non-governmental bodies. However, this does not mean that these islands and their marine environments are safe from poaching, whether from the mainland or other states in the Indian Ocean. Despite their isolation, the limited areas and fragile ecosystems of these islands mean that they are also vulnerable to invasive species that threaten the viability of the genetic pool, either through space restriction or crossbreeding.[46]

While issues of ownership and pressures of development have exacerbated the problems facing the effective management of protected areas, the range of agencies involved in their management has also created difficulties. Government, the private sector, and NGOs currently manage protected areas, resulting in differing approaches that are not always consistent with national policies or objectives. This suggests the need for the negotiation of a commonly acceptable framework that can be applied by the various actors involved in managing protected areas. An effective policy for access to genetic resources, and particularly benefit sharing, would need to feature within such a framework and could potentially contribute to resolving some of the resource issues facing the protected area network.

3.2.4 Agriculture

Considering its resources and capacity, the Seychelles has a fairly well developed policy addressing ex situ conservation. At the heart of this policy is the living collection[47] based at the Grand Anse Agricultural Research Station. This is managed by the Ministry of Agriculture and Marine Resources and contains some 300 accessions, overwhelmingly consisting of tropical fruits and root crops.[48] However, of critical importance to the question of access to genetic resources, and perhaps instructive for future Seychelles policy on the matter, is the fact that the collection, despite its importance for the region, consists exclusively of introduced varieties. As such, limiting access to this collection, whether to foreigners or Seychellois, is unlikely to be constructive in its current composition. This is primarily due to the fact that the collection is not representative of the Seychelles's own agricultural diversity, something that has led to the suggestion that collection missions focused on local landraces are needed, although this has only been undertaken in a limited manner thus far, as discussed below.[49] A further handicap in the use of the Grand Anse ex situ collection in any access to genetic resources activities is that it is generally poorly documented[50] and, while a reasonable level of evaluation has been conducted, there has been almost no characterisation activity.[51] Thus, even if a significant proportion of

44 NBSAP, *supra* n. 2 at 51.

45 G. Domingue & R.A. Payet, *Status and Management of Marine Protected Areas in the Republic of Seychelles*, UNEP-ICRAN Report (1999).

46 Invasive species are considered to be a major problem throughout the archipelago, and although a government program to address this has been established, action is yet to been taken. Dulloo, *supra* n. 1.

47 There is no genebank in the Seychelles, or indeed in the Indian Ocean region, and it has been pointed out that for the Seychelles, with its limited agricultural interests and resources, it may not be a worthwhile investment. DULLOO, *supra* n. 7 at 21.

48 The collection was established in 1979/80 with the aim of supplying propagative material and to allow for evaluation rather than from any conservation motive. Dulloo, *supra* n. 1.

49 DULLOO, *supra* n. 7 at 18.

50 Dulloo, *supra* n. 1.

51 Evaluation relates to the agronomic performance of a species or variety while characterization relates to its taxonomy. These activities are undertaken by agronomists in cooperation with farmers, as there are no plant genetic resources specialists in the Seychelles. DULLOO, *supra* n. 7 at 22.

the collection were to be devoted to local varieties, its international value would be somewhat limited due to the lack of accompanying information. However, since all these existing and proposed collections are aimed primarily at domestic needs and seem to effectively serve their purpose, any decision on developing their scope and capacity for recording associated information should be based on a realistic cost-benefit analysis of the likely increase in value to the Seychelles and of their likely attraction to foreign researchers.

As an accompaniment to the Grand Anse collection, the Ministry of Agriculture is establishing a nursery for the farming sector that will conserve and propagate 34 native species for distribution to farmers.[52] This will hopefully encourage local farmers to access native species for propagation. As with the main Grand Anse collection, the domestic orientation of this activity thus far has meant that the question of access and benefit sharing has not been considered; Seychellois are provided free access and the idea of foreigners seeking access has not been considered.

A further ex situ collection is the Seychelles Botanical Gardens, which celebrated its centenary in 2001. The Botanical Gardens was originally built to harbour commercially viable species, which could be used by the agricultural community in the Seychelles. However, over time, it has become a repository of both agricultural plants as well as endemic plants of the Seychelles. To date the Botanical Gardens has no polices regarding access to and use of the genetic resources, although as a botanical garden no member of the public or visitor is allowed to touch or take cuttings from a plant.

An informal policy, or perhaps more accurately practice, of the Ministry of Agriculture has a significant impact on agriculturally related biodiversity and is related to the tendency of the majority of smallholder farmers to conserve and develop traditional varieties rather than depends on improved planting material provided by the government. This is similar to the informal seed systems found in most developing countries, with seeds being exchanged by farmers through traditional sharing practices. The Ministry of Agriculture plays an important role in facilitating this process through its extension service to farmers, as extension workers actively encourage and assist in traditional seed exchange, in contrast to the situation in many other countries. This occurs despite the fact that there is no government policy or program in this area.

A further area of agricultural legislation and policy of relevance to access and benefit sharing is that of quarantine and plant protection measures, which is relevant to the effective implementation of any access and benefit-sharing regime that might be developed in the future. Quarantine and plant protection law and policy requires that any plant material entering or leaving the Seychelles must be reported to, or certified by, the relevant authority. This has generally been well covered and implemented in the Seychelles,[53] although with some concern over enforcement,[54] possibly due to concerns of alien invasive species. However, these mechanisms have, thus far, only been concerned with phytosanitary questions.[55]

3.2.5 Intellectual Property Rights (IPRs)

There is no domestic legislation on IPRs, including plant variety protection,[56] in the Seychelles and there are currently no plans to introduce such a system.[57] The Seychelles, to the extent that it does recognise and grant IPRs, does so through the British Patent Office, as many commonwealth countries have done until recently. This means that, in theory, the British standards apply. The theoretical element is that this mechanism exists but is rarely, if ever, used, and many people are unaware of its existence. Given that most potential applicants for access to genetic resources interested in applying for intellectual property rights over the resources they access would not be concerned about the validity of their rights in the Seychelles, due to the limited market and manufacturing or research and development capacity, the local IPR regime is unlikely to be influenced by access and benefit sharing activity. The British standards broadly reflect the standards of TRIPs and allow for the patenting of most genetic resources, although with limited restrictions on the patenting of entire plants and animals. There has not been major pressure, whether bilateral or multilateral, for the development of domestic IPR legislation and this seems unlikely in the immediate future. Should the Seychelles join the WTO, this would certainly change, and there is also the possibility that domestic concern over the possible foreign patenting of genetic resources originating in the Seychelles could lead to pressure for domestic IPRs as a possible defensive mechanism.

Similarly, there are no current laws, regulations, or policies addressing the rights of indigenous peoples or local communities relating to genetic resources or associated knowledge. The Seychelles was uninhabited in pre-

52 NBSAP, *supra* n. 2 at 183.

53 Dulloo, *supra* n. 7 at 12.

54 Dulloo, *supra* n. 1.

55 Dulloo, *supra* n. 7 at 12.

56 *Id.* at 13.

57 Dulloo, *supra* n. 1.

colonial times, and thus there are no issues relating to indigenous communities. However, as illustrated by the IOC medicinal plant project, there is a body of traditional medicinal and other knowledge that may be of interest to academic or commercially oriented researchers. This has prompted some interest in government and NGO circles in issues such as the protection of traditional medicinal knowledge and to a lesser extent, due to the circumstances of local agriculture, the recognition of Farmers' Rights.[58] There are no current measures to accommodate these concerns.

3.3 Legislation and Policies with Potential Relevance to Access and Benefit Sharing

Since independence in 1976, Seychelles has had three constitutions. Article 38 of the current Constitution states, besides other fundamental human rights, that:

> The State recognizes the right of every person to live in and enjoy a clean, healthy and ecologically balanced environment and with a view to ensuring the effective realisation of this right the State undertakes. . .
>
> (b) to ensure a sustainable socio-economic development of Seychelles by a judicious use and management of the resources of Seychelles.

The chapeau of this provision has some potential to be interpreted as relevant to the nature of any access and benefit sharing regime that might be developed due to its recognition that the state should uphold minimum conservation standards in its implementation of any environmentally related activity. Sub-section (b) has a clearer potential relevance in that international experience to date suggests that access to genetic resources and benefit sharing regimes can contribute to economic development, both through the direct provision of funds and through the indirect provision of scientific capacity. It could be argued that this option should be explored for the government to fulfil its obligation to "judiciously use" the resources of the Seychelles. Land ownership is also addressed in the Constitution, but this does not have the same implications as it does in other common law countries as the common law default position that resources associated with a piece of land—the "fruit" of the land—are integral to it is overridden by specific provisions addressing the control of the natural heritage of the Seychelles by the government on behalf of the people as a whole. It seems highly likely that genetic resources would be interpreted as part of the natural heritage of the Seychelles should the question arise, and thus rights to access to and benefit from them would fall under these provisions.

3.4 New Initiatives and Policy Discourse

3.4.1 New Initiatives

There are several new initiatives and issues affecting access to genetic resources in the Seychelles at the national, regional, and international levels. At the regional level, these are principally within the context of the IOC. The IOC is made up of the four countries of the region—Comoros, Madagascar, Mauritius, and the Seychelles—as well as the French Department of Reunion. As mentioned in section 2.1 above, the IOC has been active in the identification and collection of medicinal plants. It has also initiated the Indian Ocean Regional Environment Project, which has collated information regarding endangered plants in the region,[59] information that could be useful to potential applicants for access to genetic resources. The motivation for the collation of this information is also relevant as it is intended to contribute to the conservation of these endangered plants; conservation is an important element of most access to genetic resources policies, since it aims to ensure species continue to exist.

At an institutional level, the fact that the MoE has a vast mandate and was only promoted from a department in 1997, leaving its resources and capacity heavily overstretched,[60] suggests that it is likely to play an increasingly active role in access and benefit-sharing issues as its capacity develops. The primary reasons for this are that the majority of issues relating to access to genetic resources, at least in terms of the conservation and monitoring of these resources, fall within its mandate and it is generally perceived as having a more appropriate role and capacity than SBS, which currently manages all foreign scientific research in the Seychelles. In particular the MoE's authority over the Conservation and National Parks (CNP) section, which in the mid-1990s developed a database on the natural distribution of endemic and threatened species in the granitic islands,[61] may prove to be important for any regime governing genetic resources.

As an active party to the CBD and member of the FAO CGRFA, both the ongoing discussions under arti-

58 Dulloo, *supra* n. 7 at 13.

59 *Id.* at 14.

60 NBSAP, *supra* n. 2 at 55-56.

61 Dulloo, *supra* n. 1.

cle 15 of the CBD and the adoption of the ITPGR are likely to have profound effects on the country's policies. The FAO Treaty is likely to prove to be of particular importance to the Seychelles due to the country's almost total dependence on foreign germplasm for agriculture. This is particularly true because of the Seychelles relationship with the CGIAR centres and their stated intention to submit their collections to the authority of the treaty upon its entry into force.

Potentially the most significant new initiative is the ongoing process of developing a legislative regime specifically addressing access to plant genetic resources in the Seychelles. This project was initiated by the Ministry of Agriculture and Marine Resources, which, in January 2001, requested the technical assistance of FAO's Development Law Division to develop specific legislation on access to plant genetic resources.[62] Despite the focus on plant genetic resources, the two reports prepared under this activity have both highlighted the desirability and feasibility of amending the proposed draft law to address all genetic resources. To date these reports are still being analysed by the Government of the Seychelles and are thus confidential, but it is understood that the proposed regulatory system is similar to those introduced in other countries. Particular features are likely to include:

- clear minimum requirements for the submission of background information and project proposals by applicants for access;
- a permit-based system;
- requirements for the prior informed consent of the Government of the Seychelles and any affected communities;
- a distinction between academic and commercial activities, the former requiring a statutory declaration limiting the applicant's rights and ownership of any resource or derivative thereof, and the latter requiring the completion of case-by-case material transfer agreements as contracts governing access; and
- specific provisions regarding benefit sharing.

3.4.2 Policy Discourse

The primary interest in the introduction of an access and benefit-sharing regime in the Seychelles revolves around two key motivations. The first is a continuation of the Seychelles's long history of concern for the maintenance of its natural resource base. There are two aspects to this. First, the government is concerned about the unknown, but widely believed to be significant, levels of undeclared or illegal extraction of resources. At the heart of this concern is the fear that the uncontrolled exploitation of threatened species, which can occur with unregulated access to genetic resources, has contributed and will continue to contribute to the decline of these species.[63] Traditionally, this has primarily involved terrestrial species, such as medicinal plants, and a limited number of high-profile marine species, such as turtles, but increased understanding of the range of interest of potential bioprospectors is extending the range of concern to other species, in particular marine microorganisms.

The second aspect of the government's interest in access and benefit sharing in relation to conservation ties into its second motivation for the introduction of a regulatory regime: economic potential. It is widely believed that potential economic benefits are being lost due to the absence of a regulatory regime. In the context of conservation, this is significant as one of the main problems facing the existing conservation system is limited resources. If the regulation of access and benefit sharing activities can add, even in a minor way, to the resources available for maintaining the protected area network and other aspects of the Seychelles conservation policy, this could be an important impetus to its introduction. The economic factor is also viewed in terms of equity: the absence of an access and benefit sharing regulatory regime appears to allow unscrupulous actors to unjustly enrich themselves on the basis, and often at the expense, of the natural heritage of the people of the Seychelles. However, it should be noted that, although some interest in promoting bioprospecting has been expressed, there is no explicit policy to achieve this and the government, in particular the MoE, has been concerned about the bioprospecting activities in the absence of a specific legal regime. In addition, there is some concern over the lack of an international framework that would guarantee user measures.[64] The combination of these concerns, and the belief that the adoption of the Bonn Guidelines is the first step to the adoption of a binding protocol on access and benefit sharing under the CBD, has led some government officials to advocate a moratorium on all access to genetic resources pending the introduction of effective local and international legal regimes.

The reasons underlying this discourse primarily rest on the high levels of endemism found in the islands.

62 Further information on this and other similar projects can be obtained from Lawrence Christy or Marta Pardo Leal at FAO: lawrence.christy@fao.org, marta.pardo@fao.org.

63 NBSAP, *supra* n. 2 at 59.

The discussion has been sufficiently sophisticated that it has, albeit implicitly rather than expressly, recognised that there are fundamentally different situations that require varying approaches in different sectors. The issue of endemism is particularly important with regards to marine resources as it is believed that these resources may be of great interest to foreign researchers and at the same time marine organisms are of increasing interest to the modern biotechnology industry. However, neither the government nor potential bioprospectors are aware of the potential of the Seychelles to contribute anything significant in terms of genetic resources. The current system for marketing coco-de-mer, although it does not necessarily fit some understandings of access to genetic resources, illustrates the difficulties in realising true economic value, particularly when conservation imperatives are considered in the equation. Globally, coco-de-mer is found on only two islands in the Seychelles and this endemism, combined with the unusual character of the nut, means that it is highly prized by many tourists. Despite this situation, coco-de-mer is not sold under auction, but at a fixed price far lower than its likely market value based on demand. The reasoning for the low fixed prices is not publicly stated, but it is reported to be linked to the risks of poaching: should the price be higher, then the motivation for poaching will increase. Some traders have reported selling the nut for up to four times the high street value.

With a few minor exceptions, such as vanilla,[65] the Seychelles does not possess any known species of identified significance for agriculture or industry, and the food crops and plants of local industrial value have been introduced mostly within the last 150 years.[66] At least six endemic tree species have been historically important for their properties as timber, but their populations are now so small that sustainable harvesting is not an option.[67] This situation has two consequences for the future. The first is that even new discoveries in the agricultural and industrial sectors are unlikely to alter the Seychelles overall dependence on foreign germplasm for its basic needs in agriculture and industry. The second is that, while the unique environment of the Seychelles may prove to be a valuable asset in terms of bioprospecting, its value is unknown, and thus any significant investment in the sector will involve some risk.

The situation with medicinal plants is very different with considerable evidence of numerous species that may have pharmaceutical potential. At least 75 plants have been recorded as being used medicinally in the Seychelles, the majority of which are endemic to the region.[68] However, for this potential to be realised there is a need for studies of these plants, particularly with regard to toxicology and propagation but also examining the marketing possibilities for medicinals and aromatics.[69] The potential for marketing some forest species as ornamentals has also been noted.[70] Given the relatively undocumented status and high level of endemism of biodiversity in the Seychelles, there may well be some potential for new discoveries and ecotourism, but the actual financial flows that could be expected are unknown and highly speculative.

IV. CONCLUSIONS

The current dynamic regarding genetic resources in the Seychelles is driven by practical necessities, which are frequently unique to the situation of a small island state, and largely consist of ad hoc responses to these necessities. A significant factor is the nature of the Seychelles's economy. With a relatively high per capita GDP, the government can afford to concentrate on fairly long-term planning and strategic thinking rather than on any immediate need to address problems such as poverty and food security that other African countries face. However, the fact that the small population creates a relatively limited total economy means that the government is unable to deploy significant resources to some sectors that other countries, even those which are significantly poorer in per capita terms, might be able to mobilize. The small population also creates another problem, that of a limited skills base that can be deployed to implement policies, the lack of specialist training being identified as an issue to be addressed in the NBSAP. Specialist scientific and legal skills—to assess the potential value of resources and the impacts of resource extraction or use and to implement policies—are of particular relevance here. The skills base problem is mitigated to some degree by what appears to be a relatively rational use of the expertise that is available, thereby maximising its utility. Consistency in appointments and duties, allowing for informal skills development through experience, a major element of this, may be encouraged by the relatively stable political landscape. In terms of human resources, the situation

64 The concept that user countries should ensure compliance with the policies and legislation of countries of origin when engaged in access to genetic resources and benefit sharing, as has been discussed in the Conference of the Parties to the CBD and other international forums.

65 FAO, *supra* n. 31at 7.

66 *Id.* at 5.

67 ICPPGR, *supra* n. 1 at 4. Of course this should not discount their potential value to biotechnology at some point in the future.

68 FAO, *supra* n. 31 at 9.

69 *Id.* at 28-29.

70 Dulloo, *supra* n. 1.

suggests that emphasis might usefully be placed on regional cooperation and capacity development, both in terms of policy implementation and benefit-sharing strategies. It might well be possible to secund or exchange skills with other Indian Ocean states where the Seychelles is not able to viably develop them internally.

The key problem to be addressed for the development of an effective access and benefit sharing policy is the fact that most governmental agencies are already overwhelmed by the scope of their tasks relative to the resources available for implementation. A good example of this problem is the situation with protected areas, where many of the numerous areas are not covered by effective regulations or management plans, and, even were these regulations or plans to be developed, capacity for enforcement is insufficient. The creative approaches that the Seychelles has developed to address this problem in the context of protected areas, such as the co-opting of NGOs and private foundations and the use of spot checks rather than blanket management, may prove instructive in the implementation of an effective access and benefit-sharing regime. At a minimum, it is clear that the Seychelles will need to develop a very flexible and minimally bureaucratic system, ideally building on existing institutions such as the MoE and Ministry of Agriculture and Marine Resources with their existing capacity in in situ and ex situ conservation and quarantine controls.

The current legal framework also presents a formidable problem in the development of an effective access and benefit-sharing regime. The current multiplicity of laws and decrees that are of relevance to ABS, often through no more than the establishment of basic management mandates, with none that specifically address the issue makes it easy for those who wish to evade controls and conditions to do so. In the current situation, an applicant can always approach a lead agency with limited capacity and a broad mandate for assistance or authorisation, or find some other form of loophole resulting from a lack of consistent coordination and policy harmonisation among lead agencies. This problem is particularly acute given that the primary generic research authorisation process, that of SBS, has no legal basis. The lack of a clear policy on ABS may also inhibit those who wish to uphold the principles and standards iterated by the CBD and its Bonn Guidelines, as it is difficult for them to assess what is expected or required of them in areas such as information provision or benefit sharing. The development and implementation of the proposed Biodiversity Act will contribute to resolving this problem to some degree, in that it introduces a rationalised division of responsibilities and more harmonised policies through its umbrella provisions. However, this act is unlikely to provide an adequate substitute for more detailed regulatory provisions specifically addressing responsible authorities and key conditions for access to genetic resources and benefit sharing.

In terms of the nature of any access and benefit sharing that it may develop, the Seychelles has a key advantage in that it has been relatively effective in identifying its policy interests and priorities. Conservation appears to be the primary concern of the Seychelles. This has two aspects. The first and dominant aspect is that of concern over the degradation of species and habitats resulting from unauthorised access to genetic resources and poaching more generally. This concern suggests the need for a relatively restrictive access regime, although the limited enforcement capacity of the government means that this should not be so restrictive as to encourage illegal activity, as illustrated by the situation with coco-demer. The second aspect of the Seychelles's concern over conservation is the issue of the limited resources available to achieve the government's objectives. This reinforces the idea that any access and benefit-sharing regime should not be overly restrictive. If the Seychelles is to capture any benefits, whether in-kind or financial, from benefit sharing that may assist in addressing its resource limitations then it will need to create a policy context that is conducive to "high quality" access and benefit-sharing activities,[71] which in most cases means for the private sector. However, it should be noted that useful benefits come in different shapes and sizes. Even the relatively limited research of a PhD student may provide information on the nature and functioning of a particular species or ecosystem that might be useful in its conservation or in securing a future commercial agreement should a valuable industrial application be identified for a genetic resource.

In the agricultural sector there is a strong emphasis on local use of resources, deriving from the government's desire to minimise food imports in certain sectors, primarily fruit and vegetables but also to some degree small livestock. As a consequence, the main access and benefit sharing interest is to ensure maximum access to foreign germplasm and animal breeds to allow for the development of locally appropriate varieties and breeds. In the field of plant genetic resources, this need could be met by membership of the ITPRG, as and when that treaty enters into force and becomes operative.

71 "High quality" activities in two senses: first, those with partners that have a role and prominence that will discourage them from openly violating the terms of an express agreement; and, second, those that have the potential to generate more than token levels of financial and in kind benefits.

With regard to the pharmaceutical and industrial sectors, there appears to be only limited priority attached to the concept of access and benefit sharing as primarily a commercial or resource-generating activity, which may be realistic given the levels of benefits generated in other countries to date. This would suggest the feasibility of a fairly restrictive regime designed purely to achieve the protection of ecosystem integrity. However, as discussed earlier, the desire to support conservation goals and to avoid encouraging illegal activities still points to the fact that an overly restrictive regime might be counterproductive.

CHAPTER 16
ACCESS TO GENETIC RESOURCES IN SOUTH AFRICA†

Michael Kidd & Mariam Mayet***

1. BACKGROUND

South Africa is one of the most biological diverse countries in the world. It contains between 250,000 and 1,000,000 species, with a high level of endemism. The country has extraordinary plant richness, with 18,000 vascular plant species found within South Africa, of which 80 percent occur nowhere else. It is the only country on Earth to have within its national confines an entire plant kingdom, one of just six in the world, known as the Cape Floral Kingdom. This area has the highest recorded species diversity for any similar sized temperate or tropical region in the world. It also has a wealth of life forms, hosting 5.8 percent of the world's total mammal species, 8 percent of bird species, 4.6 percent of the global diversity of reptile species, 16 percent of the total number of marine fish species in the world, and 5.5 percent of the world's insect species. Its marine life is similarly diverse: it has three water masses —the cold Benguela current, the warm Agulhas current, and oceanic water—making it among the most oceanographically heterogeneous in the world. Over 10,000 plant and animal species, almost 15 percent of the coastal species known worldwide, are found in South African waters, with about 12 percent occurring nowhere else.[1]

It is not surprising, therefore, that South Africa is a favoured destination for "biodiversity prospecting" companies seeking potential new crops and novel biochemical molecules with medicinal, agricultural, horticultural, environmental, or other economic potential.

South Africa is a country characterised by a wide income gap between rich and poor (one of the most pronounced in the world) and widespread unemployment and accompanying poverty. One of the main aims of the government, which came to power initially in 1994 after the country's first democratic elections, is to address issues relating to development and upliftment of the poor. Consequently, one might expect to see environmental concerns playing second fiddle to what are perceived as more pressing needs, such as development, employment, provision of housing, health, and so on. Although this is probably the case in reality, the government has, since 1994, made remarkable strides in developing environmental policies and laws that, at least on paper, pursue the aims of sustainable development. The environment is certainly an issue that has not been displaced from the government's agenda, even though it may sometimes be somewhat overshadowed by other concerns. Some of this new environmental legislation is discussed further below.

For these reasons, it is imperative that the country has a strong policy implemented by effective legislation in order to manage access to and use of genetic resources as well as benefit sharing. This chapter will show that, although promising progress has been made, including the development of the National Environmental Management: Biodiversity Bill that explicitly addresses access to resources and benefit sharing, there is some way to go before this position is reached.

1.1 Bioprospecting Initiatives and the Process to Obtain Access to Biological Resources

Bioprospecting Initiatives by the Government

Bioprospecting initiatives have usually been carried out by government agencies such as research institutes that are publicly funded. These include parastatals such as the Agricultural Research Council and the Council for Scientific and Industrial Research (CSIR), universities, and other institutes. Where these bioprospecting activities have not been done in collaboration with the private sector, they have almost always been limited to research activities. These are occurring all the time, and hundreds

† The authors are grateful to Sandra Clelland, a patent attorney from Johannesburg, for advice on the intellectual property issues covered by this chapter.

** Professor of Law at the University of Natal.*

*** Advisor to Greenpeace International.*

[1] *White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity*, GN 1095, in *GG* 18163 of July 28, 1998, sec. 1.2.1.

of collections take place monthly for research purposes. The extent of this is difficult to quantify, as it is unlikely that any records are kept provincially. No national records are kept of bioprospecting activities undertaken by or on behalf of the government. Collections by researchers employed by government departments, such as scientists working for nature conservation authorities, may also be taking place. Precise details of such activities are not possible to check for certain, because there is no legal requirement to maintain registers or details of collections.

Institutes such as the CSIR also bioprospect for commercial purposes, as in the case of the Hoodia plant, a succulent plant indigenous to Southern Africa and long used by the San people to stave off hunger and thirst. This appetite suppressant is considered to have the potential to become the first major drug to be derived from an African plant and commercialised into a prescription. A licensing agreement for the further development and commercialisation of the product has been signed by the CSIR and Phytopharm, which specialises in the development of phytomedicines.[2]

Bioprospecting Initiatives by Non-Governmental Organizations

An example of this is the collaboration between Rhodes University and the National Cancer Institute in the United States. An agreement exists between these two institutions for a joint programme to investigate coastal and marine macro-organisms and algae from South Africa for their potential as anti-cancer agents. Initial collections have already taken place in Algoa Bay with scientists from the U.S. Coral Reef Research Foundation and the University of Port Elizabeth. Later collections and identifications will additionally include the East London Museum and possibly other research institutions working on developing marine natural products.[3]

Bioprospecting Initiatives by the Private Sector

The best example of this is the controversial agreement entered into by the National Botanical Institute (NBI) and the Ball Horticultural Company, an international horticulture and floriculture company. The agreement is the first North-South bioprospecting agreement in the horticulture-floriculture sector.[4] In terms of the contract, briefly, Ball is granted the right to market and distribute plants collected by the NBI (initially, up to 25 species at any one time). The NBI and South Africa will derive benefits from royalties paid by Ball and remuneration derived from intellectual property rights, marketing of the NBI's Kirstenbosch logo, and the stimulation of economic growth and technology empowerment in South Africa, especially among members of previously disadvantaged communities.[5]

There has been controversy over the agreement, one of the main criticisms being the lack of transparency. There is concern over the limited extent to which the public, even those most affected by the agreement, were consulted. The government has maintained that the process was transparent, but several doubts remain. Another problem is the assertion that "the agreement does not strongly commit Ball to invest directly in technology transfer and product development within South Africa."[6] Apparently, the agreement, in rather weak language, requires Ball to give "special consideration" to investing in the local development and growing of products "wherever appropriate and feasible."

Among the lessons that can be learned from this agreement and that involving the Hoodia, referred to above, is that comprehensive legislation dealing with bioprospecting could remove many of the problems experienced in these transactions. In particular, the government needs to give careful attention to issues such as the minimisation of transaction costs involved in bioprospecting agreements and the remuneration of local communities. The National Environmental Management: Biodiversity Bill,[7] once enacted, may address these and other issues.

As far as the intellectual property aspects of the NBI-Ball agreement are concerned, Ball is granted an exclusive license to commercialise plant material provided by the NBI and is entitled to obtain a patent or Plant Breeders' Right certificate on superior products developed. Ball will pay royalties on "successful products" to the NBI, the proportion of which will vary according to the extent of breeding and technology used to develop the plant. It is not known exactly what meaning should be given to the phrase "successful product" or how it is to be determined.

In terms of the agreement, the NBI will essentially use its expertise to select South African plants of horticultural interest to Ball from its living collections and from the wild. Ball will obtain either plant breeders' rights or patent protection for any selected or hybridised varieties of the plants, and the NBI will receive a per-

2 Rachel Wynberg, *Privatising the Means of Survival: The Commercialisation of Africa's Biodiversity, in* GLOBAL BIODIVERSITY IN CONFLICT 3-4 (2000).

3 *Id.* at 5.

4 Gudrun Henne & Saliem Fakir, *Blind Leap of Faith*, AFRICAN WILDLIFE, July/Aug. 2001, at 12.

5 *Id.* at 13.

6 *Id.*

7 The bill is discussed in detail below in section 3.3.

centage of the profits for 20 years following each plant's introduction to the market. What this percentage is, and how it is to be utilised, is presently not general knowledge in South Africa outside NBI circles. In return, Ball has been handed the right to develop and patent any South African plant except trees, woody shrubs, and succulents unless these (i.e., particular trees, woody shrubs, or succulents) are specifically requested by Ball.

1.2 Assessment of Country's Potential Value as a Center for Bioprospecting

Although South Africa's richness in species biodiversity would suggest that the country would be a valuable center of bioprospecting, there have been no formal assessments of this potential value.

2. INSTITUTIONS

2.1 Government Agencies

South Africa does not currently have legislation in force directly regulating access and benefit sharing, however other aspects of management of biological resources are subject to several laws. The institutional framework within which South Africa's biological resources are controlled and managed is somewhat fragmented. The following table sets forth the administrative authorities that share this responsibility and the legislation which they are charged with implementing.[8]

The institutional context is exacerbated by the fact that several of the provincial bodies are still in a transition process caused by the necessity to integrate more than one nature conservation body. For example, in the Eastern Cape, once the province was created by the new Constitution, elements of the erstwhile Cape Province nature conservation body had to merge with the conservation bodies from the Transkei and the Ciskei. Similar contexts exist in several other provinces.

The lead agent for management of biological resources throughout the Republic is, theoretically, the Department of Environmental Affairs and Tourism (DEAT). The White Paper on Environmental Management Policy for South Africa[9] states that DEAT is the lead agent for environmental management and is "custodian of the nation's environment and must ensure that people's environmental rights are enforced."[10] The White Paper on the Conservation and Sustainable Use of Biodiversity describes DEAT as the "champion of biodiversity,"[11] but recognises the important roles that several national departments (for example, Agriculture, Health, Trade and Industry, and Arts, Culture, Science and Technology), as well as provincial and local governments, have to play in achieving the aims of the biodiversity policy. This means that both sectoral and geographical responsibilities will be shared (provincially, for example), depending on the institution. According to the White Paper,

> As the institution charged with administering the Convention on Biological Diversity, the Department of Environmental Affairs and Tourism will play a strong leadership role in ensuring that the provisions of this policy are implemented effectively. Through its Environmental Management and Sea Fisheries Chief Directorates, the Department is already actively engaged in implementing many of the provisions required by the Convention [on Biological Diversity]. New actions articulated by this policy will, however, require

ADMINISTRATIVE AUTHORITY	RELEVANT LEGISLATION
Provincial nature conservation institutions	Provincial nature conservation legislation
Department of Water Affairs and Forestry	National Forests Act
Department of Agriculture	Plant Breeders' Rights Act
Department of Agriculture	Plant Improvement Act and Animal Improvement Act
Department of Environmental Affairs and Tourism	National Environmental Management Act National Environmental Management: Biodiversity Bill (once enacted)
National Botanical Institute	Forest Act (National Botanical Gardens)

8 National departments unless stipulated otherwise.

9 GN 1096 in GG 18164 of 28 July 1997.

10 *Id.* at 43.

11 *Id.*; *supra* n. 1, sec. 4.2.1.

> the Department to be strengthened, existing priorities to be realigned, and new and additional financial resources to be committed to and by the Department.[12]

As far as the regulation of access to genetic resources is concerned, however, DEAT's lead agent role, in putting into effect the country's responsibilities in terms of articles 15, 18, and 19 of the Convention on Biological Diversity (CBD), has yet to be realised from a strictly legal perspective. The provisions of the National Environmental Management: Biodiversity Bill envisage a controlling role for DEAT, through the minister, in the permitting process in relation to bioprospecting, access, and benefit sharing, although provision is made for other organs of state potentially to carry out this function as well, in terms of regulation made by the minister.

Although not required by existing law, DEAT has been playing an overseeing or monitoring role in the conclusion of benefit sharing agreements where these have been concluded (for example, the NBI-Ball Agreement[13]). In this matter, DEAT also played a role in facilitating governmental discussion and debate between the relevant national and provincial government departments.

Although in theory there is one lead agent, the responsibilities of various government departments at different levels (national, provincial, and local) involve management of biodiversity. Indeed, this is provided for by the Constitution.[14] The potential for overlap of mandates therefore exists (for example, with the Department of Agriculture, especially in cases where the circumstances pertain to that sector), although no proper legislative or institutional audit has been conducted to ascertain whether and to what extent duplications, overlaps, or conflicts exist on the question of access to genetic resources. This is probably a necessary prerequisite for the drafting of comprehensive and implementable national uniform legislation. It is really the absence of such a regulatory framework, rather than overlaps in authority, that is currently the more important problem facing South Africa. Although the absence of a regulatory framework is being addressed, the question of overlapping mandates has not, it is submitted, been adequately canvassed in the policy development process.

The new bill provides expressly for the (national) DEAT, through the minister with the assistance of the National Biodiversity Institute, to manage access and benefit-sharing. Since the Constitution provides for concurrent national and provincial jurisdiction on natural resource matters, there is the possibility for conflict in the event that a province enacts legislation dealing with this issue. The Constitution does provide for dispute resolution mechanisms, either through negotiation in the spirit of co-operative governance or, legally, by means of the provisions of section 146 of the Constitution.

It is likely that, if any such conflict arises, the national legislation would prevail, since the government could argue that the national legislation is necessary for the protection of the environment and that the regulation of access and benefit sharing is something that cannot be adequately regulated by the provinces acting separately. These are factors that determine whether national legislation prevails over provincial.[15]

2.2 International Institutions

The role played by international institutions in controlling or influencing access to, control or utilisation of, and benefit sharing with respect to genetic resources is difficult to assess or quantify in South Africa. This is particularly so given the absence of a dedicated and coherent regulatory and institutional framework governing access to genetic resources. The new (post-1994) government has taken the admirable approach of consulting widely in drawing up new policy and in the creation of new legislation. The government would, consequently, be open to suggestions made by intergovernmental organisations, such as the Consultative Group on International Agricultural Research and the United Nations, but it would not be possible to assess, nor wise to speculate, as to the extent of the influence that such bodies have on government thinking.

3. LAWS AND POLICIES

3.1 Laws and Policies Specifically Governing Access and Benefit Sharing

There are no provisions in the Constitution that expressly relate to ownership of, or access to, genetic resources. As far as national legislation is concerned, there is currently no legislation specifically addressing ownership of, access to, and benefit sharing regarding genetic resources, although the new bill will address these issues.

The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity[16] is

12 *Id.*

13 *See supra* sec. 1

14 Schedule 4. *See infra* sec. 3.2.

15 Constitution of the Republic of South Africa, sec. 146.

16 *Supra* n. 1.

South Africa's policy response to the CBD.[17] The document sets out the guiding principles for the country's biodiversity policy and strategy, including that all life forms have intrinsic value and that people have a duty of care to conserve and avoid negative impacts on biodiversity, and to use biological resources sustainably, equitably, and efficiently.[18]

The White Paper's biodiversity policy and strategy is divided into six goals. These are to:

1. Conserve South Africa's biodiversity;
2. Use biological resources sustainably and minimise adverse impacts on biodiversity;
3. Ensure that benefits derived from the use and development of South Africa's genetic resources serve national interests;
4. Expand the human capacity to conserve biodiversity, to manage its use, and to address factors threatening it;
5. Create and implement conditions and incentives that support the conservation and sustainable use of biodiversity; and
6. Promote the conservation and sustainable use of biodiversity at the international level.[19]

In order to implement these policy objectives, as well as to give effect to other international conventions dealing with biodiversity (CITES, Ramsar, and the Bonn Convention on Migratory Species in particular), the National Department of Environmental Affairs and Tourism has embarked on a process to introduce a National Biodiversity Act.[20] The process began in the second half of 2000, and the bill is now shortly to be presented to Parliament. There is still the possibility that the bill (discussed in detail below)[21] could be changed before it is enacted, but any changes are unlikely to be substantial.

Although there is not currently a regulatory system in place, there is a policy on biodiversity that deals explicitly with access to genetic resources. Government policy (embodied in the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity), is that genetic resources provide valuable opportunities for the nation to enhance the benefits from its vast biological wealth through, inter alia, research and commercialisation of genetic resources. This is subject to the proviso that there is proper control over its genetic resources through the introduction of appropriate legislation and the establishment of institutional structures which ensure that benefits arising from the use and development of such resources serve the national good (for example, the stimulation of economic activity).[22]

3.1.1 Laws, Regulations, and Policies Specifically Governing Access to Genetic Resources and Benefit Sharing

Plant Breeders' Rights Act No. 15 of 1976

The purpose of the Plant Breeders' Rights Act No. 15 of 1976 is to provide for a system for the granting and registration of plant breeders' rights relating to varieties of certain kinds of plants and for the requirements that have to be complied with for the grant of such rights. It also regulates the protection of such rights and the grant of licences in respect of the exercise of the rights. This act gives effect to South Africa's obligations under the UPOV Convention.[23] The criteria for a variety of plant to be granted a right are set out in section 2, as follows:

> (1) This Act shall apply in relation to every variety of any prescribed kind of plant if it is new, distinct, uniform and stable.
>
> (2) A variety referred to in subsection (1) shall be deemed to be—
>
> (a) new if propagating material or harvested material thereof has not been sold or otherwise disposed of by, or with the consent of, the breeder for purposes of exploitation of the variety—
>
> (i)in the Republic, not more than one year; and
>
> (ii) in a convention country or an agreement country, in the case of-
>
> (aa) varieties of vines and trees, not more than six years; or
>
> (bb) other varieties, not more than four years, prior to the date of filing of the application for a plant breeder's right;
>
> (b) distinct if, at the date of filing of the application for a plant breeder's right, it is clearly distinguishable from any other variety of the same kind of plant of which the existence on that date is a matter of common knowledge;
>
> (c) uniform if, subject to the variation that may be expected from the particular features of the

17 *Id.* at sec. 1.1.2.

18 *Id.* at sec. 2.4.

19 *Id.* at ch. 3.

20 The bill is named the National Environmental Management: Biodiversity Bill.

21 Sec. 3.3.

22 *See generally* Goal 3 in the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity.

23 International Union for the Protection of New Varieties of Plants, 1961.

> propagation thereof, it is sufficiently uniform with regard to the characteristics of the variety in question;
> (d) stable if the characteristics thereof remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.

Under the act, the minister designates an official as the Registrar of Plant Breeders' Rights. This person serves as the administrative official in charge of administering the functions under the act. The breeder of a new variety of plant may apply for plant breeders' rights[24] and if successful the registrar may issue a protective direction.[25] The effect of this is that, while a protective direction is in force, the variety in respect of which it was issued shall be protected as if a plant breeder's right had been granted in respect thereof, and anything that would constitute an infringement of a plant breeder's right or would be actionable in proceedings by the holder of such right, shall, if it is done with reference to a variety so protected, be actionable.[26] If the registrar is of the opinion, inter alia, that the variety is a new variety, the right shall be granted.[27]

In short, the effect of the granting of such a right is that prior authority must be obtained from the owner of the plant breeders' right by any person intending to undertake the production, sale, import into, or export from South Africa for propagating material of the relevant new variety.[28]

Plant Improvement Act No. 53 of 1976

The Plant Improvement Act No. 53 of 1976 provides for the registration of establishments from which the sale of certain plants or the cleansing, packing, and sale of certain propagating material may be undertaken. The act prescribes the conditions under which such plants or propagating material may be sold for the purposes of cultivation. It also provides for the recognition of certain varieties of plants, for a system of certification of plants and propagating material (with the object of maintaining the quality of certain plants and propagating material), and ensures the usefulness of the products thereof for agricultural and industrial purposes. Finally, the act controls the import and export of certain plants and propagating material. The plants to which the act applies appear to be primarily commercial food crops, grasses, and grains.

24 Plant Breeders' Rights Act 15 of 1976, sec. 6.

25 *Id.* at sec. 14.

26 *Id.* at sec. 15.

27 *Id.* at sec. 20.

28 *Id.* at sec. 23.

3.1.2 Draft Laws, Regulations, and Policies

The White Paper on Conservation and Sustainable Use of Biological Diversity addresses access and benefit-sharing, and this policy document has been followed by the development of the National Environmental Management: Biodiversity Bill. Both the White Paper and the new bill are discussed in section 3.3 on "New Initiatives" below.

3.1.3 International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

Although South Africa did participate in the negotiations towards this treaty, the country has not yet signed the treaty.

3.2 Laws and Policies with Relevance to Access and Benefit Sharing

Currently, there is no legislation directly addressing issues of access to and use of biological resources, but this will change with the enactment of the new bill (discussed below). There are, however, several existing enactments and common law principles relevant to biological resources in general. We will deal with each in turn.[29]

The property clause in the Bill of Rights in South Africa's Constitution is potentially relevant to genetic resources. The clause provides that no one may be deprived of property except by a law of general application, and no law may permit arbitrary deprivation of property.[30] In addition, property may be expropriated only through law of general application for a public purpose or in the public interest, and is subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or approved by a court.[31]

The significance of this clause is apparent when considering the common law position with respect to ownership of property. Under South African common law, the owner of land owns everything beneath and above the land. This means that plants attached to the land belong to the owner of that land. Wild animals, however, are regarded as res nullius (owned by nobody) and ownership of these can be acquired through the exercise

29 Framework legislation such as the Environment Conservation Act No. 73 of 1989 and the National Environmental Management Act No. 107 of 1998 will not be discussed here. Although they are relevant to environmental management and biological resources, they contain no provisions, other than general principles, that are directly relevant to access to or protection of biological resources. There is no distinction at all drawn between scientific and commercial research. NEMA contains "national environmental management principles" which have to be taken into account by any organ of state in carrying out any action or taking any decision affecting the environment. So this could affect access to resources in a general way.

30 Constitution, sec. 25(1).

31 *Id.* at sec. 25(2).

of effective control with the intention to become owner. Ownership is lost, however, once effective physical control is lost.[32]

Given the constitutional property clause and the common law position, the question that must be answered is whether measures adopted by the state that may have the effect of curtailing a property owner's rights over the plants growing on his or her land will be limited by this property clause. The Constitution and certain recent cases[33] suggest that no restrictive measure less than full expropriation would require compensation to be paid to the owner. Deprivations of property rights falling short of outright expropriation would not have to be compensated,[34] and the basic reason for this is that the Constitution distinguishes between expropriation (which explicitly requires compensation to be paid) and deprivation (for which compensation does not have to be paid). The significance of this for present purposes is that any regulation imposing restrictions on ownership of genetic resources would probably not require the original owners of those resources to be compensated because it would be regarded as a deprivation rather than an expropriation.

Provincial Nature Conservation Legislation

According to the Constitution, the areas of "environment" and "nature conservation, excluding national parks, national botanical gardens and marine resources" are functional areas of concurrent national and provincial legislative competence.[35] There is currently no overarching national legislation that concerns biodiversity conservation, but this is dealt with at provincial level. The 1996 Constitution divided South Africa into nine provinces, each of which has its own legislature.[36] Only two provinces have so far enacted their own nature conservation legislation,[37] neither of which addresses access and benefit sharing. For the rest, the provincial nature conservation ordinances of the erstwhile four provinces,[38] often in a somewhat uneasy combination with the conservation legislation of the former "homelands"[39] and "self-governing territories,"[40] are still applicable.

The provincial nature conservation ordinances are all similar and regulate hunting of wild animals and the gathering of plants by a listing process—those species that are listed are "off limits," whereas those that are not listed may be hunted or gathered subject to whatever other regulation may apply to these activities.[41] If we examine the Natal Ordinance[42] as an example, chapter XI governs indigenous plants. The Ordinance places certain plants into the categories of "specially protected" and "protected" plants, and these cannot be gathered, sold, purchased, exported, imported, or relocated without permits or licences, as the case may be (the extent of the regulation depending on the category).[43] No indigenous plant may be gathered on a public road or in the road reserve.[44] Possession of a specially protected plant without an adequate explanation is an offence.[45] Trespassing on land for the purpose of gathering any indigenous plant is an offence, which has the effect of making the gathering of plants dependent on the permission of the landowner.[46]

National Forests Act No. 84 of 1998

According to section 7 of the National Forests Act 84 No. of 1998, no person may cut, disturb, damage, or destroy any indigenous living tree in, or remove or receive any such tree from, a natural forest except pursuant to a permit or ministerial exemption. A "natural forest" is a group of indigenous trees whose crowns are largely contiguous; or which have been declared to be a natural forest by the minister under the act.[47] Forests may also be declared to be protected areas (and this is not confined to indigenous forests), in which case the forest products[48] in that forest are protected from gathering, etc., except in defined circumstances.[49] The minister may also declare as protected (a) a particular tree, (b) a particular group of trees, (c) a particular woodland,[50] or (d) trees belonging to a particular species.[51] No person may cut, disturb, damage, destroy, or remove any pro-

32 There are certain exceptions to this position in terms of the Game Theft Act No. 105 of 1991, but these are not important for present purposes.

33 Harksen v. Lane, NO 1998 (1) SA 300 (CC); Steinberg v. South Peninsula Municipality, 2001 (4) SA 1243 (SCA).

34 See JAN GLAZEWSKI, ENVIRONMENTAL LAW IN SOUTH AFRICA 93-94 (2000).

35 CONSTITUTION, ch. 4.

36 *Id.* at ch. 6.

37 These provinces are Mpumalanga and KwaZulu-Natal, although much of the latter provincial legislation, while promulgated, still awaits a proclamation bringing it into effect.

38 Transvaal, Orange Free State, Cape, and Natal.

39 Transkei, Bophuthatswana, Venda, and Ciskei.

40 *E.g.*, KwaZulu.

41 There is a gradation of categories ranging from endangered species on the one end to those that may (presumably) be harvested at the other.

42 Ordinance 15 of 1974.

43 *See id.* secs. 194, 195, 196, 198, 199, 200, 201A.

44 *Id.* at sec. 202.

45 *Id.* at sec. 203.

46 *Id.* at sec. 205.

47 National Forests Act No. 84 of 1998, sec. 1.

48 Section 1 defines "forest produce" as anything which appears or grows in a forest, including- (a) any living organism, and any product of it, in a forest; or (b) inanimate objects of mineral, historical, anthropological, or cultural value.

49 *Id.* at sec. 10.

50 Section 1 defines "woodland" as a group of indigenous trees which are not a natural forest, but whose crowns cover more than five percent of the area bounded by the trees forming the perimeter of the group.

51 *Id.* at sec. 12.

tected tree; or collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree, except under a licence granted by the minister.[52]

Marine Living Resources Act No. 18 of 1998

The Marine Living Resources Act No. 18 of 1998 is primarily concerned with the conservation of the marine ecosystem and the long-term sustainable utilisation of marine living resources. The act is directly relevant to the issue of access to resources, but in the context of access for consumption (fishing), rather than for other commercial exploitation. Although the act does not expressly address access to marine resources in the bioprospecting sense, the provisions of the act could (particularly in the absence of legislation specifically addressing the issue) be used for this purpose. There is provision made for marine protected areas,[53] where certain types of activity such as fishing are prohibited without permission.

Protected Areas Legislation

There are several different types of protected areas defined by different legislation (and at the time of writing, a new bill, the National Environmental Management: Protected Areas Bill, is shortly to be presented to Parliament together with the new Biodiversity Bill). These include local authority reserves, provincial reserves, national parks (in terms of the National Parks Act No. 57 of 1976), and others. Generally, access to biological resources in protected areas is either prohibited outright or carefully controlled. For example, in the National Parks Act, activities constituting access to resources are largely prohibited outright, except for the removal of seed from a plant or tree subject to official permission and similarly in regard to aquatic species.[54] There is no express provision in the National Parks Act for scientific research to be carried out within national parks by persons other than employees of the board (which is known as South African National Parks).

Forest Act No. 122 of 1984

The Forest Act No. 122 of 1984 has been largely repealed save for those provisions that establish and empower the NBI,[55] which is responsible for conservation, both in situ and ex situ, of indigenous plants. Section 66 provides for national botanical gardens adminstered by the NBI.

52 *Id.* at sec. 15.

53 Marine Living Resources Act No. 18 of 1998, sec. 43.

54 National Parks Act, sec. 21.

55 Forests Act No. 122 of 1984, pt. IX.

Animal Improvement Act No. 62 of 1998

The Animal Improvement Act No. 62 of 1998 provides for the breeding, identification, and utilisation of genetically superior animals in order to improve the production and performance of animals in the interest of the Republic. The act applies to any kind of animal or breed specified by the Minister of Agriculture.[56] The act, inter alia, controls the import[57] and export[58] of animals and their genetic material.[59]

Intellectual Property Rights

In order to set out the overall context in which South Africa's intellectual property rights regime operates, certain general preliminary factors need to be addressed. First, South Africa is a member of the World Trade Organisation (WTO). For the purposes of the WTO, it is classified as a developed country. It has, since before 2000, complied with its obligations under the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPs). In the run up to the Seattle Ministerial Conference, South Africa, together with African governments, the Organisation of African Unity, the South African Development Community, and the African Group of Ambassadors affirmed the following:

- Their rejection of the patenting of life forms;
- The need for the TRIPs Agreement to exclude microorganisms and microbial processes from patentability;
- The importance of maintaining flexibility within article 27(3)(b) of TRIPs for sui generis systems to protect plant varieties, and the need for such systems to protect the innovations and practices of farming communities;
- The need for TRIPs to be harmonised with the CBD and the International Undertaking; and
- The importance of relaxing the exclusive rights of patent holders in respect of drugs listed as essential by the World Health Organisation.[60]

We return now to general intellectual property issues, and in particular the rights of indigenous peoples or local communities to control access, ownership, and

56 Animal Improvement Act No. 62 of 1998, sec. 2.

57 *Id.* at sec. 16.

58 *Id.* at sec. 17.

59 Defined in sec. 1 as ova, embryos, semen, and any other material originating from an animal through which the hereditary factors of such animal can be transferred.

60 Council of Ministers, Elements for a Positive Agenda in the New Trade Negotiations Under the WTO from an African Perspective. 70th Ordinary Session/5th Ordinary Session of the AEC, 6-7 July Algiers, Algeria CM.2110 (LXX) Annex IV; SADC Ministers Agreed Negotiating Objectives for the Third WTO Ministerial Conference, WT/L/317, 1 Oct. 1999.

utilisation, and benefit sharing with respect to genetic and biological resources. No current laws or policies addressing this issue exist. A process was initiated some four years ago by the Chairperson of the (parliamentary) Portfolio Committee on Science and Technology to develop policy and legislation dealing with indigenous knowledge. The policy has yet to be formalised and adopted by Parliament. It is likely to be some time before such legislation comes to fruition.

South Africa is a member of the International Convention for the Protection of New Varieties of Plants (UPOV) and has plant breeders' rights legislation discussed above. South Africa signed, ratified, and implemented UPOV 1978. It signed UPOV 1991, but ratification has not yet taken place, although the Department of Agriculture has been keen to do so for several years. Despite not ratifying UPOV 1991, the Plant Breeders' Rights Act has already been amended to bring it in line (to a degree)[61] with the 1991 Convention. As indicated in section 3.1.1 above, plant breeders' rights legislation has been firmly in place in South Africa for several years now.

On a more general level, relating to the patentability of plants, animals, and microorganisms, plants and animals are patentable if they are produced by a micro-biological process.[62] For example, transgenic plants and animals are patentable (and have been patented) provided that they meet the other requirements for patentability (i.e., that the plant or animal is new, involves an inventive step, and is capable of being used or applied in industry or agriculture). The development, use, and release into the environment of, inter alia, genetically modified plants in South Africa is, however, regulated by the Genetically Modified Organisms Act.[63]

The requirement of a micro-biological process has not been extended to microorganisms, and therefore a microorganism is patentable, whether it is produced by a micro-biological process or not. If a micro-biological process or product thereof is claimed in a patent application and a microorganism is required to perform the invention of a patent, if it cannot be made or obtained on the basis of the description in the specification, and if it was not available to the public prior to the filing date of the patent, then a culture of the microorganism must have been deposited with a depository authority pursuant to the terms of the Budapest Treaty.[64] Any person is entitled to be furnished with a sample of the deposited culture after the patent or patent application has been published. A patent may be revoked on the ground that the provisions of section 32(6) have not been complied with.[65]

As for protection of plant varieties, the closest South Africa has to a sui generis system for plant variety protection is the Plant Breeders Rights Act and attempts have been made to protect farmers' rights as far as possible (within the confines of UPOV 1978). However, this situation has not been balanced with sui generis legislation to protect indigenous knowledge associated with biodiversity.

As far as patent protection of botanical genera is concerned, as indicated above, only plants which have been produced by a micro-biological process are patentable. The duration of a patent is 20 years. A plant variety which is not produced by a micro-biological process can be protected under the Plant Breeders' Rights Act. In order to qualify, the variety must be new, distinct, uniform, and stable (attributes that are set out in full above).[66] The variety must also be a variety of a plant species which is prescribed in the regulations. However, the exclusion of a species from the regulations does not mean that protection is not available, as it is possible to apply to have a plant added to the list. The duration of a plant breeders' right is 25 years in the case of vines and trees, and 20 years in all other cases, from the date of grant of the right.[67]

How does the position for plants differ from the patent protection system for product inventions? Section 25 sets out the definition of a patentable invention. This is defined negatively, i.e. the Patents Act excludes certain inventions rather than positively defining what is patentable.

Very briefly, the invention must be new, involve an inventive step, and be capable of use in industry or agriculture.[68] The following are not patentable as such: a discovery; a scientific theory; a mathematical method; a literary, dramatic, musical, or artistic work or any other aesthetic creation; a scheme, rule or method for performing a mental act, playing a game, or doing business; a program for a computer; or the presentation of information.[69]

61 Not all varieties are protected by the Plant Breeders' Rights Act, only those specifically listed in the act.

62 Patents Act No. 57 of 1978, sec. 25(4)(b).

63 Act No. 15 of 1997.

64 Patents Act No. 57 of 1978, sec. 32(6) and reg. 28A. The Budapest Treaty is the Budapest Treaty on the International Recognition of the Deposit of Micro-organisms for the Purposes of Patent Procedure.

65 The reason for this is that the patent will be granted in South Africa whether the sample is deposited or not, because the Patent Office will not check the application, but other people should be capable of performing the patented invention from the information supplied in the patent specification, and if they cannot do so (e.g., if no sample was deposited), then the patent may be revoked.

66 *See supra* sec. 3.1.1.

67 Plant Breeders' Rights Act, sec. 46(1).

68 Patents Act, sec. 25(1).

69 *Id.* at secs. 25(2), (3).

The following are also not patentable:

- An invention of which the publication or exploitation would be generally expected to encourage offensive or immoral behaviour; [70]
- Any variety of animal or plant or any essentially biological process for the production of animals or plants, not being a micro-biological process or the product of such a process;[71] and
- A method of treatment of the human or animal body by surgery or therapy or of diagnosis practised on the human or animal body.[72]

Therefore, the product of a biological process cannot be patented if the process does not include a microbiological process. There has been no South African court decision regarding the meaning of "essentially biological process," but the Guidelines for Examiners in the European Patent Office can be of some help. These suggest that:

> The question whether a process is "essentially biological" is one of degree depending on the extent to which there is technical intervention by man in the process; if such intervention plays a significant part in determining or controlling the result it is desired to achieve, the process would be excluded. To take some examples, a method of cross-breeding, inter-breeding, or selectively breeding, say, horses involving merely selecting for breeding and bringing together those animals having certain characteristics would be essentially biological and therefore unpatentable. On the other hand, a process of treating a plant or animal to improve its properties or yield or to promote or suppress its growth e.g. a method of pruning a tree, would not be essentially biological since although a biological process is involved, the essence of the invention is technical; the same could apply to a method of treating a plant characterized by the application of a growth-stimulating substance or radiation. The treatment of soil by technical means to suppress or promote the growth of plants is also not excluded from patentability.

A process which is not essentially biological is therefore patentable, provided it meets the other criteria for patentability, namely that the process is new, inventive, and capable of use in trade, industry, or agriculture. Therefore biotech inventions not involving an essentially biological process are patentable, even if no micro-biological process is involved. Similarly, processes involving micro-organisms are also patentable, as are microorganisms themselves, even if they were not produced by a micro-biological process.

South African patent law does not provide for any distinctions in patentability based on the source of the genetic information (i.e., viruses, bacteria, plants, animals, humans, and human organs or human-derived products, including cell lines and genes) or the form of the nucleic acid sequence.

There are no sections relating specifically to the unpatentability of biotechnological inventions. However, section 25(4)(a) could possibly be used to exclude some biotechnological inventions. The section provides that "a patent shall not be granted for an invention the publication or exploitation of which would be generally expected to encourage offensive or immoral behaviour." There is no case law in South Africa on this section, so further elucidation of the possible ambit of the provision is not possible. Finally, as far as farmers' varieties, landraces, or crop wild relatives are concerned, these are not currently provided for in South African legislation relating to intellectual property (the Patents Act and Plant Breeders' Rights Act) and are consequently not regulated.

CBD and TRIPs

The nature and extent of discussions regarding the CBD and TRIPs within South Africa is not clear. There does not appear to be any policy or concerted and comprehensive government-driven initiative with stakeholder participation looking critically at the relationship between the CBD and TRIPs. Such an initiative might focus on the determination of the obligations upon national governments in terms of the implementation of the agreements; the identification of potential conflict situations and the implications on the national interests and the implementation process; and the identification of a means of implementing the international obligations in an integrated fashion at the national level. It is not surprising, therefore, that there is no coherent conceptual and legal framework which effectively integrates the international obligations under both the CBD and TRIPs in a manner which stays true to the fundamental objectives of the CBD and which is compatible with TRIPs.

Further, the CBD and TRIPs agreements represent two significantly separate multilateral approaches to the

70 *Id.* at sec. 25(4)(a).
71 *Id.* at sec. 25(4)(b).
72 *Id.* at sec. 25(11).

utilisation of living resources. The government should link the discussion between these two intrinsically linked approaches and seek to resolve the differences by adopting an approach that is based on achieving sustainable development that is—

a) aimed at supporting and promoting national priorities and interests;
b) consistent and compatible with relevant international commitments; and
c) integrated and coherent.[73]

3.3 New Initiatives

Government policy priorities are set out in the White Paper on Conservation and Sustainable Use of Biological Diversity. This policy document was the outcome of an extensive public participation process, which included the involvement of citizens and NGOs (mainly local, but including bodies such as the IUCN). Various diverse strategies were utilised to lobby and engage government.

According to the White Paper,

> Government realises that existing biological knowledge is patchy, and that substantially more research is required to improve our understanding. In particular, the interactions between biological and social processes are poorly understood, as are the causes underlying the decline in biodiversity. There has also been an underinvestment in the application of research results to biodiversity management.[74]

Although it is realised that the carrying out of biological inventories is important, in effect, the White Paper talks about giving support to institutions such as universities to continue work being done in this sector. The focus is on integration without government funding necessarily being available.

Central to government thinking is that if a well-considered strategy is adopted, biodiversity prospecting can reap benefits for countries rich in genetic diversity, especially with regard to enhancing research capacity and developing technology. It is the government's hope that benefit-sharing arrangements would:

a) strengthen conservation of biodiversity;
b) promote reconstruction and development of South Africa and stimulate economic development in the most disadvantaged parts of the country and sections of the population; and
c) strengthen science and technology capacity.[75]

In the White Paper, the government's overarching objectives are:

a) ensuring the protection and maintenance of biodiversity in order to meet basic human needs;
b) ensuring sustainable economic development;
c) enhancing the provision of jobs in relation to the conservation of biodiversity and sustainable use of biological resources;
d) ensuring that benefits derived from the conservation and sustainable use of biodiversity favour the poor;
e) enhancing human resource capacity; and
f) increasing public participation in the conservation and sustainable use of biodiversity.[76]

The policy as it pertains to access and benefit sharing could be strengthened in a number of ways. First, bioprospecting brings a limited set of benefits. It should be considered as one of many different options to reap benefits from biological resources. According to Wynberg,[77] bioprospecting alone is unlikely to solve national conservation and developmental problems and needs to be complemented by a set of comprehensive and innovative approaches drawing upon consumptive and non-consumptive use of biodiversity. This may, for example, include the development of local phytomedicine industries that add value to resources already in use; or it may be through focused efforts to support community-driven projects on natural product development or tourism. Effective land tenure reform is likely to yield, for example, far more significant social and biodiversity benefits in the long term than bioprospecting.

One of the interesting questions that arises in considering government policy in this area concerns the relative priority it gives to commercialisation, conservation, community empowerment and development, and equity in the context of South Africa's access to genetic resources discussions and strategies. Judging from the NBI-Ball agreement, government appears to be prioritis-

[73] The authors thank Cecelia Oh from the Third World Network for sharing some of the thinking that has gone into the policy for a regulatory framework for access to genetic resources and benefit sharing measures in Malaysia, May 1999.

[74] White Paper, *supra* n. 4 at sec. 4.2.1.

[75] *Id.* at goal 3, sec. 3.1.

[76] *Id.* at intro., ch. 3.

[77] Rachel Wynberg, *Benefit Sharing in South Africa: Fact or Fiction*, *in* Sarah A. Laird (ed.), Biodiversity and Traditional Knowledge: Equitable Partnerships in Practise (2001).

ing the commercialisation of genetic resources over other considerations such as conservation, and community empowerment. The agreement has yet to address development needs such as the bulking up[78] or local development of products. Overarching national government policies of poverty alleviation, job creation, and the reconstruction and development of the country, particularly at the community level, have seemingly been ignored in this agreement.

Generally speaking, the benefit-sharing agreements concluded to date[79] have paid little if any attention to developing innovative conservation projects in areas where collections take place, or for exploited resources. This may happen only if it proves to be economically competitive. According to Wynberg,[80]

> with the high risks and costs involved in research and development for new pharmaceutical, horticultural, and other products, social responsibility plays second fiddle. The reality is that developing country institutions simply lack the technological and marketing know-how to insist on fairer deals.

As far as implementation of the policy is concerned, South Africa has published the National Environmental Management: Biodiversity Bill, which will, inter alia, give effect to its responsibilities under the Convention on Biological Diversity and which directly addresses bioprospecting, access and benefit sharing in chapter 6. As of June 2003, the bill was soon to be presented to Parliament for debate for intended promulgation during the second half of 2003.

The bill[81] contains chapters dealing with:

- the establishment of a National Biodiversity Institute;
- measures for conservation of biological diversity, including planning and species conservation;
- alien and invasive species;
- international trade in wildlife; and
- access to biological resources, including research and bioprospecting agreements.

In relation to bioprospecting, access, and benefit sharing, which are covered in chapter 6 of the bill, the bill seeks to regulate bioprospecting involving indigenous biological resources and to ensure the equitable sharing of benefits arising from the commercialisation through bioprospecting of traditional uses or knowledge of indigenous biological resources,[82] with persons or communities practising those traditional uses or knowledge.[83]

The bill prohibits bioprospecting involving indigenous biological resources without a permit issued pursuant to chapter 7 of the bill. "Bioprospecting" is defined in section 1 as "the systematic search, collection, gathering, extraction, development or application of, or research on, genetic resources for commercial and industrial exploitation." The permitting is carried out by the Minister of Environmental Affairs and Tourism or an organ of state in the national, provincial, or local sphere of government so designated by regulation under section 81. It is not clear at the time of writing what the department's intentions are in respect to allocation of permitting responsibilities for bioprospecting.

The bill further requires a bioprospecting permit holder to enter into a benefit-sharing agreement with the person or community practising the traditional use or knowledge before exploiting such use or knowledge of any specific indigenous biological resource.[84] The person or community in question may not unreasonably refuse to enter into such an agreement if the traditional use or knowledge in question is in the public domain and not protected by intellectual property legislation.[85] The bill also regulates the content and format of the agreement. No rights or obligations under a benefit-sharing agreement may be transferred to another person without the written approval of the minister.[86]

From the institutional point of view, the National Biodiversity Institute is given certain functions in respect of bioprospecting,[87] namely—

- to make recommendation to the Minister, at his or her request, relating to an application for approval of a benefit-sharing agreement;

78 That is, adding value to plant life or developing products therefrom at a local level.

79 Including those among CSIR-Phytopharm-Pfizer; NBI-Ball; and Rhodes University-National Cancer Institute.

80 Wynberg, *supra*. n. 77 at 10.

81 Published in *GG* 24935 of 30 May 2003.

82 The term "indigenous biological resources" is defined in sec. 75(2) as including
(i) any indigenous animals, plants, and other organisms, including any indigenous animals, plants or other organisms cultivated, bred or kept in captivity or cultivated in any way by means of biotechnology;
(ii) any cultivar, variety, strain, derivative, hybrid or fertile version of any such indigenous animals, plants or other organisms; and
(iii)any exotic animals, plants or other organisms that, through the use of biotechnology, have been altered with any genetic material or chemical compound found in any such animals, plants or other organisms, but excluding –
(i)genetic material of human origin; and
(ii) any exotic animals, plants or other organisms, other than exotic animals, plants or other organisms referred to in sec. 75(2)(a)(iii).

83 National Environmental Management: Biodiversity Bill, sec. 75.

84 *Id*. at sec. 77(1).

85 *Id*. at sec. 77(2).

86 *Id*. at sec. 78.

87 *Id*. at sec. 79.

- to engage with the applicant and other party on the terms and conditions of an agreement before making a recommendation to the Minister;
- to facilitate negotiations between the applicant and other party and ensure that the negotiations are conducted on an equal footing;
- to ensure that the agreement is equitable (on request of the Minister); and
- to perform any other function that may be prescribed.

The bill also provides for the establishment of a Bioprospecting Trust Fund, into which all moneys accruing from of benefit-sharing agreements must be paid, and from which all payments to those beneficiaries must be made.[88] The Director-General is responsible for the management of, and accountable for the money in, the Fund.

It seems clear that much of the detail of the regulation of bioprospecting, access, and benefit sharing will be provided by means of delegated legislation. Section 81 empowers the minister to make regulations relating to—

- the designation of organs of state that may issue the relevant permits;
- the form and contents of, and the requirements and criteria for, benefit-sharing agreements;
- moneys payable in connection with such agreements; and
- the administration of the Bioprospecting Trust Fund.

Due to the recent release of the latest version of the bill, comment is scarce. However, comment on the version first released for public comment at the end of 2002 was critical of the bill's provisions relating to access and benefit sharing. Since the provisions of the earlier bill and the current one are substantially similar, it will be instructive to consider how experts in the field received these provisions. According to Wynberg and Burgener, in a review constituting a synthesis of comments on the bill prepared for IUCN South Africa,—

> in its current form the legislation does not suitably effect South Africa's obligations under the CBD, is out of line with current national policy on bioprospecting, as encapsulated in the Biodiversity White Paper, and will neither control access to South Africa's biological wealth, nor enable fair and equitable benefit-sharing from the commercialisation of these resources.[89]

In particular, the following aspects were identified as being problematic: the clarification of the state's role as trustee of biological resources; inadequacy of the institutional arrangements provided for; fragmented permitting and procedural arrangements; inadequacy of restricting benefit sharing to holders of traditional knowledge only; lack of stipulation of benefit-sharing principles; failure to provide for prior informed consent; confusing definitions; lack of a bioprospecting strategy; and inadequate linkages and coordination with other legislation.[90]

Some of these criticisms warrant closer scrutiny. First, several of these perceived shortcomings could be addressed by means of ministerial regulation, but the bill is largely silent on how such regulations should be enacted—the minister is given wide discretion in this regard. Critics suggest in particular that regulations relating to benefit-sharing agreements should be made with reference to principles, for example, the 2002 Bonn Guidelines. This is an important criticism, since there are Constitutional Court cases that have suggested that the delegation by the legislature of wide discretionary power to make regulations is unacceptable, and that this discretion should be delegated subject to stated guidelines or criteria within which the power should be exercised.[91]

Another serious defect is the absence of recognition of the principle of prior informed consent. Critics have identified that not only does the bill exclude the principle entirely, but turns it on its head in section 77(2), which in effect forces consent to be given.[92]

In summary, the chapter in the bill dealing with bioprospecting, access and benefit sharing does have the potential to regulate the field successfully and according to the tenor of the CBD, but there are currently many questions remaining regarding how the powers delegated by the bill will be exercised. The absence of express principles (the prior informed consent principle in particular) exacerbates these weaknesses and provides cause for some doubt as to the bill's likely efficacy in this important field.

88 *Id.* at sec. 80.

89 Rachel Wynberg & Markus Burgener, *A Critical Review of Provisions relating to Bioprospecting, Access and Benefit-sharing in the Biodiversity Bill* (February 2003), *available at* http://www.biowatch.org.za/biodiv_consol.htm (last visited June 19, 2003).

90 *Id.*

91 Dawood v, Minister of Home Affairs 2000 (3) SA 936 (CC); Janse van Rensburg NO v, Minister of Trade and Industry, NO 2001 (1) SA 29 (CC).

92 Wynberg & Burgener, *supra* n. 89.

4. CONCLUSION

As the above analysis demonstrates, current legislation does not address "bioprospecting" per se. This means that a prospective collector would not have to obtain specific permission to "bioprospect" as such. However, in order to collect samples of biological material, the collector would have to comply with the relevant legislation, invariably provincial nature conservation legislation, and other relevant legislation such as the National Forests Act No. 84 of 1998 in the case where access is sought to biological resources in forest reserves or the Forest Act No. 122 of 1984 where access is sought to plant material in botanical gardens or herbariums under the control and management of the National Botanical Institute. In this regard, the necessary permit(s) would have to be obtained from the authority designated in the relevant legislation and in the normal course, legislative requirements would have to be complied with.

A collector will therefore have to know which legislation applies and find out which authority or authorities in the government and indeed, what sphere of government, to approach for the necessary permission. Such permission would be made in the light of the conservation of the species in question, since current legislation is concerned with conservation rather than with bioprospecting, at least directly.

In short, there would appear to be nothing in current legislation effectively governing bioprospecting, provided any applicable legislative provisions relating primarily to the taking of the species in question have been complied with. As far as benefit sharing is concerned, this is not addressed at all in existing law, although the new bill does address this issue.

Also, the issue regarding the use of genetic resources (research and commercial use) is not properly or directly addressed in legislation.[93] This is a major legislative lacuna.

While South Africa is intent on commercialising its biodiversity, it should ensure that this is done as part of an overarching and multi-faceted strategy that considers bioprospecting as only one of several developmental options to reap benefits from biological resources.[94]

Current legal and institutional lacunae must be filled urgently. South Africa will need to develop the requisite institutional capacity, including the technological and marketing know-how, required to negotiate fair and equitable deals. In this context, the need remains to level the playing field by creating an environment conducive to negotiation between parties on an equal footing.

Finally, the question of farmers' rights and the International Treaty on Plant Genetic Resources in Food and Agriculture is also relevant to this discussion. South Africa has not yet signed the treaty,[95] and farmers' rights are not addressed by South African law other than in the way provided for by the Plant Breeders' Rights Act and Plant Improvement Act, both of which are discussed above.

In the field of access to genetic resources, South Africa's situation has several strengths. First, the facts and statistics outlined in the introduction to this chapter confirm the country's "remarkable diversity."[96] In addition, South Africa has relatively good technological, research, and infrastructural capacity. A further strength is the existence of several collaborative partnerships, outlined above.

At the same time, there are several weaknesses. First, there are no legislation or institutional structures suitable to govern access to South Africa's genetic resources. Second, there is insufficient integration of biodiversity consideration into national decisionmaking, illustrating that environmental concerns have traditionally been regarded as a relatively low priority alongside other government policy concerns. The need to link biodiversity conservation to the needs of South Africa's people must be addressed. Third, there has been a tendency among government departments to keep functions exclusive, and this has thwarted efforts to integrate biodiversity and environmental considerations cross-sectorally. In this regard, South Africa still has some way to go before optimal intergovernmental coordination concerning environmental matters can be achieved. A fourth weakness is that the linking of conservation to other competencies within government, such as tourism and agriculture, has resulted in considerable competition in the allocation of funding. Fifth, there is a lack of government capacity to monitor implementation. For example, there is no structured mechanism to independently evaluate the performance of government and other sectors.[97] Finally, there appears to be insufficient collaboration between industry and local research institutions. Such collaboration has been identified as important in facilitating much needed taxonomic work through activities such as collection.[98] It appears as if taxonomy is desperately under-funded in South Africa.[99]

---

93 Since there is no legislation in place dealing with genetic resources, the distinction between genetic and biological resources is not made in South African law at present.

94 Wynberg, *supra* n. 77, at 12-14.

95 See information on participation provided at http://www.fao.org/Legal/TREATIES/033s-e.htm (last visited July 31, 2003).

96 White Paper, *supra* n. 4, at sec. 1.2.1.

97 See *id.* at sec. 4.2.3.

98 Wynberg, *supra* n. 77.

99 White Paper, *supra* n. 4, at sec. 4.2.1.

In conclusion, South Africa is moving toward a legislative framework to address access to genetic resources and related issues within the country. As pointed out above, the extent to which the legislation will adequately address both the letter and the spirit of the CBD is difficult to predict, but important shortcomings in the bill may undermine this objective. However, the international debates concerning access to genetic resources are well known to South Africans involved in the field and the process of fleshing out the framework provided by the bill will almost certainly be informed by the considerable expertise that exists in the country. The future is awaited with interested anticipation.

CHAPTER 17
ACCESS TO GENETIC RESOURCES IN UGANDA

Godber Tumushabe* and Arthur Mpeirwe**

1. BACKGROUND

Uganda is located in the eastern Africa region at latitudes 4.2°N and 1.5°S and longitudes 28°E and 35°W. It covers an estimated total area of 241,020 km², of which 15.1 percent is water bodies and wetlands, 11 percent game reserves and national parks, and 5.9 percent forest reserves. Its geographical features range from glacier-topped mountains, rainforests, and dry lands to wetlands and swamps. According to the 2001 census, total population currently is 24 million people.

Uganda is one of the countries in the world with an extensive biodiversity and a great diversity of ecosystems. Fauna diversity includes 338 species of mammals, 291 species of fish, 149 species of reptiles, 100 species of amphibians, over 1,000 species of birds (constituting 11 percent of the total world population), and over 1,200 species of butterflies.[1] Uganda has 94 recognised vegetation communities stretched across the forest and savannah zones of the country. They include several closed canopy tropical high-forest types such as montane, heather and moorland, swamps and wetlands, moist woodlands, and dry bushlands and thickets.[2] Of global significance, Uganda is home to more than half of the world's population of mountain gorillas. These are found in Bwindi Impenetrable Forest in southwest Uganda.[3] This exceptional diversity is attributed to its geographical location and geographical features.

Uganda's biological diversity is found in the country's expansive protected area system and rangelands, as well as on private land and domestic gardens. For example, as of October 2000, Uganda has 10 national parks, 10 wildlife reserves, seven wildlife sanctuaries, and 13 community wildlife areas.[4]

The economic backbone of Uganda is agriculture. Close to 84 percent of Ugandans live in rural areas and depend on subsistence agriculture.[5] The climatic conditions and biodiversity are favourable to agriculture. The soil fertility for most of the country is able to support plant life without the need of fertilizers. These conditions enable Uganda to have two crop cycles a year. It is estimated that 54 percent of the country's gross domestic product comes from agriculture.[6]

Uganda's biological resources have been exploited mainly for subsistence. Currently, it is believed that a substantial percentage of the population significantly rely on this biodiversity for food, shelter, clothing, medicine, and energy. It is estimated that 80 percent of the population, mainly in rural areas, still rely on herbal medicine. Because of this interaction with nature, there is a bounty of indigenous knowledge on conservation and exploitation of this biological diversity. The economic benefits of Uganda's biodiversity resources are estimated to be more than US$550 million.[7]

Uganda has gone through a period of political instability since 1962. The political terrain has been switching from multi-party democracy (1962-71) to dictatorship (1971-79) back to multi-party democracy (1980-85). The main characteristic of these changes has been wars, civil strife, and economic mismanagement. The country has enjoyed relative political stability and economic recovery only since 1986 under a sui generis system of government known as a "movement" or no-party system. The system is described as an umbrella system where all citizens are free to participate in leadership on individual merit. While the system is legally all embracing, there are sections of the society who do not sub-

* ***Executive Director, Advocates Coalition for Development and Environment (ACODE).***

** ***Research Associate, Advocates Coalition for Development and Environment (ACODE).***

1 NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY (NEMA), STATE OF THE ENVIRONMENT REPORT FOR UGANDA, 1998 (1999).

2 Ministry of Water, Lands and Environment, The Forest Sector Umbrella Programme (FSUP) (1999).

3 NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY, STATE OF THE ENVIRONMENT REPORT FOR UGANDA, 2000/2001 59 (2001).

4 See UGANDA WILDLIFE AUTHORITY (UWA), STRATEGIC PLAN 2001-2005. (2000).

5 Ministry of Agriculture, Anical Industry and Fisheries & Ministry of Finance, Planning and Economic Development, Plan for Modernization of Agriculture: Eradicating Poverty in Uganda (Government Strategy and Operational Framework) (2000); *see also*, NEMA, *supra* n. 3.

6 J.M.A. Opio-Odongo, Godber W. Tumushabe, & W. Kakuru, *BIODIVERSITY Management in Uganda*, *in* John Mugabe & Norman Clark (Eds.), MANAGING BIODIVERSITY: NATIONAL SYSTEMS OF CONSERVATION AND INNOVATION IN AFRICA 153 (1998).

7 NEMA, *supra* n. 3 at 5.

scribe to it and have been agitating for a return to multiparty democracy, a position that has recently been agreed to. The country has a parliament elected on the system of individual merit and therefore ideally no official opposition.

The system of administration obtaining in Uganda is decentralisation. Local authority is based at the district level, but residual authority is further decentralised to lower structures known as local councils. Of significance for genetic resource exploitation and management is the fact that under decentralisation, local councils have the mandate to manage some of the natural resources under their jurisdiction.

1.1 Developments in Commercial Exploitation of Genetic Resources

Since the beginning of the 1990s and mainly following the publication of *Our Common Future*,[8] there has been growing realisation of the opportunity for commercial exploitation of genetic resources. This has increased the need to put in place legal regimes and institutional arrangements to manage this commercial exploitation and negotiate for benefit sharing for both the country and communities. In Uganda, genetic resources are easily accessed through both in situ and ex situ conservation centres and gene banks at national research centres. As shown in the subsequent sections, there are both informal and formal biodiversity prospecting initiatives taking place in the country. There are also informal collaborations between Ugandan researchers and foreign corporations to access genetic material without any mechanism for rewarding the local communities. The bulk of current biodiversity prospecting occurs in the pharmaceutical and agricultural sectors.[9]

Uganda's current legal framework for the conservation and benefit sharing of genetic resources applies to at least three scenarios. The first scenario is to consider already existing laws ranging from common law principles to statutory legislation before 1992.[10] The second scenario is to look at the legislative developments from 1992 to date. During this period, deliberate attempts have been made to include specific provisions on access to genetic resources and benefit sharing in framework and sectoral laws. The third scenario is to consider the ongoing attempts both at the international and national levels to formulate specific laws governing access to genetic resources and benefit sharing.

While there has been considerable progress in developing laws aimed at regulating access to genetic resources and benefit sharing, the current legal framework is far from being comprehensive or holistic. The sectoral nature of the post-1992 legislative developments means that legal provisions regulating access to genetic resources remain scattered, institutional mandates remain unclear, and these two factors combine to encourage unregulated bioprospecting initiatives.

1.2 Bioprospecting Initiatives

There appear to be several bioprospecting initiatives that have either been undertaken or are currently going on in Uganda. These initiatives involve the private sector, individuals, and public institutions in collaboration with foreign researchers. However, most of these collaborations are informal and undocumented.

Currently, the government of Uganda does not have any concrete bioprospecting programs. The Uganda National Council of Science and Technology (UNCST) is just beginning a process of developing a bioprospecting program. This initiative is complimented by studies on indigenous knowledge, which UNCST is carrying out. Despite this policy vacuum, the government has financed much bioprospecting work through public and academic institutions. The Natural Chemotherapeutical Laboratories, a government-owned entity, is engaged in the screening and verifying of herbal medicine. There are similar activities at Makerere University Medical School. Some of these initiatives are born out of collaboration with foreign institutions.

At the same time, there are bioprospecting initiatives being undertaken by non-governmental organizations (NGOs). A local NGO, the Human Initiative 2000, is currently involved in widespread advocacy for adoption and planting of the neem tree for use in the production of insecticides as a repellent to malarial mosquitoes, the production of oil, and as medical cure for ulcers and dental decay. The neem tree is not indigenous to Uganda and does not grow wildly in Uganda's natural forests. However, it has gained wide recognition in indigenous communities as a multimedicinal plant and may eventually become part of Uganda's biological diversity. Access to the neem tree is not restricted. Instead the advocacy encourages as many people to grow it and derive benefit from its multifunctional qualities such as medicine, nutrition, and income.

---

8 World Commission on Environment and Development, Our Common Future (1987).

9 *See infra* sec. 1.2.

10 The adoption of the Convention on Biological Diversity in 1992 has led to new legislative initiatives, which have attempted to move away from the relevant laws before this period.

It is also believed that there are many private bioprospecting initiatives taking place in the country. Many of these, too, are informal, undocumented, and therefore not easily known. For example, Kato Aromatics, an Egyptian private company is known to be using extracts from the *omuteete* plant (cymbopogon ssp) to produce toothpaste. St. Joseph's, an educational institution uses extracts from the custor plant (known in some of the indigenous communities in Uganda as *kisogasoga*) to manufacture soap. The lemon grass, which is a species of cymbopogon ssp, is being processed to extract a natural oil that may be used for making creams, adding fragrances to creams and perfumes, and other similar uses.

These initiatives are not officially documented by UNCST or any other government agency. In such circumstances, it is unlikely that any arrangements for benefit sharing could be included in these informal arrangements.

Finally, there are also several individual researchers and NGOs who are engaged in informal collaboration with foreign researchers to screen some genetic material. The materials are usually transferred without agreement to foreign laboratories for further processing. What happens after transfer is uncertain. Apart from relying on the foreign researcher's report, the local Ugandan researcher has no capacity to know what has been done with the materials sent abroad. In this way, a lot of genetic material has been exported for potential commercial gain by foreign companies with no direct benefits to the country.[11]

2. INSTITUTIONS

The management of biological resources in Uganda cuts across various sectoral agencies. The major agencies with legal or administrative mandate over biological resources include: the National Environment Management Authority, the Uganda Wildlife Authority, Ministry of Agriculture, the National Council for Science and Technology, and the Forestry Department, among others. However, the draft Access to Genetic Resources Regulations (discussed in section 3.3.1, below) seeks to streamline the institutional framework to ensure efficiency and coordination. The various sectoral agencies mentioned above have responsibilities with respect to access to genetic resources within their sectoral mandates. However, for the purposes of this paper, focus will be on the roles of the National Environment Management Authority and the Uganda National Council for Science and Technology.

[11] This information is based on interviews made with various people working in Uganda on access to genetic resources and related issues.

2.1 Lead Agencies

National Environment Management Authority

The National Environment Management Authority (NEMA) is established under section 5 of the National Environment Statute. NEMA's primary function is to ensure the integration of the environment in national planning and development. Section 45 of the statute charges NEMA with issuing guidelines and prescribing "measures for the sustainable management and utilization of genetic resources of Uganda for the benefit of the people of Uganda." The proposed institutional architecture under the draft regulations vests NEMA with the responsibility of initiating and coordinating the formulation of a national policy on access to genetic resources; organising, supervising, and coordinating the activities related to the implementation of the regulations; and general oversight. In discharging this function, NEMA is required to coordinate with sectoral agencies through its membership to the Inter-Agency Committee for Access to Genetic Resources provided for under the draft regulations.

Uganda National Council for Science and Technology

The Uganda National Council for Science and Technology (UNCST) is the statutory lead agency with the mandate of overseeing and regulating the conduct of scientific and technological research in the country, including the promotion of indigenous science and technology. Under this mandate, UNCST developed an administrative system for issuing access permits.

This system has been legitimised by the draft Regulations on Access to Genetic Resources, which give the UNCST the role of a clearing house mechanism with respect to access to biological resources. Regulation 7 gives UNCST the functions of processing application permits, coordinating other lead agencies with mandates associated with access to genetic resources, establishing and maintaining a depository for material transfer agreements (MTAs), and generally ensuring compliance with the provisions of the regulations. The law does not specify any public officer to oversee the negotiation of MTAs. This leaves it to the UNCST to designate a competent officer in its ranks to oversee the MTA negotiations.

In addition to assigning UNCST as the clearing house mechanism, various sectoral institutions are established as lead agencies in their areas of competencies. In their respective capacity as lead agencies for access to biological resources, these institutions are required to, among other things, review applications and advise UNCST on the granting of prior informed consent

(PIC), monitor the application and use of the biological resources, and ensure that the rights of local communities are sufficiently protected in any MTA.

The draft Regulations on Access to Genetic Resources constitute a comprehensive attempt to address institutional and regulatory weaknesses in the area of access to genetic resources. However, the slow process of approval has undermined the utility of these regulations. The drafting of the regulations was completed in 2000; but as of June 2003, the regulations have not been finalized.

2.2 Role of International Institutions

Access to, and utilisation of, genetic resources requires project financing, often provided by international institutions. For example, U.S. Agency for International Development (USAID) funded the Development Through Conservation (DTC) project, which focussed on activities related to the conservation of Bwindi and Mgahinga National Parks.[12] The activities were later extended to include agro-forestry, improved agricultural practices, soil conservation, and conservation education. The availability of funds for biodiversity conservation ensures sustainable use and access to natural resources by the communities. Through this type of collaboration and facilitation, international institutions can influence access to genetic resources while not formally regulating it.

The Consultative Group on International Agricultural Research (CGIAR) has also played a significant role in the management of genetic resources in Uganda. It holds a considerable ex situ germplasm collection, some of which is from Uganda and held in trust for communities in Uganda.

2.3 Role of Communities

Under some Ugandan laws relating to biological resources, indigenous communities are allowed user rights that entitle them to access, utilize, and own some genetic and biological resources for consumptive purposes. One such law is the Uganda Wildlife Statute (described in section 3.2, below), which empowers a local government council to establish a committee to advise the board of trustees of the Uganda Wildlife Authority (UWA) on the management and utilisation of wildlife within the local jurisdiction.[13] The statute also provides for a number of wildlife user rights such as for hunting, farming, ranching, trading, educational and scientific purposes, and general extraction, which can only be exercised with licence from the Wildlife Authority.[14]

The NEMA Statute (also described in section 3.2, below) is another example of a law that protects the traditional uses of forests, which are indispensable to local communities.[15] These include uses such as collection of firewood, herbal medicine, and building materials. The statute does not extend similar protection of indigenous rights to other resources. However, NEMA retains the power to prohibit any human activity.[16] This power extends to traditional as well as other uses. The statute mandates NEMA to issue guidelines and measures for ensuring the same.

2.4 Process for Obtaining Access to the Genetic Resources

Although regulations specifically governing access to genetic resources are still in draft form, there is a de facto process established for researchers seeking to obtain such access. UNCST has developed application forms, which every researcher has to fill and submit to UNCST. The application must be accompanied by two copies of the research proposal and other supportive documents such as institutional approvals and recommendations. All research applicants, except Ugandan students residing in Uganda, pay a fee. Applications are subjected to various levels of review. On submission, applications are reviewed by staff of the Research Registration and Clearance section of the Scientific and Industrial Research unit of UNCST. After this review, the application is forwarded to a relevant lead agency for further technical review.

Upon completion of the review, the lead agency returns the application to UNCST with recommendations. At this stage, UNCST makes the final decision based on the comments of both reviews as well as social and ethical considerations such as the acquisition of PIC, benefit to the community, and benefit-sharing provisions. After approving the research project, UNCST forwards the application forms to the Office of the President for clearance. This vetting system strictly considers the security and political implications of the research and not the technical aspects. The applicant is informed of the status of the application within two weeks from the date of submission.

[12] The Bwindi Impenetrable Forest National Park and Mgahinga Gorilla National Park, located on the southern-most tip of Uganda, represent one of the most important biodiverse forests in Uganda and are known internationally for being host to the few globally remaining species of mountain gorillas. *See* UWA, *supra* n. 4.

[13] Uganda Wildlife Statute, sec. 13.

[14] *Id.*. at sec. 30.

[15] *Id.* sec. 46(5).

[16] *Id.*

Once the application has been approved and cleared, the applicant receives from UNCST:

- An approval or clearance letter,
- A research identity card, and
- A letter of introduction to the Resident District Commissioner of the district in which the research is to be conducted.

If UNCST determines that the application is incompetent in some material respect or fails the social and ethical standards, UNCST rejects the application and informs the applicant accordingly. There is no avenue for appeal against such a decision. However, discontented applicants may petition UNCST to review its own decision. In such circumstance, a neutral taskforce is appointed to advise UNCST. The mandate of UNCST and the procedure for approving the collection of biological resources extends in the same way to the identification, extraction, or other use of genetic resources.

3. LAWS AND POLICIES

3.1 Specific Access and Benefit-Sharing Legislation and Policies

In any discussion on access to genetic resources and benefit sharing in Uganda, it important to make the 1992 United Nations Conference on Environment and Development (UNCED)[17] the reference point. This is because, other than the fact that Uganda signed and ratified the Convention on Biological Diversity, it is from this time that national awareness on the potential opportunities for commercial exploitation and the need to regulate access started growing.

Consequently, national laws relating to genetic resources fall into two broad categories: the pre-UNCED laws and the post-UNCED laws. The pre-UNCED laws consist of all those laws enacted before the UNCED. During this period, access to genetic resources and benefit sharing issues did not attract national attention. For this reason, laws enacted in this period did not include any specific provisions on access to genetic resources or sharing of benefits arising from the exploitation and utilization. Most of the laws in this category date back to the colonial period.

The Convention on Biological Diversity adopted at UNCED in 1992 increased the political and economic significance of these genetic resources. Consequently, several of the post-UNCED laws in the area of natural resources enacted after 1992 contain provisions on access to genetic resources.

The rationale behind the current regulatory regime is multi-faceted. It encompasses conservation, as well as enhancement of research, development capacities, and revenue, among others. It is increasingly becoming clear that biological resources are an important and integral part of Uganda's national resources. Consequently, the government has been making attempts to consolidate these resources with the understanding that they will contribute to national economic development. This is not only reflected in the draft Access to Genetic Resources Regulations, but also in the draft Plant Variety Protection Bill.

3.1.1 Debate on Access and Benefit Sharing

There has been almost no policy debate on the issue of access to genetic and biological resources in Uganda. This being the case, the communities have not raised any concerns regarding the issue. During the process of drafting the access to genetic resources regulations, NEMA organised a number of workshops. The attendance was mainly by government departments such as UNCST, Uganda Wildlife Authority (UWA), National Agricultural Research Organization (NARO), and academic institutions as well as a few NGOs. Communities were not involved.

While there are several NGOs working in the area of biodiversity and environment protection, few of these have been involved in the debate regarding access to genetic resources. This is perhaps because there has generally been no debate on access to genetic resources in the country. So far, Advocates Coalition for Development and Environment (ACODE), a local NGO has been working with NEMA on the draft access to genetic resources regulations. Another local NGO, Uganda Wildlife Society, has done some research and advocacy on the issue. The African Centre for Technology Studies, based in Nairobi, was involved in the preparation of the draft Access to Genetic Resources Regulations. Still, there is need for further increased debate on access to genetic resources so that the implementation of the regulations is effective.

Since the drafting of the regulations, the subject has remained at the institutional level. Once the regulations are approved, there is need to re-invigorate the debate to stimulate involvement of the communities in implementing and monitoring.

[17] The Conference was held in Rio de Janeiro, Brazil, in 1992.

3.1.2 Benefit Sharing

Benefit sharing may be monetary or non-monetary. In the context of Uganda, there is more emphasis on monetary benefits than non-monetary. UNCST helps parties to negotiate benefits such as:

- Participation of Ugandan citizens and institutions in scientific research and other activities involving access to biological and genetic resources;
- Sharing in research and development results, and commercial, financial, medicinal, and other benefits derived from the use of biological or genetic resources;
- Conducting scientific research or other activities involving access to biological or genetic resources in Uganda;
- Access to, or transfer of, technology and capacity building; and
- Payments of royalties and other compensations.

In the case of monetary benefits, distribution is indirect. The benefits are channelled to the government through the relevant institution. It is then used to finance the national budget which ideally benefits the entire nation. In this way, the benefits are deemed to have gone to the beneficiaries. This tallies with the design of the legal ownership of the resources. National laws vest ownership of natural resources in the state on behalf of and for the benefit of the people of Uganda. These laws create a trust relationship between the state and the people. But it is argued that if the people own the resources, benefits ought to accrue to them more directly. The draft regulations have partly addressed this by providing for accessory agreements which are normally concluded when the biological or genetic resources to be accessed are found on private land or land owned and controlled by a local community. In such cases, some of the benefit goes directly to the owner of the land of the genetic or biological resource.

When the biological resource to be accessed is on public land, the lead governmental agency or UNCST receives the benefit. For example, UWA operates a fund for which one of the sources of money is the application fee for wildlife user rights. Similarly, UNCST operates an account in which application fees for access to genetic and biological resources are deposited. It becomes clear therefore, that the government and the bioprospectors set the parameters for benefit sharing. The communities have no influence on the determination of the benefits to accrue to them, except when the resource is found on their lands.

3.1.3 The Constitution

The fundamental norms governing access to genetic resources in Uganda are found in the 1995 Constitution.[18] Unlike its predecessor,[19] the current constitution, which was adopted in 1995, contains provisions on sustainable development and environmental management in the National Objectives and Directive Principles of State Policy as well as in its substantive provisions.

Part XIII of the National Objectives and Directive Principles of State Policy provides for the protection of the natural resources of Uganda. This section provides that "The State shall protect important natural resources, including land, water, wetlands, minerals, oil, fauna and flora on behalf of the people of Uganda." This general provision is followed by more substantive and specific provisions on the environment.[20] In particular, the Constitution provides that the State, including local governments, shall create and develop parks, reserves, and recreation areas and ensure the conservation of natural resources.[21] This section further compels the State, including local governments, to promote the rational use of natural resources so as to safeguard and protect the biodiversity of Uganda.

Key provisions in the substantive sections of the Constitution covering ownership, access and control of land reinforce these provisions. Article 237(1) provides that land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure system provided for in this Constitution.[22] Article 237(2)(b) on the other hand provides that notwithstanding clause 1 of this article "the Government or a local government shall hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves, game reserves, national parks and any land to be reserved for ecological and tourism purposes for the common good of all citizens."

Although the Constitution makes no specific mention of "genetic resources," it is tenable to argue that the above provisions provide the framework for the ownership of genetic resources in Uganda. However, the provisions also present practical problems in terms of interpretation and operationalisation of access rules and pro-

18 CONSTITUTION OF THE REPUBLIC OF UGANDA, (1995).

19 Until 1995, Uganda was governed under a Constitution adopted in 1967. For a detailed discussion of the pre-1995 constitutional dispensation, see Godber Tumushabe, *Environmental Governance, Political Change and Constitutional Development*, *in* UGANDA, GOVERNING THE ENVIRONMENT: POLITICAL CHANGE AND NATURAL RESOURCES MANAGEMENT IN EASTERN AND SOUTHERN AFRICA (H.W.O. OKOTH-OGENDO & FODBER W. TUMUSHABE EDS.) (1999).

20 1995 CONSTITUTION, pt. XXVII.

21 *Id.* at pt. XXVII(iii).

22 For details on the land tenure systems, see article 237(3) of the Constitution and section 3 of the Land Act.

cedures. First, the full meaning of the provisions of clause 1 of article 237 has yet to be established since "the citizens" of Uganda are not a recognized juridical construct. This presents the problem of interpretation and determination as to whether genetic resources found in the whole of Uganda are vested in the citizens of Uganda or the vesting has to be determined on the basis of the recognized land tenure systems.

The second problem relates to the application of article 237(2)(b) which effectively creates a trustee-beneficiary relationship between the government and the people of Uganda with respect to natural resources. Although part of Uganda's common law heritage, the "public trust" doctrine, which is essential for the enforcement of beneficial interests, is not well developed in Uganda. Statutory law is developing much faster in recognizing this doctrine than judicial practice. A number of statutes create trustee-beneficiary relationship as between the citizens and the government. But because of lack of court jurisprudence on the doctrine, enforcing the rights of access to genetic resources in protected areas is very difficult. In this context, the government retains the upper hand against its citizens as far as access to genetic resources in protected areas is concerned. Consequently, in the absence of jurisprudence, enforcement of the rights of access to genetic resources in protected areas is not only difficult but also tilted in favour of the government as the trustee.

The 1995 Constitution of Uganda does not contain any explicit provisions regarding issues of access, control, and utilization of genetic resources. However, some inferences may be made with respect to the systems of land tenure provided for in article 237(3) of the Constitution. This article provides that "land in Uganda shall be owned in accordance with the following land tenure systems: customary, freehold, mailo[23] and leasehold."

However, ownership of land is qualified by section 44 of the Land Act[24] which provides that "a person who owns or occupies land shall manage and utilize the land in accordance with the Forest Act, the Mining Act, the National Environment Statute, 1995, the Water Statute, 1995, the Uganda Wildlife Statute, 1996, and any other law." As shown in the later sections of this chapter, some of these sectoral laws set forth procedures and regulations governing access to genetic resources. This means that tenure does not guarantee access to genetic resources in protected areas. One has to apply the procedures and the regulations under relevant sectoral law to access genetic resources.

The Constitution does not lay out any specific provisions regarding benefit sharing. Yet, this is not surprising since a constitution is supposed to lay down the basic principles and additional details enshrined in more specific statutes, rules or guidelines. The only indirect reference could be drawn from the public trust provisions which, in the absence of a well-developed court jurisprudence, provide little guidance to policymakers and practitioners with respect to benefit sharing.

3.1.4 Laws, Regulations, and Policies Specifically Governing Access to Genetic Resources and Benefit Sharing

The 1995 National Environment Statute (NEMA Statute) is the only existing legislation that expressly provides for the regulation of access to genetic resources. Section 45(2) mandates the National Environment Management Authority (NEMA) to issue guidelines for the management and sustainable use of genetic resources of Uganda for the benefit of the people of Uganda. Such measures and guidelines are required to specify:

- the appropriate arrangements for access to the genetic resources of Uganda, by noncitizens and the fees to be paid for such access,
- measures for regulating the export of germplasm,
- sharing of the benefits derived from the genetic resources originating from Uganda, and
- any other matter which the Authority considers necessary for the better management of genetic resources of Uganda.

The nature of these provisions requires NEMA, in consultation with the lead agency,[25] to develop detailed guidelines and regulations prescribing more specific rules of access, control, and benefit sharing. Although the statute does not prescribe the lead agency for access to genetic resources, in practical terms, this role has been assumed by UNCST. Consequently, the drafting of subsequent regulations in this area has been undertaken under the auspices of the UNCST and NEMA.[26] In the following section, we analyse in detail the draft regula-

23 *Mailo* is a form of ownership that confers long-term of ownership of about 1000 years. The name "mailo" is a translation of the word "mile" into Luganda. The nomenclature arose because the land was measured in square miles by the King of Buganda when allocating it to his loyal chiefs.

24 Act No. 16 of 1998.

25 Under section 2, a "lead agency" is defined under the National Environment Statute to mean any ministry, department, parastatal agency, local government system or public officer in which or whom any law vests functions of control or management of any segment of the environment.

26 During the process of developing the current draft regulations on access to genetic resources, most of the lead agencies for specific sectors were encouraged to be part of the process since they would play a significant regulatory role in implementing the regulations.

tions that have been developed in accordance with section 45 of the NEMA Statute.

3.1.5 Draft Laws, Regulations, or Policies

With respect to access to genetic resources and benefit sharing, NEMA has in place draft regulations. These draft regulations are made under the NEMA statute and seek to vest power in the UNCST to implement them. There are also provisions for regulating access to genetic resources and benefit sharing in the draft Plant Variety Protection bill. These are discussed in detail in section 3.3, below.

3.1.6 Status of International Treaties

Generally, international treaties in Uganda do not have binding force until they have been ratified by Parliament. This is because, under the Uganda's 1995 Constitution, only the Parliament of Uganda is empowered to make laws.[27] On the other hand, article 123 empowers the President or person authorized by him "to make treaties, conventions, agreements, or any other arrangements between Uganda and any other country or between Uganda and any international organization or body in respect of any matter." The Constitution further empowers Parliament to "make laws to govern ratification of treaties, conventions, agreements or any arrangements made pursuant to article 123(1).[28]

It is in the light of the above provisions that the status of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) may be considered.[29] Uganda acceded to the ITPGR on March 25, 2003.[30] Under article 3, the "Treaty relates to plant genetic resources for food and agriculture." It covers a broad range of issues including sustainable use of plant genetic resources,[31] farmers' rights,[32] the multilateral system of access[33] and benefit sharing.

Although the ITPGR has recently been adopted and is yet to come into force,[34] a number of legislative initiatives in Uganda are incorporating its provisions. For example, some of the provisions of the treaty are incorporated in the draft Plant Variety Protection bill including some relating to farmers' rights. Although the bill is based on article 27.3(b) of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs), as a sui generis system, the government is taking advantage of the relevant provisions of the ITPGR to come up with an appropriate legislation for the protection of community and indigenous farmers' rights.

3.2 Legislation and Policies with Relevance to Access and Benefit Sharing

3.2.1 The Forest Act, Cap 264, 1994

The main objective of the Forest Act is to consolidate the law relating to forests and forest reserves.[35] The Act prohibits, subject to any exemptions granted under it, the cutting, taking, working, or removing forest produce in or from a forest reserve, village forest, or open land without a license.[36] This provision does not expressly regulate access to genetic resources. It was mainly intended to restrict utilization of forest products, but it can be used to regulate access to genetic resources as well. The Act also prohibits, with exceptions, the clearing, using, or occupying of any land in a forest reserve for grazing, camping, fish farming, the planting or cultivation of crops, the erection of buildings or enclosures for recreational, commercial, residential, or industrial purposes, or construction or reopening of any road, track, or bridge in a forest reserve.

As already indicated, the Forest Act is an old piece of legislation enacted before the debate on access to genetic resources started in the late 1980s. Consequently, while these provisions could be considered relevant to access to genetic resources, they were largely intended as a colonial protection measure for forests across the country. In fact, it is unlikely that the immediate post-independent government was concerned with issues of access, control, or benefit sharing of genetic resources. Rather, the rationale for this and many other pre- and

27 Article 79(2) of the Constitution provides that "except as provided in this Constitution, no person or body other than Parliament shall have power to make provisions having the force of law in Uganda except under authority conferred by an Act of Parliament."

28 See Ratification of Treaties Act, Act No. 5 of 1998.

29 International Treaty on Plant Genetic Resources for Food and Agriculture, *opened for signature* Nov. 3, 2001, *available at* http://www.fao.org/Legal/TREATIES/033g-e.htm (last visited Aug. 23, 2003) [hereinafter ITPGR].

30 It is important to observe that Uganda, as of May 31, 2003, was listed on the Treaty website as having acceded to the Treaty. However, since Uganda participated in the negotiations, this should ratification rather than accession. Personal communication from Mr. John Mulumba Wasswa, National Agricultural Research Organization (NARO), to Godber Tumushabe, June 2, 2003.

31 ITPGR art. 6.

32 *Id.* at art. 9.

33 *Id.* at arts. 10-13.

34 Article 28 of the ITPGR provides that "subject to the provisions of Article 29.2, this Treaty shall enter into force on the ninetieth day after the deposit of the fortieth instrument of ratification, acceptance, approval or accession, provided that at least twenty instruments of ratification, acceptance, approval or accession have been deposited by Members of the FAO." Article 29.2 on the other hand provides that "instruments of ratification, acceptance, accession or approval, deposited by a Member Organization of the FAO, shall not be counted as additional to those deposited by its Member States."

35 See Long Title to the Forest Act, Cap 264.

36 Sec. 14.

post-colonial pieces of legislation was to consolidate state control over these resources.

Nevertheless, given a wide and flexible interpretation, these provisions can be relevant and applicable to bioprospecting. The provisions also take into account the principle of sustainable use to ensure that future generations continue to have the right of access to these resources. In practice however, these provisions have not been applied to regulate access to genetic resources and benefit sharing. Their application seems to be limited to the original purpose, namely to protect forests against illegal exploitation.[37]

3.2.2 The National Agricultural Research Organization Statute, 1992

Sometimes referred to as the NARO Statute, this law was enacted in 1992 to streamline agricultural research activities in Uganda. The statute, among other things, establishes research institutes.[38] These institutes are charged with several activities including identifying production, policy, market, processing, and utilization constraints in the fields of agriculture, livestock, and fisheries. Although most of the research involving biological resources is being undertaken within the NARO affiliated centres, the statute does not contain any provision on access to genetic resources or the sharing of benefits. Similarly, there are no regulations to give guidance on how scientists can access genetic resources for scientific research. Indeed, the issue of proprietorship of innovations from research undertaken at public research institutions such as NARO is still an open-ended question in Uganda, whether they involve genetic resources or not.

3.2.3 The Agricultural Seeds and Plants Statute, 1994[39]

The main objective of this statute is to provide for the promotion, regulation, and control of plant breeding and variety release, multiplication, conditioning, marketing, importing, and quality assurance of seeds and other planting materials. The statute provides for the establishment of a National Seeds Industry Authority whose functions include:

- Review and maintain the national variety list and approve new varieties of seeds;
- Review the history and transformance records of selected varieties of seeds;
- Determine the contribution of varieties of seeds multiplication programmes;
- Make recommendations on absolute varieties of seeds;
- Determine varieties to be released;
- Establish standards of varieties of seeds eligible for seed certification; and
- Formulate policy.

Section 8(1) establishes stringent requirements for variety testing. Accordingly, all varieties of seeds or breeding materials whether imported or domestic are required to be tested for a minimum of three generations before release. The Agricultural Seeds and Plants Statute is silent on access to genetic resources. It speaks more directly to the production of seeds, quality, and release to the market than to the regulation of access to genetic resources and benefit sharing. Because the law gives no such mandate, the National Seed Industry Authority does not regulate access to genetic resources and benefit sharing. The only mandate the Authority may have is to require any researcher coming to them to have a permit from UNCST.

3.2.4 The Uganda National Council for Science and Technology Statute, 1990[40]

This law establishes the Uganda National Council for Science and Technology (UNCST) as the lead agency for scientific and technological research and development including promotion of indigenous science and technology. The law does not specifically provide for access to genetic resources and benefit sharing. However, under its legal mandate of regulating the development of science and technology, UNCST has through practice developed a permit system that requires all researchers to obtain written permits from it before undertaking any research in Uganda. The permit applies for both Ugandan and foreign researchers, although there is differentiation in the amount of fees paid.[41] As already indicated this permitting system is premised on an administrative arrangement rather than a legal requirement. However, it is an important and essential first step in the control of access to biological resources. It could even be extended to cover some aspects of benefit sharing. Since UNCST sets conditions when granting a permit, UNCST could include conditions that address aspects such as benefit sharing. This being a regulatory system, access is automatic as long as the application satisfies all requirements and procedures. Access is restricted only in cases of incompetent applications.

37 John Ntambirweki, The National Profile for Uganda on Policy Developments with Regard to Access and Benefit Sharing Measures (1998, unpublished).

38 National Agricultural Research Organization Statute (1992), sec. 18(1).

39 Statute No. 10 of 1994.

40 Statute No. 1 of 1990.

41 Foreigners are currently required to pay the equivalent of US$300 for each research permit issued.

3.2.5 The Uganda Wildlife Statute, 1996[42]

The Uganda Wildlife Statute was enacted in 1996 to provide, inter alia, for the sustainable management of wildlife, and to consolidate the law relating to wildlife management in Uganda. The statute sought to establish a coordinating, monitoring, and supervisory body that would perform the functions set out in the law. The statute established the Uganda Wildlife Authority as the lead agency for purposes of wildlife and enjoins it:

- to ensure the sustainable management of wildlife conservation areas; and
- to identify and recommend areas for declaration of wildlife conservation areas and the revocation of such declarations.

The statute establishes a system of wildlife conservation areas to, among other things, conserve Uganda's biological diversity.[43] The statute further establishes a system of wildlife use rights; upon application, the UWA can grant a wide range of rights to the applicants. The rights pertain to conservation areas. In terms of bioprospecting, the relevant rights are: trading in wildlife and wildlife products, general extraction, and using wildlife for educational or scientific purposes including medical experiments and developments. But there is no explicit mention of bioprospecting or benefit sharing.

The unique character of this legislation is that it makes provisions in general terms for the sharing of benefits accruing from the utilization of wildlife resources but does not provide for terms and conditions for benefit sharing.[44] However it gives the minister power to prescribe additional considerations for conditions for grant of wildlife use rights.[45] The regime may be used to regulate bioprospecting through the application process for wildlife use rights although in practice these provisions have not been invoked for that purpose.

According to the statute, application for wildlife use rights is made to UWA.[46] UWA grants such rights on the basis of the considerations stipulated in the statute.[47] The regime of wildlife use rights, as introduced by the Statute in 1996, was something entirely new in wildlife management in Uganda. It has therefore taken sometime to operationalise these provisions, and this hampers efforts to undertake a more empirical analysis of the utility of the provisions as an adequate framework for promoting benefit sharing.

Further still, the application process for wildlife use rights requires some level of literacy and awareness among potential beneficiary communities. In the current socio-economic context, the application of wildlife use rights can easily be exploited by elite businessmen and women who may want to cash in on the regime without extending any benefit to the local communities.

3.2.6 The Fish Act, Cap 228

The Fish Act predates the genetic resources debate that has ensued since UNCED.[48] The Act generally provides for the control of fishing, the conservation of fisheries, and the purchase, sale, marketing, and processing of fish. Like the Forest Act, the Fish Act does not specifically address access to genetic resources or sharing of benefits accruing from their utilization. Under the Act, the ownership of marine resources vests in the government. The government regulates access to those resources through the fisheries department, which grants fishing permits. These permits are strictly for fishing purposes. For scientific research, one must have the permit from UNCST under the established administrative procedure. Accordingly, the provisions relating to ownership of and access to fish can affect the legal regime governing access to pescatorial genetic resources.

3.2.7 Intellectual Property Rights

Uganda is a member of the WTO and, being one of the least developed countries, is required to implement the full provisions of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) by January 2006. In its stated position shared with Cuba, Pakistan, Dominican Republic, and Sri Lanka during the Seattle Ministerial Conference, Uganda recognised the inconsistencies between the TRIPs Agreement and the Convention on Biological Diversity, and expressly stated that, pending thorough examination of the issue, patents inconsistent with article 15 of the Convention should not be granted.

Regarding implementation issues to be discussed during the first year of negotiations, Uganda again stated a joint position with Pakistan and Sri Lanka to the effect that article 27.3(b) of TRIPs be amended in light of the provisions of the CBD and ITPGR. In these two agreements, the conservation and sustainable use of biological diversity, the protection of the rights and knowledge of indigenous and local communities, and the promotion of farmers' rights are fully taken into account.

---

42 Statute No. 14 of 1996.

43 See secs. 14-19.

44 See, e.g., secs. 20(e), 20(2)(c), 26.

45 Sec. 33(70(k).

46 Sec. 32.

47 See sec. 33 for further details.

48 During the stakeholder discussions on the draft access to genetic resources regulations, the issue of fisheries genetic diversity kept surfacing as one that could easily be sidelined.

Uganda further proposed that the review of the substantive provisions of article 27.3(b) should, inter alia:

- clarify artificial distinctions between biological and microbiological organisms and processes; and
- ensure the continuation of the traditional farming practices, including the right to save and exchange seeds and sell their harvest.

The position of the African Group at the Seattle Ministerial, of which Uganda is a member, was similar in many respects to that of the rest of the developing countries. The African group questioned the TRIPs requirement for mandatory patenting of some life forms and some natural processes. It proposed a clarification that plants, animals, and microorganisms should not be patentable. It also sought a clarification that a sui generis system of plant varieties protection could include systems that protect the intellectual property rights of indigenous and farming communities. The African Group further proposed that the provisions of the TRIPs Agreement should be in harmony with the CBD and ITPGR.

The Patent Statute[49] specifically excludes plant and animal varieties and microorganisms from patentability.[50] No legal, regulatory, or policy changes have been made yet, and there are no other legal forms of protection for plant varieties in Uganda. Uganda has not yet acceded to the Convention for the Protection of Plant Varieties (UPOV). However, the government is in the process of reviewing all the laws that are affected by the TRIPs Agreement and out of this process it is hoped that the issue of conformity with article 27.3(b) will be addressed.

With regard to patenting of life forms and processes, Uganda's position is reflected in the African Group position mentioned above. This position is premised on the concerns raised by various interest groups over food security and livelihoods of smallholder farmers. Farmers have always freely shared, saved, and accessed seed without restriction. Ethical issues are also raised from various corners, as is the lack of clarity on the criteria and rationale for protecting life forms. The other issues of concerns are the impact of patents on life forms on further research. The position of Uganda government is augmented by the current Patent Statute, which excludes plant and animal varieties from patentability.

However section 21(1) of the Patent Statute provides that the Minister may by statutory instrument direct that applications for patents relating to specified technical field be subject to examination as to substance and under sub-section (2), the minister may add further technical fields. However, no such statutory instrument has been adopted to date.

Other sectoral laws provide for protection of various innovations. For example, The Animal Breeding Act provides under section 9(4) that all animal genetic material developed in Uganda shall be patented and thus protected under provisions of national and international intellectual property rights. Under the status quo, this conflicts with the provisions of the Patent Statute which excludes protection of life forms. But the conflict will diminish when the TRIPs Agreement enters into force since article 27(3)(b) obligates member states to provide protection for plant and animals either by patents or a sui generis system. The Agricultural Seed and Plant Statute, for its part, provides for the grant of breeders rights for a variety of seeds. While this may conflict with the Patent Statute, the conflict diminishes because this represents a sui generis system for the protection of seeds.

3.3 New Initiatives

3.3.1 The Draft National Environment (Access to Genetic Resources and Benefit Sharing) Regulations, 2001

The draft National Environment (Access to Genetic Resources and Benefit Sharing) Regulations, 2001 (hereinafter "the draft regulations") were drafted over a period stretching from 1998 to 2001. The final draft of the regulations was submitted to NEMA in March 2001. The draft regulations were developed through a consultative process involving key government agencies and civil society organizations.

The draft Access to Genetic Resources Regulations present the most comprehensive attempt by the government to date to put in place a regulatory framework for access to genetic resources and benefit sharing. The draft regulations define genetic resources as any genetic material of actual or potential value. These regulations are still pending approval of the Policy Committee of NEMA before they are published in the official gazette.

In the current form, the draft regulations are set out in five parts. Part I addresses preliminary issues, defines the key terms, sets out the objectives of the regulations, and sets the scope of application and vesting of rights over genetic resources. Regulation 3 provides that the objectives of the regulations are three-fold: providing arrangements and procedures for access to genetic

[49] Statute No. 10 of 1991.

[50] Sec. 8(1)(b).

resources of Uganda; providing for benefit sharing; and promoting sustainable management and utilization of genetic resources. Regulation 5 on the other hand vests the right to determine, control, and regulate access to genetic resources in the government for the benefit of the people of Uganda.

Part II of the draft regulations lays out an institutional framework for the management of genetic resources. It designates the UNCST as the competent authority for all matters relating to access to genetic resources including acting as a clearinghouse mechanism. This part of the draft regulations also attempts to demarcate responsibilities between the competent authority and other lead agencies, as well as between NEMA and the competent authority. Regulation 12 extends the scope of these regulations to the protection and enhancement of traditional and community knowledge.

In Part III, the draft regulations provide for all matters to be contained in a material transfer agreement (MTA). The MTA is made a condition precedent to access any genetic resources of Uganda. The various actors are brought into the MTA negotiation process through what is referred to as accessory agreements. Regulation 19 in particular provides for the sharing of benefits arising from the utilization of genetic resources. While regulation 19(1) provides the principles that should apply to benefit sharing (fairness and equity), regulation 19(2) sets out more generic benefits to be shared including participation of Ugandan citizens and institutions in any activities being conducted with the genetic resources, payment of access fees and royalties, joint ownership of patents, etc. These principles basically constitute the terms and conditions for access.

The draft regulations contain comprehensive provisions on benefit sharing. Regulation 19(1) provides that "in accordance with these regulations, the benefits accruing to the collection, modification and use of biological or genetic resources shall be shared under the principle of fairness and equity and on mutually agreed terms as provided for in this regulation." The regulations provide five instances in which benefits could be shared. First, it is a requirement that Ugandan citizens and institutions participate in the scientific research and other activities involving the biological or genetic material obtained in accordance with these regulations. Second, the regulations provide for sharing of benefits from the research and development results as well as commercial, financial, medicinal, and other benefits. Third, the agreement for access may require that some of the scientific research or other related activities be conducted within Uganda. Finally, the regulations provide that the agreements for access may include requirements for access to, transfer of technology, and capacity building, as well as payment of royalties or any other payments mutually agreed.

It is important to note that the benefits mentioned above are not exhaustive. Rather, they are a minimum requirement for any MTA and additional benefits may be negotiated depending on the biological or genetic material involved.

Until the draft regulations become law, access to genetic resources and benefit sharing will remain regulated under the broad provisions of the National Environment Statute and the administrative regulatory procedures of the UNCST permit system.

Regarding access to genetic resources, the major initiative is the process of finalizing the draft regulations on access to genetic resources. It appears that the final draft of the regulations will be published and come into force sometime by the end of 2003.[51]

UNCST has also embarked on a process of developing a bioprospecting programme. However, it is not possible to determine how long the process of developing such a programme may take.

These processes are driven by the realisation that genetic resources can be exploited for economic development and poverty eradication. These goals are articulated in many of the government policy documents such as the Poverty Eradication Action Plan (PEAP) and many sectoral policy documents. These documents were compiled through multi-stakeholder consultations at the national level. In terms of access to genetic resources, the government seems to give priority to revenue collection. Other objectives such as conservation are crucial, but seem not to attract equal attention.

3.3.2 The Draft Plant Variety Protection Bill

Another ongoing legislative process relevant to access to genetic resources and benefit sharing is the process to enact a law on plant variety protection. The Draft Plant Variety Protection Bill was prepared by the Uganda Law Reform Commission and published by the Ministry of Agriculture in 2002. The draft bill seeks to "promote the development, conservation and sustainable use of plant varieties including knowledge and technologies in order to maintain, improve and protect their diversity as a means of enhancing national food security and economic returns."

The draft bill specifically recognizes the rights of both the plant breeders for their new varieties and the local communities for the existing varieties. The bill

[51] Official information from NEMA, obtained through an interview with a senior legal officer.

seeks to protect community rights, plant breeders' rights, and farmers' rights and to promote appropriate mechanisms for equitable sharing of benefits from the use of their varieties, knowledge and technologies The bill also establishes a new institutional arrangement for enforcing these rights.

It is important to observe that the Plant Variety Protection Bill contains some of the provisions in the draft regulations on access to genetic resources and benefit sharing discussed in more detail below. For example, the bill provides for prior informed consent, which is already provided for in the draft regulations on Access to Genetic Resources (discussed above in section 3.3.1). The bill requires that any person who wishes to access plant genetic resources of a community variety for the development of a plant variety should obtain PIC of the community that owns the variety. The draft bill does not provide a procedure for obtaining prior informed consent.

4. CONCLUSION: STRENGTHS AND WEAKNESSES

The main strength relating to access to genetic resources lies in the fact that Uganda is a signatory to the Convention on Biological Diversity. The Convention requires signatory states to put in place measures and mechanisms for regulating access to genetic resources. This has therefore prompted many governments, including Uganda, to put the issue of access to genetic resources firmly on the policy and legislative agenda.

The current regulatory system regarding access to genetic resources is based on administrative procedures and practices developed on the basis of wide interpretation and possible implied mandate of UNCST. The system lacks not only the force of law but also clarity and uniformity. Clarity would ordinarily occur when it is based on the law because the law specifies what has to be done, when, by whom, and how. Any derogation would make the decision illegal. This does not happen in a procedure based on administrative practice. The institutional framework is still not streamlined and the legal framework is yet to be clarified. This is the major weakness. This weakness is increasingly conspicuous due to the failure of the government to approve the draft Regulations on Access to Genetic Resources or an alternative legislation.[52]

While regulation of access to genetic resources and benefit sharing in Uganda under the current legal and policy framework remains inadequate and uncoordinated, a lot of bioprospecting continues to take place and genetic resources continue to be exploited without benefits accruing to the communities. There are legal and policy initiatives, however, to regulate access to genetic resources and benefit sharing. Approval of the draft regulations on Access to Genetic Resources and Benefit Sharing is expected by end of this year. These regulations are expected to establish a comprehensive and well-coordinated regulatory and administrative system. This system, however, will only work in an environment of well-sensitised communities and policymakers.

---

[52] At a meeting of the Technical Committee on Biological Diversity of the National Environment Management Authority (NEMA) on May 2, 2003, it was reported that the draft copy of the regulations had been submitted to NEMA's Policy Committee on the Environment for final approval. Minutes of Meeting with the National Environment Management Authority (2003).

CHAPTER 18
ACCESS TO GENETIC RESOURCES IN ZAMBIA

Lovemore Simwanda & Godfrey L.P. Mwila***

1. BACKGROUND

Zambia, like most countries in Africa, is endowed with an abundant heritage of biological resources. These include crop and medicinal plants, domesticated and wild animals, fisheries, beneficial insects and microorganisms, and a wide range of forestry resources such as fruit trees, timber, and fodder trees and shrubs. This biodiversity has been nurtured and maintained by generations of local communities through their traditional practices and customs.

The rich heritage of biological diversity in Zambia is threatened with erosion and loss due to a number of factors. This realisation has led to implementation of initiatives to mitigate the situation at the global, regional, and national levels.

The chapter assesses of the status of genetic resources management with focus on the policy, legal, and institutional issues and frameworks affecting access to genetic resources. The discussion covers all major categories of biological resources, including agricultural biodiversity, forestry resources, and fisheries.

1.1 Geography and Climate

Zambia is a land-locked country situated in southern Africa. The country is approximately 752,617 squares kilometres in size, lying between latitudes 8° and 18° South and longitudes 22° and 34° East. It is surrounded by eight neighbouring countries, namely Tanzania and the Democratic Republic of the Congo to the north; Malawi and Mozambique to the east; Zimbabwe, Botswana and Namibia to the south; and Angola to the west.

Most of Zambia lies between 1,000 and 1,600 m above sea level. The highest parts of the country are in the northeast, with the plateau gradually sloping to the southeast. The large rivers and plains of Kafue, Zambezi, and Chambeshi form expansive wetlands, which divide the landscape. The dominant soil types are oxisols, ultisols, and alfisols, with entisols in the Western part of the country, and some vertisols in the valleys and floodplains.

The country's sub-tropical climate is characterised by three seasons: the hot dry season from August to October, the rainy season from November to April, and the cool dry season from May to July. The mean annual rainfall ranges from 700 mm in the southern parts of the country to 1,400 mm in the northern part. Average temperatures range from a mean monthly minimum of 10°C in June and July to a mean monthly maximum of 30°C in October and November.

From the agro-ecological point of view the country is divided into three major regions. Region I covers the low-lying valley areas and is characterised by low mean annual rainfall (< 800 mm), high temperatures, and a shorter growing season. The soils tend to be more fertile. Agriculture production in this region is concentrated on millet, sorghum, and livestock rearing. Region II covers much of the plateau areas of Southern, Central, Lusaka, Western, and Eastern Provinces. The annual rainfall is medium (800-1000 mm). This region is the most densely populated and has the most agricultural activities. It is characterised by permanent cultivation systems, with maize, groundnut, and livestock rearing being the major agricultural production activities. It has traditionally been considered the Zambian maize belt. In the semi-arid sandy areas of Western Province, the production of cassava, sorghum, millet, and extensive cattle rearing predominate. Region III covers the plateau areas of the northern part of the country, which includes the copper belt, part of Central Province, Luapula, Northwestern, and Northern Provinces. It is characterised by high annual rainfall (above 1,000 mm), moderate temperatures, a longer growing season, and relatively leached and acidic soils. The region has relatively low population density and is dominated by traditional agricultural production, which is characterised by shifting cultivation with major crops being millet, cassava, beans, and

** Chairman, Environmental Conservation Association of Zambia.*
***Principal Agricultural Research Officer, Agriculture Research Inistitute, Ministry of Agriculture and Cooperatives.*

groundnut. Livestock rearing is limited compared to the other two regions.

Biogeographically, Zambia falls in the Zambezian biome with some afromontane elements in the northeast. The dominant vegetation type is miombo woodland of *Brachystegia* and *Isobeolinia* species. Mopane woodlands are found in the Luangwa and Zambezi valleys, while extensive wetlands and flood plains are scattered across the country. The country belongs to the Zambezi river drainage system, with about 6 percent of the total land area covered by fresh water lakes and rivers.

It is estimated that at least 5,500 vascular plant species occur in Zambia.[1] There are also at least 233 species of mammals, 731 species of birds, 145 species of reptiles, and 200 species of fish.[2] There are three areas considered as centres of endemism in Zambia. These are the Luangwa valley in the east, Mbala in the northeast, and Solwezi-Mwinilunga in the northwest.

1.2 Socio-political

For political and administrative purposes the country is divided into nine provinces and 73 districts. There are 73 ethnic groups and seven major local languages. English has been adopted as the official language.

The annual population of Zambia is estimated at 9.8 million.[3] The population growth rate averages 3.2 percent since 1990. It is estimated that 42 percent of the population lives in the urban areas, while 58 percent lives in rural areas. Population density averages 12.2 persons per square kilometre, though varying greatly from province to province.

Zambia attained political independence from Britain in October 1964. At the time of independence, the country was considered one of the wealthiest in Africa. This status has changed following the economic decline that began in 1975. According to the 1996 UNDP Human Development Report, per capita income stood at US$270, compared with US$580 in 1975. The decline in economic performance has over the years led to increased poverty levels, with an estimated 80 percent of the population now living in poverty.

There are many variations with respect to soil and vegetation types within each of the major agro-ecological regions. This, together with the influence of ethnic differences among the people found in different areas led to the emergency of various farming systems. The two predominant farming systems in region III, for instance, are slash and burn (*chitemene*) and the grass mound (*fundikila*), in which the main crops are finger millet, cassava, beans, and groundnuts. In region II the cattle-maize farming system is predominant. In region I it is the cattle-sorghum/millet system that is predominant.

1.3 Economy

The main economic activities in Zambia are copper mining, agriculture, and to a lesser extent tourism. Earnings from copper exports provide the bulk of the foreign exchange of the country. The contribution of the agriculture sector to the economy has been increasing over the years mainly due to diversification into non-traditional export crops. Currently its contribution to the GDP is estimated to be between 11 and 16 percent. The sector employs about 70 percent of the labour force in the formal sector and remains the major opportunity for employment creation in rural areas.

Agricultural production in Zambia is broadly categorised as small-scale, with farmers cultivating traditional or customary land and mainly using low-input management systems and commercial scale, where farmers have leasehold titled land and practice high input production systems.

The agriculture sector comprises 85 percent of small-scale farmers, utilising about 75 percent of the cultivated land, and 15 percent commercial farmers utilising the remaining 25 percent. Zambia has an estimated 600,000-700,000 small-scale farm households scattered in the rural parts of the country that depend directly on agriculture. Despite the scale and significance of the agricultural sector, only some 20 percent of the country's potential arable land is utilised.

Zambian agriculture is characterised by great diversity in terms of agro-ecological conditions, farming systems, access to markets, and support services. Maize is the major staple food crop grown both as a subsistence and cash crop throughout the country. Between 1989 and 2002, the area planted with maize averaged about 650,000 hectares, with production averaging about 750,000 metric tonnes.

Following the introduction of economic liberalisation policies in 1991, which included the removal of subsidies on agricultural inputs, the productive capacity of small-scale farmers declined dramatically. Compounded by the adverse effects of drought, poor

[1] Simon N. Stuart & Richard J. Adams, Biodiversity in Sub-Saharan Africa and Its Islands: Conservation, Management and Sustainable Use (1990).

[2] Ministry of Environment and Natural Resources (MENR), National Biodiversity Strategy and Action Plan (1998).

[3] Central Statistical Office of Zambia, 2000 Census of Population and Housing Report, *available at* http://www.zamstats.gov.zm/census/census.htm (last visited Aug. 22, 2003).

access to improved planting material, and declining crop yields due to low soil fertility, food insecurity is becoming a permanent feature of Zambian society. It is estimated that food insecurity in Zambia affects about 80 percent of the population today, especially in rural areas.[4] A number of government interventions are aimed at addressing the increasing problems of food insecurity. One of the main interventions since 2000 is the Food Security Pack (FSP), which seeks to empower vulnerable but potentially viable farmers by providing agricultural inputs, including planting material and seed for selected crops.

1.4 Use of Genetic Resources in Zambia

Conservation and utilisation of biological diversity in Zambia is driven by the need to support the economic and basic livelihood activities of the country. The agriculture, fisheries, forestry, wildlife, and tourism sectors directly depend on these biological resources.

Zambia is endowed with an abundance of natural resources and rich biological diversity. Important components of biodiversity in the Zambian context include agricultural biodiversity; wildlife resources (terrestrial and marine), including birds, insects, and microorganisms; and forestry resources. Traditional communities in different ecosystems in Zambia have relied on local biological diversity for their food, fodder, medicine, and building materials.

While Zambia can still boast of a fairly rich biological diversity, the country faces a number of socio-economic problems with potentially negative impacts that could accelerate the depletion of the country's biological diversity.

1.5 Bioprospecting Activities

Botanical collections of wild plant species for taxonomic and other scientific studies are some of the officially known bioprospecting activities relating to local genetic resources—at times conducted by scientists from outside the country collaborating with local institutions and scientists. Although the objectives of these activities are to collect voucher specimens for taxonomic and biosystematics' studies, plant parts capable of regeneration have also been sampled and taken out of the country for other purposes.

There are no clearly established procedures for obtaining permits to collect plant genetic resources in Zambia by foreign collectors. The collector is, however, expected to submit a written request and receive approval before entering the country and undertaking the collection. There is no special permit document, as grant of permission is by way of a letter of reply, which normally encourages the applicant to be in the company of local counterparts and reminds the applicant of the need to leave duplicate samples of the collected genetic resources in the country. There are no penalties specified for failure to obtain a letter or for violating the conditions of the letter, as the permission granted is based on administrative guidelines.

These foreign institutions collaborate with local institutions either through a memorandum of understanding (MOU), in the case of a project running over a period of time, or through a letter of application to the head of the concerned institution in cases of a one-time activity. Since botanical collections usually target protected areas, either for wildlife or forestry resources, special permits are requested from the authorities managing these areas, normally through the local counterpart, to allow entry into these areas and access to the plant genetic resources. MOUs and permits other than those involving entry into protected areas are ad hoc to a large extent. Permits issued to allow entry into protected areas either for wildlife or forestry resources exploitation or collection are based on set of conditions derived from national policy and legislative framework.

One such institution that has undertaken botanical collections for botanical studies through a collaborative project is the Missouri Botanical Gardens of the United States. This was executed through a MOU signed with the Ministry of Agriculture through the National Plant Genetic Resources Centre under the Research and Specialists Services Department. These explorations and collections were carried out between 1993 and 1997, covering the whole country, and were targeted at the collection of herbarium specimens of wild plant species. Duplicate voucher specimens were left with the local herbarium at Mt. Makulu Agricultural Research Centre. Special permits to enter wildlife and forestry protected areas, such as national parks and forest reserves, were obtained from the Directors of the National Parks and Wildlife and Forestry Departments who issued the written permits. Entry into protected forestry reserves did not require a permit for the purposes of taxonomic collections. No conditions regarding ownership, use, and distribution were applied as it was assumed that only herbarium specimens would be collected and taken out of the country. Duplicate samples were, however, required to be left in the country and results of taxonom-

[4] Programme Against Malnutrition (PAM), The Targeted Food Security Pack Programme for Vulnerable but Viable Farmers: Experiences, Achievements and Challenges Since Inception (2003).

ic identification or any research shared with the collaborating institution in Zambia.

Collections of plant material for medicinal purposes, both by locals and persons from outside the country, have largely been conducted privately and unofficially. These resources have been collected both from open and protected forestry areas.

The other activity related to bioprospecting of genetic resources is the exploration and collection of wild plant species related to crops such as rice (*Oryza ssp.*) and cowpea (*Vigna ssp.*). A written application to the Permanent Secretary or Director of the Research and Specialist Services Department in the Ministry of Agriculture is sent by any external institution seeking to undertake such an activity in the country. This application should provide information on the purpose of the collection, species of interest, and scope of the project. These collections have been carried out by the International Institute of Tropical Agriculture (IITA), for wild *Vigna* species, and by the International Rice Research Institute (IRRI) for wild *Oryza* species. The local counterparts from the collaborating institution usually become team members on the collection expedition. Duplicate samples of the collected genetic material are left in the country. No conditions have been placed on these collections as the Consultative Group on International Agricultural Research (CGIAR) institutions are regarded as development partners whose activities are assumed to have the potential to benefit the country.

Entry into national wildlife parks and collection of the plant material required obtaining permit from the relevant authorities. No conditions relating to ownership, use, and third party transfer are imposed.

2. INSTITUTIONS

2.1 Government Agencies Managing Biological Resources

As part of measures to enhance the management of the country's biological resources, Zambia created the Ministry of Environment and Natural Resources (MENR) in 1991. MENR has the overall responsibility for managing natural biological resources and addressing general environmental problems. The management of agricultural biological resources, such as crops and fisheries, however, falls under the Ministry of Agriculture.

Recent policy changes in the management of various components of biological diversity in Zambia have included strategies that involve and empower local communities in the sustainable use and management of biological resources. A community participation approach to the management of wildlife has been tried, for instance, under the Administrative Management Design for Wildlife Management (ADMADE) in game management areas (GMAs). The objectives of ADMADE included the co-management of wildlife and sharing of revenue generated from utilisation of wildlife with local communities. Full empowerment, in which communities have exclusive rights to their biological resources, has, however, yet to be developed and adopted.

The specific responsibilities for the management of certain biological resources are elaborated below.

2.1.1 Agricultural Biological Resources

Agricultural biodiversity is defined to encompass the variety and variability of cultivated crops, domesticated animals, wild crop relatives, and useful harvestable wild plants, microorganisms, and the agro-ecological complexes with which they are associated. The food and livelihood security of humankind, especially those living in rural settings, depends on the sustainable management of these biological resources that are important for food and agriculture.

Continued research aimed at crop development and improvement is necessary for increased and sustainable crop production. Agricultural biodiversity, in particular plant genetic resources, represents foundation for crop improvement.

Continued availability of the genetic resources for present and future use can only be guaranteed if deliberate measures for their conservation are put in place.

Zambia possesses a wide range of genetic resources of cultivated plant species, their wild relatives, and useful wild plant species, as well as farm animal genetic resources. The crop and animal genetic resources consist of mainly traditional varieties and breeds that have evolved over generations through both human and natural influences. Zambia has also benefited from exotic genetic resources, which have enhanced the local germplasm and facilitated the development of higher performing varieties that are also widely adapted.

Over the years these genetic resources have been subjected to different pressures and threats leading to some loss of valuable genetic diversity. The main factors contributing to the loss of this diversity include the introduction of improved high-yield crop varieties and exotic animal breeds over a number of years, clearing of large areas for agriculture and other developments, recurring drought, and land degradation through overgrazing and soil erosion.

Prior to 1990, when the national plant genetic resources programme was established, activities on plant genetic resources concentrated on germplasm mobilisation. These activities were undertaken between the late 1970s and mid-1980s mainly by international research centres in collaboration with the then-International Board on Plant Genetic Resources (IBPGR), now the International Plant Genetic Resources Institute (IPGRI). The collections were undertaken in conjunction with the relevant departments of the Ministry of Agriculture. In almost all cases, duplicate samples that were left in the country, mainly with relevant commodity research teams, have been lost due to a lack of institutional and technical capacity for their proper maintenance.[5]

The initial collection missions in Zambia were organised and undertaken by International Research Institutions starting in the early 1970s. Most of these missions, which were multicrop and targeted specific areas, were organised and financed by the then-IBPGR (Table 1).

The National Plant Genetic Resources Programme was established in 1989 under the Department of Research and Specialist Services Department of the Ministry of Agriculture and Co-operatives with the mandate to conserve and promote the utilisation of the locally available crop genetic resources. Initial activities under the programme were collection expeditions, which sought to fill gaps in geographic and species coverage. These collections, which have been planned and implemented as national activities, began in 1992 and have been ongoing up to now, and have yielded about 2,500 accessions covering mainly the major food crops.

Some germplasm accessions have been distributed in response to requests from both institutions within the country and those from other countries. Most researchers have made requests for food legumes such as cowpea, and Bambara nuts; cereals such as maize and finger millet; and African leafy vegetables such as *Cleome sp.*, *Amaranthus sp.*, and *Cucurbita sp.* The recipient of the distributed germplasm is required to provide feedback on research undertaken on the genetic resources to the institution that distributed the material.

Some institutions abroad have directly benefited from crop genetic collections made and maintained in Zambia. One such institution is the National Botanical Research Institute of Namibia, which requested 11 and

TABLE 1: COLLECTION MISSIONS UNDERTAKEN BY INTERNATIONAL INSTITUTIONS IN ZAMBIA[6]

YEAR	TARGET AREA (PROVINCES)	SPECIES AND SAMPLES COLLECTED	
1978	—	*Oryza sativa* *O. glaberrima* *O. barthii* *O.longistaminata*	(154) (47) (10) (17)
1980	Eastern & Northern	mainly millets grain legumes	(393) (378)
1981	Southern, Western Central, Copperbelt & Luapula	cereals legumes cucurbits oil seed crops okra	(478) (498) (445) (143) (85)
1982	Northwestern Luapula Northern	various species	(526)
1984	Northwestern Southern	various species	(407)
1987 1989	Eastern, Southern Western, parts of Central Copperbelt Luapula & Western	wild Vigna wild relatives of Vigna, sorghum, Oryza, cucurbits	(168) (184)

5 KALIANGILE *ET AL.* (EDS.), CONSERVING PLANT GENETIC RESOURCES OF ZAMBIA, Proceedings of the First National Workshop on Plant Genetic Resources (1990).
6 *Id.*

five accessions of Bambara nuts and cowpea, respectively. The faculty of Agriculture at the University of Swaziland received 33 accessions of Bambara nuts, 15 accessions of *Cucurbita sp*. (mainly pumpkin), and nine collections each of *Cleome sp*., *Amaranthus spp*., and *Abelmoschus esculenthus*. Some masuku (*Uapaca kirkiana*) provenances were distributed to Tanzania, Malawi, Zimbabwe, and Mozambique as part of a germplasm exchange programme under the ICRAF wild fruit domestication programme. There were no other conditions placed on the distributed genetic resources, apart from the need to share research results among participating countries in the regional collaborative project.

In terms of exchange of genetic resources within the country, local maize, sorghum, and millet germplasm accessions were provided to the respective commodity research teams for screening under the breeding programmes. The School of Agriculture at the University of Zambia has also accessed germplasm material. The requests for germplasm have, in most cases, been directed to the National Plant Genetic Resources Centre (NPGRC). There are no established procedures for germplasm exchange, other than the need to abide by the phytosanitary regulations to ensure the safe movement of germplasm across borders. Individual breeders and researchers outside the country have, for instance, exported germplasm material without the knowledge of the Ministry of Agriculture.

2.1.2 Forest Genetic Resources

Zambian forests provide food sources such as fruits, vegetables, mushrooms, roots and tubers, which are harvested to meet subsistence needs and to a lesser degree, the income needs of local people. Timber derived from indigenous tree species, edible insects such as caterpillars, and secondary products such as honey are valued forest products with great economic potential.

The Forest Act of 1948, as amended in 1973 and 1999, provides regulations pertaining to the exploitation and accessibility of local and national forest resources. Logging of tree species and collection of forest resources is under the direct regulation of the Forestry Department. The act and regulations are directed at the forest reserves, which cover about 10 percent of the country, and aimed at ensuring the conservation and development of forest resources. The Forest Act also encourages joint forest management activities in certain forests. In this scenario, government and local communities come together to manage and utilise certain forest resources in a sustainable fashion for the benefit of all concerned.

Exploitation of forest resources in open areas (customary land under chiefs) is free unless it is for commercial purposes, in which case a forest license is necessary. The license for exploiting forest resources commercially in the traditional chief's area is usually subject to the chief's consent. However, if the produce is to be moved from the particular forest area, a department conveyance license is a must and, in some cases, district council levies are also charged for removal from one district to another. The government established local forest areas for sustainable use while national forest reserves were established to protect major catchment areas and biodiversity.

There have been a number of research initiatives regarding forest genetic resources. Conditions on access to genetic resources has been through MOUs signed between the Forest Department and the research institution, when working in gazetted forest areas, and the Zambia Wildlife Authority (ZAWA) when working in national parks or game management areas. The Forest Department is also consulted when these resources are being accessed in traditional forests (chief's areas), especially in recent times, as concerns about biopiracy are becoming common. Basically, the conditions on these permits result from the general management authority of the particular relevant institution.

There are a number of local initiatives to undertake both in situ and ex situ conservation of species believed to be overexploited, such as medicinal plants and others of significant importance. The conservation of such material is done by natural botanical gardens and the establishment of tree nurseries for out-planting the products in the field. The traditional healers and parishioners of Zambia have established tree nurseries for medical plants, particularly those said to be threatened of extinction due to overuse by the quickly expanding numbers of healers.

The Munda Wanga Botanical Garden and many others in Lusaka are also involved in developing the garden within its zoological park, and many commercial farmers are establishing nurseries and plantations of local indigenous plant species. The Zambia Forest Policy encourages tree planting either at tree nursery level or actual field plantation for reclaiming denuded forest areas. In Zambia, every person is free to obtain plants from tree nurseries regardless of nationality, but if the plant is to be exported from Zambia then the exporter first needs to obtain a phytosanitary certificate.

2.1.3 Wildlife Resources

Until the late 1980s, the management and regulation of wildlife resources, including terrestrial and

marine lifeforms and forestry resources, has been the sole responsibility of the government. For example, the government established national parks primarily for the conservation of wild animals. The other strategy for the conservation and sustainable use of wild animals is game management areas (GMAs). In GMAs, government through the ZAWA controls the hunting of wild animals through a licensing and monitoring system. In Zambia, every person is free to obtain blood or tissue samples if the purpose is seen to be relevant to the ZAWA or any other relevant institution regardless of nationality; but if the blood or tissue samples are to be exported as specimen from Zambia, then the exporter needs to obtain a special clearance certificate from the ZAWA.

A number of game ranches in Zambia have been established by the private sector holding different animal species. Game ranches support both consumptive and non-consumptive uses of wildlife. Game ranching has the potential of significantly contributing to sustainable use and management of wildlife because ranch owners have exclusive rights to this resource. A rancher can make animals available for research to foreign researchers on his or her ranch if the work is being done in country; but if some samples of the animals need to be taken out of the country, then the researcher needs to obtain a special clearance certificate from the ZAWA.

The action plan and policy for the wildlife sector envisions establishing a system of user rights with defined rights of access to wildlife resources for communities inhabiting the GMAs or living near the national parks. This is in addition to safari hunting and non-consumptive wildlife tourism. These rights can also be applied to genetic resources, depending on the circumstances prevailing.

The Wildlife Act No. 12 of 1998 stipulates that entry into a National Park is restricted unless pursuant to a permit from the ZAWA. Access to game and other genetic resources in GMAs is through a permit issued by the ZAWA. These permits do not have special conditions per se, but are part of the generic permit system applied to research. This act also promotes the establishment of community resource boards in GMAs in order to develop an integrated approach to the utilisation and management of natural resources in GMAs or open areas falling under its jurisdiction. In this case, the community resource boards regulate the access to genetic resources under its specific area jurisdiction in order to ensure sustainable utilisation.

2.1.4 Fisheries Resources

The government has also designated the major lakes, swamps, and floodplains as national fisheries, in which the government through the Fisheries Unit in the Ministry of Agriculture and Cooperatives (MACO) controls fishing activities. Regardless, all the major fisheries are either fully exploited or overexploited, and this has led to reduction in stocks of fish.

Current fisheries policy includes the management of both major and minor fisheries, requiring activities such as establishing community-based fisheries management to promote local participation in fish management and sustainable utilisation of both naturally occurring and introduced fish resources.

2.1.5 Institutions Implementing the CBD

The Ministry of Tourism, Environment and Natural Resources is the focal point institution for CBD implementation in Zambia. A Biological Steering Committee was established to coordinate and monitor implementation of programmes on biodiversity management. This committee includes:

- The Environmental Council of Zambia (ECZ), as mandated by the law to control and protect the environment from damage;
- ZAWA, as mandated by the law to protect and ensure sustainable use of wildlife resources;
- The Fisheries Sub-programme in the Ministry of Agriculture and Cooperatives, as mandated to promote sustainable use of fish resources;
- Department of Forestry, as mandated by the law to protect and promote sustainable use of forestry resources;
- Ministry of Agriculture and Cooperatives (MAC), whose primary responsibility is to increase food productivity on a sustainable basis; and
- National Institute for Scientific and Industrial Research (NISIR), which is a government agency established to initiate and carry out scientific and industrial research. It is established by statute under the Science and Technology Act but has no powers regarding authorisation over access to genetic resources for any purpose.

2.1.6 Plant Variety Protection (PVP)

Currently, there is no legal framework or law in place to protect plant varieties, or to regulate access to genetic resources. Neither are there policies or laws specifically addressing farmers' rights in Zambia. The

draft agriculture policy has elements that provide for the need to recognise these rights and promote increased participation of farming communities in the conservation, utilisation of their own genetic resources, and share in the benefits accruing from their use. A sui generis system for plant variety protection (PVP) that incorporates provisions on farmers' fights and the regulation of plant genetic resources has been drafted. This is discussed in more detail in section 3.3 below.

3. LAWS AND POLICIES

The general policy direction of the country with regard to biological resources has been oriented towards the development of an integrated approach for the conservation, sustainable use, and fair benefit sharing.

The National Environmental Action Plan (NEAP) is the national policy framework for the management of the environment and natural resources in Zambia. The NEAP has been instrumental in identifying key environmental concerns for the conservation of genetic resources. This has resulted in sectoral Action Plans that have been drafted to address such concerns.

Since signing the Convention on Biological Resources (CBD) in 1993, the country has embarked on measures to control the depletion of its biological resources and promote their sustainable use, by starting to implement appropriate provisions of the CBD. This had involved reviewing policies, strategies, and legislation in order to enhance capacities for conservation and sustainable utilisation of the country's biological resources. These led to the implementation of a number of measures which included the formulation and adoption of the National Environmental Action Plan (NEAP) in 1994, adoption of the Environmental Support Programme (ESP) in 1996, the preparation of the Zambia Forest Action Plan (ZFAP) in 1997, and the preparation of the National Biodiversity Strategy and Action Plan (NBSAP) in 1998. The NBSAP expanded the policy framework for the management of Zambia's biological resources, with clearly identified and prioritised strategic goals. Repealing certain laws affecting the conservation and utilisation of wildlife, fisheries, and forestry resources strengthened the system of in situ conservation of biological resources. Measures for ex situ conservation have been initiated through involvement of the private sector in the establishment of game ranches and bird sanctuaries.

The NBSAP recognises the rich base of biodiversity resources of Zambia and the important role of genetic resources, particularly as integral components in the economic development of the country. The conservation and sustainable use of the genetic diversity of Zambia's plants, animals, and fisheries are therefore reflected as strategic goals in the NBSAP.

Cooperation with local communities has characterised the design and implementation of the joint forest management mechanisms, strengthening and increasing public awareness in conservation and sustainable use of biological resources and the promotion of the establishment of community based natural resources management (CBNRMP) projects.

Changes to the policy and legal frameworks have affected the management of the major components of the country's biological resources. Legal changes in the wildlife, forestry, and fisheries sector have to a large extent been through amendments to the existing laws. Policy changes have been directed at increasing participation by the private sector and communities in the management of these resources.

3.1 International Processes

Zambia signed the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) on November 4, 2002, and has begun the process of ratification. To this effect, the Minister of Agriculture has prepared a cabinet memorandum. The circulation of the memorandum and the treaty document will facilitate consultations among relevant government ministries. Consultations of relevant stakeholders during negotiations leading to the agreement and adoption of the ITPGR were done at the national level through seminars following each negotiating session and through a number of national and regional workshops. The national workshops on plant genetic resources held in 1999, and attended by representatives from government departments, NGOs, universities, traditional leaders (chiefs), and the Parliamentary Committee on Agriculture, were particularly significant in this regard.

There are currently no specific initiatives directed at the implementation of the ITPGR, although recent and upcoming policy changes provide a conducive environment for the realisation of some of the elements of the treaty, especially farmers' rights.

Zambia is a member of the World Trade Organisation (WTO) and classified in the category of the least developed countries. As such, Zambia is required to implement the full provisions of the TRIPs Agreement by 2006. However, the Zambian position is supportive of the African Group position with respect to ensuring the compatibility of TRIPs with the CBD. The

major concern that Zambia has, like most African countries, with the WTO and the TRIPs Agreement in particular is the lack of recognition of communal ownership rights of genetic resources by the intellectual property rights (IPR) provisions and the danger of appropriation of these resources. It is also feared that by bringing biological resources under WTO, the earlier international agreements such as CBD would be undermined by turning genetic resources into mere commodities of international trade.

Zambia does not support the patenting of lifeforms, including plant varieties, and as such intends to follow the sui generis system to provide for the protection of plant varieties as required by article 27.3(b) of TRIPs. This should provide a balance between the interests of breeders' (formal innovators) and farmers' rights and should include provisions on equitable and fair benefit sharing. To this effect Zambia has been considering the adoption of the African Model Law to develop such a sui generis system. There has, however, been influence, mainly from external forces, to adopt UPOV as the appropriate sui generis system for complying to TRIPs regarding plant variety protection. To date, however, Zambia has not acceded to or ratified any of the UPOV Acts.

The proposed access regime is for extractive and consumptive purposes oriented toward enhancing community participation in biodiversity conservation, utilisation, research, and development capacities. In the long term, the regime should facilitate benefit sharing and contribute to improved livelihoods of local communities. The government is addressing this by encouraging CBNRM initiatives to be run by community-based committees and structures for the control, management and utilisation of the resources, such as community resource boards and joint forest management teams that will be governed by by-laws developed by the affected communities in their respective areas.

The priority elements of the government's policy affecting the management of biodiversity in general, and the development of an access regime in particular, are poverty alleviation through community empowerment and capacity building as the main strategies.

3.2 Laws and Policies with Relevance to Access and Benefit Sharing

3.2.1 The Constitution

The Zambian Constitution is rather vague on the provisions for environmental and natural resources management. However, the Constitution does recognise the fact that the government has an obligation to provide a healthy environment, safe drinking water, and good sanitation, although this is a privilege and not a right.[7]

Regarding land, the Constitution places custodianship of the land resources to the republican president, who holds it in perpetuity on behalf of the people of Zambia.

3.2.2 Framework Statutory Provisions

The current policies and legislation do not treat genetic resources as different from biological resources especially with regard to forestry and wildlife resources. This distinction is, however, made in the case of crops and animals.

Land Act, Cap 287

In Zambia there are two land tenure systems: customary and statutory tenure. The current statutory system is the leasehold tenure system where land holding rights are recognised under the law and persons holding such land may use it as collateral. The customary land tenure system is also recognised under Zambian law, although the nature of the rights means that persons holding such land cannot use it as collateral. In addition, the security of tenure under customary law is impaired by the fact that there is often no proper physical description of boundaries and therefore, the land is prone to encroachment and disputes. Customary land, which is mostly administered and allocated by traditional chiefs, forms the bulk of the land in Zambia.

The land allocation procedure varies slightly according to the land category on which the plot being applied for is located. In the case of statutory (also known as state land) land, the land delivery process starts with the identification of an area, which is planned into plots by the planning authorities, namely: district, municipal, and city councils. In the case of agricultural land, the agents are the Department of Field Services in the Ministry of Agriculture and Cooperatives and the Resettlement Department under the office of the Vice President.

For land allocation in customary areas, the land delivery process starts with a prospective developer approaching the chief or chieftainess of the area for consent to hold land on leasehold tenure and to obtain a certificate of title. Where the chief or chieftainess is satisfied that the land is available, the chief or chietainess writes a consent letter addressed to the council secretary. In addition, a planning authority depicting the land that is being applied for draws a site plan. The consent letter

[7] Const. of Zambia (Act No. 17 of 1996, *as amended by* Act No. 18 of 1996), pt. IX (Directive Principles of State Policy and the Duties of Citizen), sec. 112.

and site plan are taken to the council secretary, who endorses and stamps the documents, has the land inspected by the committee that deals with land matters, and has the applicant interviewed. Where the applicant is successful, the council secretary recommends the allocation of the unnumbered plot, to the Commissioner of Lands. The application forms, site plan, and council minutes are attached to the recommendation letter certifying that the recommended plot is free of settlement by other subjects of the particular chief or chieftainess. If satisfied, the Commissioner of Lands approves the application. For land in excess of 250 hectares, the Commissioner of Lands must seek clearance from the minister responsible for land before approving an application.

The demand for land has increased considerably, and there are more applications seeking land in both sate and customary land. Currently, the land delivery system is unable to meet the increase in the demand by the public for title to land. This high demand for land calls for the conversion of customary land into state land to meet future land requirements.

Restrictions on granting land to non-Zambians (foreigners) were established when when the Conversion of Titles Amendment Act No. 15 of 1985 was passed. The land allocation procedure to foreigners does not differ from the procedure followed by Zambians. However, when alienating lands to non-Zambians, there are some conditions that non-Zambians are required to fulfil.

For Individuals:

a. They should be residents in Zambia or hold an entry permit in accordance with the Immigration and Deportation Act, Chapter 123 of the Laws of Zambia;
b. They must be investors within the meaning of the Investment Act, Chapter 385 of the Laws of Zambia and hold an investors license;
c. They must obtain the state's consent in writing;
d. The interest or right in land should be inherited upon death of the title holder or transferred under the right of supervivorship; and
e. The interest or right in land should arise out of a lease for period not exceeding five years.

Environmental Pollution and Control Act (EPPCA) of 1990

The EPPCA was enacted in 1990 and provided for the establishment of the Environmental Council of Zambia, which has a broad mandate for the control of pollution, protection of the environment, and monitoring trends in the use of natural resources in the country. The subsequent review has provided for environmental impact assessments (EIA) to be conducted each time extensive exploitation of natural or biological resources is to be undertaken.

This act requires an EIA for any significant resource exploitation that is to be undertaken. As with other EIA regimes relating to extractive industries and uses, an EIA is required when the proposed activity is likely to, or may, have a significant impact.

Zambia Wildlife Act, Cap 316(1998)

The Zambia Wildlife Act provides for the establishment of the ZAWA. The mandate of the ZAWA, established in 2000, is to conserve Zambia's wildlife resources. Among other duties, the ZAWA manages the biological systems in wildlife protection areas in order to preserve biological diversity. Thus, anyone seeking access to any biological resource found in wildlife protected areas, either for consumptive or any other purpose, is required to get permission from the ZAWA. Indeed this act is the basis for the ZAWA issuance of research permits in protected areas, as mentioned in section 2.1.3 above on wildlife resources.

Forest Act, Cap 119 (1973)

The current Forest Act was enacted in 1973. In 1999, the act was revised based on a 1998 policy document. However, the revised act has not yet been implemented. In Zambia, the essence of forest management is to maintain forest biodiversity on a sustainable basis. The current Forest Act (Act No. 7 of 1999) does make some mention of joint forest management initiatives, in which communities will have control over the management and utilisation of forest resources.

Fisheries Act, Cap 314 (1974)

The Fisheries Act of 1974 provides for the conservation and protection of aquatic biodiversity. The current Fisheries Act does not adequately provide for community involvement in the management of aquatic biological diversity. The act is to be revised soon, and a bill to this effect is before Parliament. The current revised Fisheries Bill mentions community-based fisheries. However, the bill does not have any provisions on the general management of the marine resources or specifically relating to extraction.

3.3 New Initiatives

The Ministry of Agriculture and Cooperatives has spearheaded the drafting of Plant Variety Protection (PVP) Draft Bill that incorporates breeder's rights, farmers' rights, and the regulation of access to plant genetic resources. The Seed Control and Certification Institute (SCCI), a government agency under the Ministry of Agriculture and Cooperatives, in conjunction with key stakeholders, spearheaded the drafting of the bill. This draft bill is currently being reviewed at the Ministry of Agriculture before submission to Cabinet and later Parliament for adoption and enactment respectively. The process, however, has moved slowly.

The Ministry of Science, Technology and Vocational Training has initiated a process to develop the national Biotechnology and Biosafety Policy and Legislation, which requires a convergence of skills from a variety of disciplines. Biotechnology has also brought with it concerns about potential risks posed to animals, human health, and the environment.

The Ministry of Environment and Natural Resources has embarked on the development of the National Environmental Policy aimed at enabling Zambia to fulfil some of its obligations to the CBD.

Zambia is currently participating in a global IPGRI project aimed at strengthening capacity at national and regional levels for policy development in genetic resources management issues.[8] The central approach of the project is stakeholder appraisal as the basis for identifying priority genetic resources policy issues, which then become the focus for intervention in terms of policy development and strengthening. The Department of Research and Specialist Services in the Ministry of Agriculture and Co-operatives is hosting the country project and has appointed a task force to implement the activities of the first phase.

4. CONCLUSIONS

One of the major weaknesses of the policy development process has been limited direct community involvement in the debate pertaining to biodiversity management, access to genetic resources, and benefit sharing. Much of this has been through NGO, CBO, and traditional leaders representation at provincial, national, and district levels.

Discussions regarding fair benefit sharing by communities of benefits accruing from the utilisation of genetic resources within the country have been limited. Government officials, researchers from the universities, and NGO representatives are the key players in defining parameters that may be used in benefit-sharing mechanisms.

There are no established procedures for germplasm exchange, other than the need to abide by phytosanitary regulations to ensure the safe movement of germplasm across borders. Individual breeders and researchers outside the country without the knowledge of the Ministry of Agriculture have, for instance, exported germplasm material.

Currently, there is no legal framework or law in place to protect plant varieties, or to regulate access to genetic resources. Neither are there policies or laws specifically addressing farmers' rights in Zambia. The draft agriculture policy has elements that provide for the need to recognise these rights, promote increased participation of farming communities in the conservation and utilisation of their genetic resources, and share in the benefits accruing from their use.

There are currently no specific initiatives directed at implementing the ITPGR, although recent and forthcoming policy changes provide a conducive environment for the realisation of some of the elements of the treaty, especially farmers' rights.

There are no clearly established procedures for obtaining permits to collect plant genetic resources in Zambia by foreign collectors. Similarly, the Zambian Constitution is rather vague on the provisions for environmental and natural resources management.

The priority elements of the government's policy that impact on the management of biodiversity in general, and the development of an access regime in particular, in Zambia are poverty alleviation through community empowerment and capacity building as the main strategies. In addition, the high demand for land in Zambia calls for the conversion of customary land into state land to meet future land requirements.

The current policies and legislation do not treat genetic resources differently from biological resources, especially with regard to forestry and wildlife resources. This distinction is, however, made in the case of crops and animals.

There also are no laws that address the rights of local communities to control access, ownership, and utilisation of genetic resources. However, there are policies and laws that promote community rights of access to and utilisation of biological resources such as forestry, wildlife, and fisheries. Zambian law does not allow patenting of plant varieties, although there is no other form of protection in place as yet.

8 *See supra* ch. 4, sec. 8 of this volume.

PART III
REGIONAL AND SUB-REGIONAL INITIATIVES

CHAPTER 19
AFRICAN MODEL LAW ON THE PROTECTION OF THE RIGHTS OF LOCAL COMMUNITIES, FARMERS AND BREEDERS, AND FOR THE REGULATION OF ACCESS TO BIOLOGICAL RESOURCES

J.A. Ekpere*

Recent international developments regarding the governance of genetic resources have highlighted the need to address related issues in the African context. The ratification of the Convention on Biological Diversity (CBD), the debate at the World Trade Organization (WTO) surrounding the Trade Related Aspects of Intellectual Property Rights (TRIPs) Council's discussions on the protection of new plant varieties, the conclusion of negotiations on the UN Food and Agriculture Organization (FAO) International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), and the entry into force of the Cartegena Protocol on Biosafety have converged to put several new issues relating to genetic resources on the agenda for Africa's consideration.[1] The drafting of the African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources (the Model Law) is one effort to provide a basis for discussion and common understanding of these international instruments and negotiations to enable compliance and stimulate further negotiations by the African Union member states.[2]

This chapter details the background and process leading to the Model Law and outlines its major aims and objectives. The chapter further explores the key provisions of the Model Law and how they respond to or are in consonance with the CBD's provisions on access to biological resources and associated benefit sharing, as well as with obligations under related international agreements. Finally, the chapter evaluates some of the recent attempts to arrive at a common understanding of the legal issues related to access and benefit sharing in Africa and the efforts to formulate a regional strategy for implementing its goals in the context of Africa's socio-economic and cultural environment.

The Model Law, crafted as a sui generis regime, regulates access to biological resources and the sharing of the benefits derived from such access. It was subjected to an extensive process of multistakeholder review in the course of its drafting. It recognizes the rights of local communities (including farming communities) over their resources and the knowledge, practices, and innovations related to those resources. It also recognizes and seeks to protect plant breeders' rights.

The Model Law promotes the principle of prior informed consent and prohibits the patenting of life-forms in consonance with African cultural values and norms. As noted by one commentator, by approaching

* ***Professor J.A. Ekpere is the former Executive Secretary, Organization of African Unity (now the African Union), Scientific, Technical and Research Commission and Coordinator of the Model Law. The opinions expressed in this paper are those of the author and do not necessarily represent the views or positions of the African Union.*** ***The author would like to acknowledge The Organisation of African Unity (now the African Union) for encouraging, supporting, and funding the Model Law initiative; The Gaia Foundation, GTZ, BEDE, and the French Ministry of External Affairs for sundry support; and The OPEC Fund for Development for supporting workshops to finalise the Model Law and paying for its publication.***

1 Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Art. 27.3(b), *reprinted in* 33 I.L.M. 81 (1994) [hereinafter "TRIPs Agreement"]; Convention on Biological Diversity, U.N. Doc. DPI/130/7, June 2, 1992, *reprinted in* 31 I.L.M. 818 (1992) [hereinafter "CBD"]; International Treaty on Plant Genetic Resources for Food and Agriculture, *opened for signature* Nov. 3, 2001, *available at* http://www.fao.org/Legal/TREATIES/033s-e.htm (last visited Aug. 23, 2003) [hereinafter "ITPGR"]; Cartagena Protocol on Biosafety to the Convention on Biological Diversity, *adopted* Jan. 29, 2000, *entered into force* Sept. 11, 2003, *reprinted in* 31 I.L.M. 1257 (2000) [hereinafter "Biosafety Protocol"].

2 African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Genetic Resources, *endorsed* July 1998, *available at* http://www.grain.org/docs/oua-modellaw-2000-en.pdf (last visited Aug. 24, 2003) [hereinafter "Model Law"].

the question of property rights from the perspective of the community, the OAU Model Legislation is able to establish a legal framework for access to biodiversity, benefit sharing, and intellectual property that satisfies the needs and requirements of African states, while meeting the obligations embodied in the international treaties and agreements.[3]

Several components of the Model Law are currently being adapted by African countries in the crafting of national legislation in compliance with article 27.3(b) of the TRIPs Agreement and in accordance with the mandates of the CBD.[4]

I. BACKGROUND

The Organization of African Unity (now the African Union, or AU) actively participated in Uruguay Round of trade negotiations that resulted in the adoption of the WTO agreements, as well as the 1992 Earth Summit in Rio de Janeiro, which resulted in the adoption of the CBD. The AU has also been participating in and paying close attention to subsequent developments in the area of biodiversity regulation. The regional recognition of the critical and wide-ranging implications these developments have for Africa is evidenced by the fact that they are regularly listed for discussion in the annual agenda of the Council of Ministers and Summit of Heads of State and Government of the AU.

While concerns regarding the conservation and ownership rights of biological resources have been regularly expressed in different fora throughout the region for quite some time, it is only relatively recently that the AU's Scientific, Technical and Research Commission (STRC) has started to focus on these issues as emerging and important components of development and commerce. Following the 5th OAU/STRC Meeting of Experts and Symposium on Traditional African Medicine and Medicinal Plants, the STRC convened a joint workshop with the Kenya Industrial Property Institute (KIPI) on "Medicinal Plant Policy Issues on Ownership, Access and Utilization."[5] The purpose of the workshop was to chart a course of action to follow through on the issues surrounding access, benefit sharing, and traditional knowledge raised at the initial symposium. Among the recommendations stemming from the workshop were those directing the OAU/STRC to:

- Initiate and coordinate the process of drafting a model law regulating the protection of indigenous knowledge regarding medicinal plants;
- Establish a working group of experts to further explore means for appropriate coordination and harmonisation of existing national policies on medicinal plants and to craft a common policy on sustainable use of those plants;
- Assist AU member states in coordinating and encouraging consultations regarding the creation of policies on ownership, access, utilisation, and conservation of medicinal plants with other member states at sub-regional and regional levels; and
- Encourage AU member states to recognise the urgent need to study the implications of TRIPs on pharmaceutical production, Africa's bioresource heritage, and the expected harmonisation of intellectual property rights (IPR).

In response to these recommendations, the STRC convened a working group of experts to address the issues raised at the workshop and to draft the appropriate documents for the consideration of the STRC and the member states of the AU. Among the outcomes of the deliberations of the working group were: Draft Model Legislation on Community Rights and Access to Biological Resources; a Draft Declaration on Community Rights and Access to Biological Resources; and a Draft Convention for the Protection, Conservation and Sustainable Use of African Biological Diversity, Genetic Resources and Related Knowledge.

The Draft Model Legislation was tabled at the 34th Summit of Heads of State and Government, where governments of member states decided to:

- Prioritise the need for regulating access to biological resources, related community knowledge and technologies, and their implication for the intellectual property rights regime created by the TRIPs Agreement;
- Adopt the OAU Draft Model Legislation on Access to Biological Resources and initiate a process at the national level, involving all relevant stakeholders, to enact it into law;
- Initiate negotiations among African countries on biodiversity, emphasising the conditions for access

3 Noah Zerbe, OAU Model Legislation: Reconciling the Rights of Breeders, Farmers, and Communities in Africa (2003).

4 TRIPs Agreement, *supra* n. 1; CBD, *supra* n. 1 at art. 15. Article 27.3(b) of the TRIPs Agreement states, "Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof."

5 Mshana, Ndoye & Ekpere (eds.), Proceedings of the First OAU/STRC/DEPA-KIPO Workshops on Medicinal Plants and Herbal Medicine in Africa: Policy Issues on Ownership, Access and Utilization (Apr. 14-17, 1997).

to biological resources and protection of community rights; and

- Develop an African "Common Position" to safeguard the sovereign rights of AU member states and the interests of their local communities, and to forge alliances with other developing countries in order to negotiate appropriate amendments to the TRIPs Agreement.[6]

These recommendations placed the Model Law vis-à-vis the CBD and the TRIPs Agreement on the national agenda of member states. The AU Council of Ministers endorsed swift national action to implement the CBD obligations regarding the protection of community rights and indigenous knowledge, reinforcing the mandate of the STRC to use the Model Law in assisting member states with the development of domestic legal instruments for the protection of community rights, new plant varieties, and regulation of access to biological resources.

2. TRIPS, BIODIVERSITY, AND TRADITIONAL KNOWLEDGE: ANTECEDENTS TO THE AFRICAN MODEL LAW

The provisions of the TRIPs Agreement and the domestic legal and administrative frameworks of many countries has thrown into focus the distinction that is drawn in the international arena between the creativity of local communities and indigenous peoples and the creativity of corporate interests. Only the latter had been accorded significant value, with global recognition and economic reward granted through the formal intellectual property system. This inequity not only derogates and threatens the integrity of biological resources and knowledge systems of local communities and indigenous peoples, but it also undervalues their technologies, innovations, and practices.

Prior to adoption of the CBD, it was argued that biological diversity, and even associated local knowledge, were subjects of universal heritage; resources that should be available to all and which could subsequently be owned through private intervention. For Africans, however, biological resources and related knowledge systems represent sources of community wealth and heritage. Communities consider themselves custodians of these resources and depend upon them for their livelihood. Biodiversity is a resource held in trust by the present generation for the service of both present and future generations. It therefore should not be considered capable of private ownership.

Biological diversity and related knowledge systems, technologies, and practices of local communities have sustained African societies since long before the advent of modern science. Indeed, much of the scientific knowledge of today is traceable to origins in such indigenous knowledge and practice.

The international reliance on global trade concepts, the trend of setting minimum standards for international commerce, and the consistent assigning of proprietary rights to biological resources without regard for the rights of local communities and indigenous peoples has created a situation that is inimical to the interest of these communities and peoples. It is a system that many Africans perceive as patently unfair.

Perhaps the most significant problem raised in the discussions leading up to the formulation of the African Model Law was the apparent contradiction between the CBD, which recognizes the sovereign right of states over their biological diversity, and TRIPs, which confers individual and monopoly rights over these resources through an IPR regime. Article 27.3(b) of TRIPs requires establishing a legal regime that grants proprietary rights over plant varieties either through patents or a sui generis system.[7] As such, TRIPs not only affects recognition of biodiversity-related local technologies, innovations, and practices, it also precludes collective ownership of these resources by local communities for common social good.

With respect to the ownership and control of biological diversity, the two instruments (CBD and TRIPs) evolved from disparate basic principles. The CBD's focus on national sovereignty and community rights directly conflicts with TRIPs' emphasis on private property rights. The resulting inconsistency of mandates requires a reconciliation of the two systems. While countervailing arguments suggesting no conflict between CBD and TRIPs have been made, a recent article by Zerbe clearly articulates the inconsistencies between the instruments, as shown in Table 1.

The concern, therefore, is that the TRIPs Agreement could encourage the appropriation of the knowledge, innovation, technologies, and practices of local communities associated with their biodiversity without regard to sustainable use and equitable sharing of benefits. The IPR system established by TRIPs thus seems to undermine the CBD in protecting biodiversity and associated indigenous knowledge, and detracts from the full realisation of its benefit-sharing regime.

6 Organization of African Unity, Declaration and Decisions Adopted by the Thirty-Fourth Ordinary Session of the Assembly of Heads of State and Government (June 8-10, 1998), *available at* http://www.africa-union.org/official_documents/Heads of State Summits/hog/8HoGAssembly1998.pdf (last visited Aug. 24, 2003).

7 TRIPs Agreement, *supra* n. 1.

TABLE 1: SUMMARY OF AREAS OF CONFLICT BETWEEN TRIPS AND THE CBD[8]

ISSUE AREA	TRIPS	CBD
Patentable Subject Matter	Circumscribes national sovereignty by mandating protection of biological and biotechnological innovations either through patents or sui generis protections.	Principle of national sovereignty implies discretion in drafting IPR legislation, including the right to prohibit private ownership of biological resources.
Benefit Sharing	Strong private IPR with no corresponding rights for communities or farmers, and no mandated benefit sharing.	Benefit sharing mandated, with the exact terms to be negotiated between government and interested parties.
Protection of Local Knowledge	Narrow interpretation of innovation associated only with commercial utility.	Recognises the role and significance of indigenous knowledge relating to the conservation and sustainable use of biodiversity.
Role of the State	Role of the state is to protect private intellectual property. The state has no role in maintaining, promoting, or protecting biodiversity.	Access to biodiversity governed by principle of prior informed consent, including required consultations with local communities.

What was therefore urgently needed was the creation of an appropriate legal system to secure the rights of local communities and peoples (particularly farmers and traditional medicine practitioners) over their resources and associated knowledge. The drafting of the African Model Law was a logical solution to the apparent impasse between existing legal instruments.

3. THE AFRICAN MODEL LAW: PROCESS AND OUTCOME

As noted above, the African Model Law was developed as a result of a process initiated by the STRC and reinforced by directives given by the OAU (now AU) Council of Ministers in 1998. It is an effort to create a sui generis system to regulate access to biological resources and protect the related rights of local communities, farmers, and breeders. The Model Law was developed through a consultative process at the regional, subregional, and national levels, which involved all relevant stakeholders and encouraged public debate.

The Model Law sought to give reasoned attention to the conservation and sustainable use of biodiversity, maintenance of food security, protection of community rights, and equitable sharing of benefits consistent with the provisions of CBD and its principle of national sovereignty. Its principal objective is to

> ensure the conservation, evaluation and sustainable use of biological resources, including agricultural genetic resources, and knowledge and technologies in order to maintain and improve their diversity as a means of sustaining all life support systems.[9]

The Model Law is fashioned as a framework instrument to provide AU member states with guidance in formulating domestic legislation. It also is intended to serve as a basis for generating a sustained African "Common Position" on the TRIPs Agreement in general, and on article 27.3(b) in particular.[10] The TRIPs Agreement provides for a review of this sub-paragraph four years after its entry into force. As most African countries were not active participants in the negotiations leading to the TRIPs Agreement, such review will provide the necessary basis of understanding for an informed common position. This review has yet to be undertaken due to the highly polarised positions that parties have adopted with respect to the appropriate process and substance.

The Law was developed with specific reference to the CBD and article 27.3(b) of the TRIPs Agreement. It does not, however, address many of the wider issues covered by TRIPs. Accordingly, the Model Law was formulated to:

- Recognise, protect, and support the inalienable rights of local communities, including farming communities, over their biological resources, crop vari-

8 Zerbe, *supra* n. 3.

9 Model Law, *supra* n. 2.

10 TRIPs Agreement, *supra* n. 1.

eties, medicinal plants, and related knowledge, technologies, and practices;
- Recognise and protect the rights of breeders over varieties developed by them;
- Provide a regionally tailored system of access to biological resources and related community knowledge, technologies, and practices subject to the prior informed consent of the state and the concerned local communities;
- Provide and promote appropriate mechanisms for enforcing the rights of local communities, including farming communities and breeders, and engender the conditions necessary appropriate access to resources and protection of related community knowledge, technologies, and practices;
- Ensure a supply of good quality seed and planting materials to farmers; and
- Ensure that plant genetic resources are utilised in a sustainable and equitable manner so as to guarantee national food security.[11]

In terms of scope, the Model Law applies to:

- Biological resources, both in situ and ex situ; The derivatives of biological resources;
- Community knowledge, innovations, technologies, and practices related to biodiversity; and
- Local and indigenous farming communities, farmers, and plant breeders.[12]

The Model Law was developed with a view to:

- Preventing the disruption of African rural life and food production that could result from the loss of:
  - Seed and other planting materials necessary for agricultural production; and
  - Traditional medicinal plants, the basis of healthcare for many African people;
- Protecting the natural fibres and dyes that are the materials needed for creation of many forms of African art and crafts;
- Promoting and ensuring the sharing of benefits that biodiversity and related knowledge, technologies, innovations, and practices of African communities make available to multinational corporations, mostly from developed nations;
- Safeguarding the African interests from potentially adverse consequences of globalisation and trade liberalisation; and
- Assisting AU member states who are also members of the WTO in fulfilling their obligations under that regime, particularly that of article 27.3(b) of the TRIPs Agreement.

4. KEY PROVISIONS OF THE MODEL LAW

The Model Law is organised into eight parts.[13] Part I states the objectives and scope of the Model Law. Part II provides definitions of the Model Law. Part III discusses the general concept of access to biological resources and benefit sharing, with an emphasis on: the conditions and procedure for filing applications for access; the meaning and requirements for consultation for prior informed consent; the necessary conditions for granting access; typology and content of agreements; benefit sharing modalities; and revocation of access permits. Part IV defines community rights and all that is implied in their protection. Part V discusses farmers' rights and the application of the Model Law to the protection of farmers' varieties. Part VI presents the requirements for the protection of breeders' rights. Part VII delineates the institutional arrangements for the management and implementation of the Model Law. Finally, Part VIII describes the enabling provisions of the Model Law, with specific reference to sanctions, penalties, and appeals.

In fulfilling their obligations under article 27.3(b) of TRIPs, most African countries have opted to adopt a sui generis, rather than a patent system for the protection of plant varieties. Most of these countries feel that more conventional forms of protection (patents or stronger plant variety protection regimes) are inappropriate for developing countries, although they are currently being applied in many developed countries.[14] In industrialised countries, where the agricultural community represents less than 1.5 percent of the population, the selection and development of new plant varieties is undertaken mostly by private firms and privately financed. The system of protection is based on the logic of an industrial economy in which the investment and interest of large seed companies and their professional breeders must be rewarded and protected through patents or strong plant variety protections (PVPs).

In developing countries (and in Africa in particular), where small farmers play a principal role, such a system is both unsuitable and alien. It is the small farmer who selects, crosses, and breeds new varieties of plants and

11 *See* Model Law, *supra* n. 2 at pt. 1.

12 *Id.. at* art. 2(1).

13 The complete text of the Model Law appears in Appendix E of this volume.

14 *See, e.g.,* The International Convention for Protection of New Varieties of Plants, *done* Dec. 2, 1961, *revised on* Nov. 10, 1972, Oct. 23, 1978, & Mar. 19, 1991, UPOV Doc. 221(E).

exchanges them with other farmers. Generally, it is this pre-selected plant material that plant breeders use in their crop improvement programmes. Moreover, formal breeding activities are mostly undertaken by public institutions, which are supported with taxpayers money. Consequently, the resulting benefits belong in the public domain and generally are not subject to monopoly ownership through patents or strong PVP regimes.

5. DISTINCTIVE PROVISIONS OF THE AFRICAN MODEL LAW

The African Model Law has a number of distinctive provisions and principles. These include: food security, state sovereignty, community rights, importance of community knowledge and technology, participation in decisionmaking, regulation of access to biological resources, prior informed consent, and fair and equitable sharing of benefits. These are discussed in turn.

5.1 Food Security

A high proportion of Africa's food supply is provided by small farmers who practice customary rain-fed farming of multiple crops with farm-saved seeds and with on-farm crop selection. For most communities, locally produced biological resources provide over 95 percent of their requirement for survival.[15] Biological diversity, therefore, is essential for sustainable food production and food security. Loss of diversity often results in ecological instability and has the potential to disrupt sustainable food production by undermining local community control and access to genetic resources. Regulation of access to and conservation of biodiversity is thus a necessary antecedent to effective food security in these societies. Such regulation should be implemented, but should also be appropriately planned for and introduced in a manner consistent with local capacity to assimilate it.

The Model Law endeavours to ensure food security by promoting the conservation of local biodiversity and related local knowledge, technologies, innovations, and practices. It recognises farmers' rights as a counter-balance to breeders' rights as a means for preserving farmers' traditional methods of saving and exchanging seed (and where necessary produce farmer-certified seed). The Model Law thus acknowledges seed security as the foundation for improving the region's long-term food and livelihood security.

5.2 State Sovereignty

Both the Rio Declaration and CBD recognise the sovereign rights of states to responsibly and sustainably access and use their biological resources, as well as to devise appropriate means for equitable sharing of the benefits derived from them.[16] Both instruments stipulate that national legislation should define and guarantee community rights to and responsibility for their biological heritage and related knowledge. This guarantee is in consonance with the ITPGR and protects local communities from the potentially adverse consequences of the ambiguities of TRIPs in this context.[17]

5.3 Community Rights

Human development has historically been defined in the context of the community. This is especially the case in Africa. The focus on the individual that defines many societies in the developed world is generally alien to African cultures. In Africa, local communities are the custodians of their biological resources and associated innovations, practices, knowledge, and technologies, which are governed largely by custom.

The United Nations has acknowledged community rights and has encouraged states to recognise, promote, and protect these rights. As such, some countries are recognising and incorporating collective rights into their national laws.

The African Model Law is based on the principle that the knowledge, technologies, and biological resources of local communities are the result of tried and tested practices of several past generations. They are held in trust by present generations for future generations, and no one has the right to create exclusive property rights over them. The Model Law formally recognises community rights, acknowledging them as particularly important to protect Africa's rich and multiethnic societies and cultural and biological heritage.

5.4 The Importance of Community Knowledge and Technology

The CBD recognises biodiversity as the basis of the livelihood people around the world. Destruction of biodiversity threatens the life-support system of all humans

15 *See, e.g.*, J.A. Ekpere, The African Model Law: The Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources – An Explanatory Booklet (2d ed. 2001).

16 Rio Declaration on Environment and Development, prin. 2, UN Doc. A/CONF.151/26, Aug. 12, 1992, *reprinted in* 33 I.L.M. 874 (1992); CBD, *supra* n. 1.

17 ITPGR, *supra* note 1.

by undermining the ecological processes that provide the ingredients for our food, medicine, shelter, and livelihoods.

Just as local knowledge and practices provide the basis for ensuring food security, such indigenous knowledge and use of resources have often played significant roles in the preservation of local biodiversity. The TRIPs Agreement does not recognise the role that the knowledge, innovations, and practices of local communities play in this context, as these practices are not subject to protection under its intellectual property regime. By contrast, the CBD appreciates the importance of local practices to biodiversity conservation and mandates that such practices be recognised and protected. The African Model Law attempts to provide states with the tools necessary to implement the mandate of the CBD and to ensure that the WTO regime does not undermine their ability to protect these essential means for protecting African resources.

5.5 Participation in Decisionmaking

The International Labour Organisation (ILO) Convention 169, adopted June 27, 1989, recognises the right of indigenous peoples to determine their own development priorities. More broadly, many international instruments—most notably principle 10 of the Rio Declaration on Environment and Development—have sought to ensure that people have the right to know about and participate in decisions that affect them.[18] The Model Law implements this principle by mandating the effective participation of affected communities in the regulation of access and sharing of benefits accruing from the utilisation of their biological resources, and the associated knowledge, technologies, and practices.

5.6 Regulation of Access to Biological Resources

The current trend towards privatisation, commercialisation, bioprospecting, and biotrade is reinforced by the TRIPs Agreement and has the potential to erode local livelihood systems that are based on biological resources. Until formal legal systems provide adequate protection for their interests and rights, local communities will continue to be on the losing end.

The Model Law provides a system for regulating access, subject to prior informed consent of the state and the concerned local community. It sets forth the information that applicants for access must provide to the national competent authority, as well as the procedure to be followed by that authority in granting various forms of access permits. These conditions are consistent with those prescribed by the CBD and its Biosafety Protocol.[19]

5.7 Prior Informed Consent

The CBD requires prior informed consent as a condition for granting access. Consequently, the Model Law requires the prior informed consent of both the state and the relevant local community before granting access to biological resources. The Model Law provides for consultation with the concerned communities on applications for access. The responsibility to ensure appropriate consultation rests with the national competent authority.

5.8 Fair and Equitable Sharing of Benefits

Consistent with the basic tenets of the CBD, the Model Law recognises the right of local communities to an equitable share of benefits derived from access to and use of local biological resources. The Model Law stipulates that a specific percentage of any financial or non-financial benefit be shared with the local community from whose territory genetic resources are obtained. One of the law's proposed mechanisms for benefit sharing is the establishment of a "community gene fund."[20] Such a fund could be used to finance development projects in the local community.

The Model Law also acknowledges the pivotal role of women in the conservation of biological diversity. It mandates gender equality in all related decisionmaking processes.[21]

6. AFRICA'S COMMON POSITION ON THE REVIEW OF ARTICLE 27.3(b)

The Model Law is unique in terms of its enunciation and amplification of the African Common Position on prohibiting patenting of lifeforms. This African response to article 27.3(b) of the TRIPs Agreement is predicated on a commitment to regional cultural norms and values, as well as the spirit, principles, and relevant provisions of the CBD. The relevant provisions of the Model Law include mandates regarding:

18 *See* Carl Bruch (ed.), The New "Public": The Globalization of Public Participation (2002).

19 CBD, *supra* n. 1 at arts. 15(5), (7); Biosafety Protocol, *supra* n. 1 at arts. 10, 23, ann. I.

20 Model Law, *supra* n. 2 at art.23(4).

21 *Id.* at art. 18.

- The sovereign right of the state to the ownership of its biological and natural resources;
- Authority to regulate access to biological and genetic resources;
- Authority to maintain knowledge, innovations, and practices of indigenous people; and
- Equitable sharing of benefits arising from the use of such knowledge, technologies, innovations, and practices.

Africa is a multiethnic continent with a profound sense of moral, religious, and cultural values. Its population consists of a diverse array of local communities and peoples whose environments are an integral component of their lifestyle and define their fellowship with others. African nations have a chequered political existence, and have experienced erratic growth and development patterns. They have been influenced significantly by their interactions with Western civilisation, mostly through colonisation. The cultural values of African societies are currently threatened as a result of these interactions, as well as by the process of globalisation with its associated trend toward profit-driven privatisation, science and technology research activities, and corporate monopoly of knowledge through the utilisation of IPRs. Africa's reaction suggests that these incursions are largely at variance with its cultures and traditions and, on the whole, are adverse to its interests to a large extent.

Africans recognise their obligations to an ever-integrating world driven by science and technology, international agreements, and the concept of free trade based on the free flow of knowledge and information. However, many of these developments are associated with principles and activities that are detrimental to Africa's sustainable development. The development of new technologies and the dissemination of innovation is indeed a desirable ongoing process that must be supported by national governments through appropriate incentives. But the types of rights that Africa needs are not those monopolised through IPRs and privatisation. Rather, the distinctive nature of African societies requires a system of rewards that supports local communities, farmers, and indigenous people and recognises their efforts over the past millennia to conserve and enhance biodiversity for the benefit of all humanity. It is against this backdrop that Africa has rejected the option for placing patents on life. Individual efforts and innovations should indeed be recognised and compensated. However, the ownership of knowledge, individual or corporate, should also be in the interest of the overall public good. This is hardly guaranteed by the current IPR system entrenched in TRIPs.

The 1999 meeting of the Members of the African Regional Industrial Property Organisation (ARIPO) criticised the TRIPs Agreement, calling attention to fundamental provisions or omissions that are inimical to the sustainable development of Africa. The members cited several adverse effects, including constraints on domestic technology development, barriers to technology transfer, and high prices resulting from monopolies (including cost of medical products, seeds, and software). They concluded that the most serious problem with TRIPs for Africa is the failure of the agreement to recognise the rights of local communities, their knowledge, innovations, and practices. This may lead to unjustified appropriation of their biological resources and related knowledge by foreign corporations. As such, the members suggested the exclusion of all lifeforms from patentability. They recommended that African countries should develop appropriate sui generis systems of protection of plant varieties, indigenous knowledge, technologies, and community rights based on the Model Law and consistent with their national priorities. They also sought to ensure that the TRIPS Agreement conforms the aims of the CBD.

Submissions by the African Group to the WTO's TRIPs Council raised similar issues regarding article 27.3(b).[22] The group explained that Africa's concerns regarding the patentability of lifeforms are predicated on ethical, moral, religious, and cultural values, arguing that "[t]he commodification and market transaction of life structure violate the fundamental moral principles of some cultures of a large number of Member States and societies."[23] The African Group paper submitted to the meeting of the TRIPs Council at the 2003 WTO Ministerial Meeting in Cancun, Mexico reiterates this position on patenting lifeforms.

Africans are poised and ready to create a unique and tailored system for regulating its genetic resources. The Model Law attempts to articulate and respond to this need while placing it within the context of Africa's existing international obligations.

---

[22] In particular, the African Group highlighted: technical issues relating to patent protection under TRIPs article 27.3(b); technical issues relating to sui generis protection of plant varieties; ethical issues relating to the patentability of lifeforms; the relationship of the conservation and sustainable use of genetic materials (resources); the relationship between the concept of traditional knowledge and farmers' rights; and access to essential medicines and HIV/AIDS drugs.

[23] Paper presented by the Africa Group at the TRIPS Council Meeting in Geneva, June 4-6, 2003, *summary available at* http://www.wto.org/english/tratop_e/trips_e/paper_develop_w296_e.htm (last visited Aug. 22, 2003).

7. THE RELATIONSHIP BETWEEN THE MODEL LAW AND OTHER INTERNATIONAL INSTRUMENTS

The African Model Law may be described as an eclectic document. It was developed with substantial awareness of the best practices implicit in other international instruments, particularly the CBD, but fashioned with a conscious African interest. The proponents of the Model Law were aware of the dangers of implementing international instruments as separate entities and in isolation of each other. Consequently, even though the Model Law rejects the option of providing protection of plant varieties through a patent regime, it accepts the notion of protection through a sui generis option—one specifically endorsed in article 27.3(b) of TRIPs. The Model Law thus rejects the patenting of lifeforms, but it recognises breeders' rights and makes specific provisions for them.[24] This is one of the points of divergence between the Model Law and TRIPs, since the latter requires patents for all inventions, whether products or processes, in all fields of technology.[25] In this and other ways, the Model Law attempts to strike a balance between existing international obligations and the unique needs of Africans vis-à-vis their biological resources.

The Model Law was also crafted in anticipation of the conclusion of the ITPGR. It therefore integrates the concept of farmers' rights while making provisions to protect breeders' rights. To this extent, the UPOV (1978) legislation on the protection of plant varieties was consulted extensively in the design of the African Model Law. The historical development of plant variety protection in Europe before the first international convention in 1961, as well as the experience gained from its two amendments (1978 and 1991), was also informative. In drafting the Model Law, there is substantial similarity in concepts, although there are some differences in interpretation.

The African Model Law is unique among international instruments in that it guarantees the right of farmers (a fundamental right in the African context) to exchange farm-saved seeds.[26] The only acceptable forms of protection for such seeds would need to be through an intellectual property regime that recognises and rewards community rights.

[24] Model Law, *supra* n. 2 at pt. VI.

[25] TRIPs Agreement, *supra* n. 1 at art. 27.1.

[26] *Id.* at art. 27.1(d).

8. THE RESPONSE SO FAR

Substantial progress has been made in Asia and South America in developing and enacting appropriate legislation on access to and benefit sharing of genetic resources, which comply with both the CBD and TRIPs. Most of these countries have chosen to enact sui generis systems. In Africa, however, prior to the adoption of the African Model Law, there was little effort made to formulate such legislation. The development and adoption of the African Model Law was a critical first step by various national parliaments to debate and enact such a legal instrument.

While the idea of a sui generis option in the African context was widely accepted as a preferred means of implementing international and domestic obligations in this area, the development of national laws based on the Model Law has been rather a slow process. A review of African countries that are in the process of developing legislation and adapting the Model Law framework, particularly with regards to access and benefit sharing, suggests that they can be generally classified into four categories:

1. Countries with sui generis legislation embodying various components of the Model Law and having internal capacity for their implementation. This group includes Egypt, Namibia, and Zimbabwe;
2. Countries with draft sui generis legislation patterned after the Model Law and pending enactment into law. This group includes, inter alia, Ethiopia, Nigeria, South Africa, Uganda, and Zambia;
3. Countries of Francophone West and Central Africa (members of the African Intellectual Property Organisation (OAPI)), which, through revision and ratification of the Bangui Accord, acceded to UPOV-type of sui generis system for plant variety protection;[27]
4. Countries without TRIPs/CBD-compliant legislation that are only now contemplating the possibility of developing a sui generis system of protection predicated on the Model Law or other legal instruments. The majority of African countries belong in this category. While most prefer the Model Law, many are under external pressure not to conform to it.

The slow response by African countries in developing domestic sui generis legislation crafted after the

[27] See L'Accord Bangui de l'Organisation Africaine de la Propriete Intellectuelle (1977), *available at* http://www.eldis.org/static/DOC2286.htm (last visited Aug. 22, 2003).

Model Law is attributable to a variety of reasons. Most African countries do not have the national capacity, skill, and expertise in legal drafting to transform the Model Law into national legislation. There is also limited local proficiency with the TRIPs Agreement and its implication for national development, international cooperation, and trade.

In addition, while some international organisations are working in an advisory capacity to provide an understanding of biological resources and their relationship to traditional knowledge in an African context, problems remain at the regional level regarding definitional equivalence of terms, common meaning, and incoherent interpretations of the provisions of the law.

African governments also generally are not well informed on the utility of protecting traditional knowledge, even though they recognise that some of this knowledge is being appropriated. Arguments in support of developing framework laws to protect indigenous knowledge and biological resources in the region are wide-ranging, and they focus variously on plant varieties, the rights of local communities, and indigenous knowledge.

Finally, constraints on implementation capacity are endemic in the region. Professional and technical competence, funding, public awareness, and civil society participation are all necessary components of effective action in this arena. Several other intangible constraints also impede objective debate and action. Many African countries depend on external assistance in these areas, and domestic capacity-building will be integral in overcoming the constraints.

9. PROPOSALS FOR ENHANCED IMPLEMENTATION OF THE MODEL LAW

As a form of sui generis system governing access to and sharing of benefits resulting from biological resources, the African Model Law can be effective if it is adapted to suit the various socio-economic and environmental settings in which it is to be implemented. The Model Law is an instrument of the AU, and the AU has a responsibility to ensure its effective implementation. Towards this end, the AU has taken the first administrative step by recommending that, "Member States should adopt the model law on access to biological resources … and initiate the process at national level involving all stakeholders in accordance with national interest and enacted into law."

While the onus for domestic implementation lies with individual member states, the AU should continue to take a leadership role in the regional process and provide support at the national level to those countries seeking assistance. The institutional systems for ensuring a coordinated process are readily available within the restructured headquarters of the AU, which also has the administrative and institutional mechanisms to implement its decisions and resolutions. These systems should be fully engaged to assist member states in the implementation process.

The Model Law should also be implemented through the coordinated efforts of existing sub-regional economic organisations (such as SADC and ECOWAS) and NEPAD as a programmatic framework of the African Union.[28] The modality for implementation should focus on advocacy, information sharing, knowledge, and skill- and confidence-building through capacity development processes. The medium should be a combination of specialised trainings, workshops, conferences, and sensitisation seminars on the protection of biological resources and traditional knowledge.

10. CONCLUSIONS

The conclusion of trade negotiations at the Uruguay Round and the establishment of the WTO created a new order in international trade relations and commerce. The TRIPs Agreement prescribes a set of rules in the area of intellectual property to which all WTO member states must comply. One rule, set forth in article 27.3(b), stipulates that new plant varieties, microorganisms, the processes related to them, and their products should be protected by patents, a sui generis system, or a combination of both.[29]

Since its entry into force, the TRIPs Agreement has been controversial in certain regards. The article 27.3(b) review process is subject to differing interpretations. African countries, through their trade missions in Geneva, have provided concrete proposals for the process in the form of an "African Common Position." This position closely tracks the ideas embodied in the Model Law.

In adopting the Model Law and recommending it as a framework for the development of TRIPs-compliant domestic legislation, African governments have done so contending that:

---

[28] For example, the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC). Information on these organizations may be found at http://www.ecowas.int and http://www.sadc.int (last visited Aug. 23, 2003), respectively. Information on the New Partnership for Africa's Development (NEPAD) is available at http://www.nepad.org (last visited Aug. 23, 2003). *See also* chs. 4 & 20 in this volume

[29] TRIPs Agreement, *supra* n. 1.

- The concept of IPRs as expressed in TRIPs is alien to Africa's understanding of property and community rights. It is therefore not appropriate for the protection of biological resources or related traditional knowledge, technology, innovations, and practices in the African cultural context.
- Africa is committed to the basic tenets and fundamental principles of the CBD, including the inalienable rights of local communities within the state structure to assume ownership of and regulate access to their biological resources. However, the TRIPs Agreement generally does not provide for community rights, and many commentators believe that TRIPs precludes them.
- There is no empirical evidence or practical experience demonstrating that the patent regime favoured by TRIPs will improve the economic welfare of Africans.
- Africa fears that the patent system, if applied to its genetic resources, will hurt its small farmers, aggravate its already tenuous food security, and increase Africa's dependence on external food and markets. This is due to the limitations that TRIPs places on the free exchange of farm-saved seed and other planting materials by conferring monopoly ownership on patent holders.
- If the patent system is instituted for biodiversity and associated knowledge in Africa, the debt burden of the continent will be exacerbated through royalty payments to developed countries, where over 90 percent of the patents for improved agricultural inputs, including seeds and other biological resource-based innovation, are held.
- The issue at stake for the continent is the appropriation of the biodiversity and the associated knowledge, innovations, technologies, and practices of local communities without equitable sharing of benefits and consideration for their sustainable use.

The Africa Group in Geneva has made a series of suggestions for the TRIPs review agenda, the most significant being a serious discussion and coming to terms with the African Common Position prohibiting the patenting of lifeforms. The Model Law seeks to provide an alternative sui generis protection system to legally secure the rights of African local communities, farmers, and breeders. While it remains to be seen how the international community will respond to this agenda, the AU and its member states should continue to strive for implementation of regionally coherent domestic legislation on biological resources that addresses and meets the economic and cultural needs of the African people.

CHAPTER 20
ACCESS AND BENEFIT SHARING OF BIOLOGICAL AND GENETIC RESOURCES IN THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC)

*Nyasha Chishakwe**

I. BACKGROUND

This chapter outlines the legislative, policy, and institutional frameworks of the Southern African Development Community (SADC) sub-region related to access and benefit sharing of biological and genetic resources in the context of the area's overall developmental condition. Recognising that sustainable utilisation of biodiversity can enhance the standards of living in the sub-region, it is pertinent to examine the legislative framework that facilitates access to these resources and the concomitant sharing of benefits. This chapter examines the current status of access and benefit-sharing mechanisms and of potential initiatives that may eventually lead to the creation of a comprehensive regulatory regime within the sub-regional framework of SADC.

1.1 The SADC Treaty and Competencies

The Southern Africa Development Community (SADC) is a sub-regional organisation that consists of 14 countries of Southern Africa comprising Angola, Botswana, Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Seychelles, Tanzania, Zambia, and Zimbabwe. The organisation was established by the SADC Treaty of 1992[1] with the aim of engendering cooperation among member states in specified areas to improve the sub-regional economy and the livelihoods of the people in the sub-region. The areas of cooperation include food security, land, and agriculture; infrastructure and services; industry, trade, investment, and finance; human resources development, science, and technology; natural resources and environment; social welfare, information, and culture; and politics, diplomacy, international relations, peace, and security.[2] These have recently been re-organised into four directorates, namely, (1) Food Agriculture and Natural Resources; (2) Trade, Industry, Finance and Investment; (3) Infrastructure and Services; and (4) Social and Human Development.

SADC is an intergovernmental organisation with the capacity to enter into agreements with other states and be part, or a member, of international organisations. Article 24 of the treaty mandates the organisation to maintain good working relations and other forms of cooperation with other states and international organisations. It further obliges the organisation to enter agreements with other states as well as regional and international organisations whose objectives are compatible with its own and the provisions of the treaty.

1.2 Geographical Context

Geographically, the SADC region extends from central and east Africa encompassing the Democratic Republic of the Congo and Tanzania to the southern tip of Africa. It has a total land area of 6,931,000 km^2 and a population density of 30 people per square kilometre. Only 7.6 percent of the total land is arable, and 32 percent of the land is forested. The region has 348 protected areas that cover 9,187,564 km^2, or 13.4 percent of the total land.[3]

SADC countries share a coastline that extends more than 10,000 km. Eight of the SADC nations have coastal areas, and these countries participate in extensive

* *Environmental Law Programme Officer, The World Conservation Union (IUCN), Regional Office for Southern Africa.*

1 Declaration and Treaty establishing the Southern African Development Community (SADC), *done at* Windhoek, Namibia, Aug. 17, 1992.

2 *Id.* art. 21(3).

3 J.A. McNeilly *et al.*, Protecting Nature Regional Reviews of Protected Areas (1994).

SADC COUNTRIES

marine fisheries activities that contribute to the overall gross domestic product (GDP) of SADC. For instance, the annual catch of marine resources in the whole SADC region is about 1.9 million tonnes, and the potential annual catch is estimated at between 2.7 million to 3 million tonnes if there are proper conservation and management policies.[4] Marine fisheries also provide a source of nutrition in the region. Most of the coastal countries export marine products to their landlocked neighbours. These resources, however, are threatened by human activity, mainly pollution and over-exploitation. For example, coastal cities and towns in the SADC region discharge more than 850 million litres of industrial and human wastes into the seas every day without any treatment, depleting marine organisms.[5]

1.3 Natural Resources

Historically, biological resources have been the cornerstone of Southern Africa's livelihood, and they continue to be so. Most people in the region, especially local communities, depend on biological resources on a day-to-day basis for survival. These resources also provide an important source of income for the SADC countries through the sale of timber, energy, woodcarvings, household goods, and tourism (consumptive and non-consumptive) services. However, these resources are threatened by both human activity and natural causes.[6] Species-rich wetlands and forests are being converted to species-poor farmlands and plantations. The sea-level rise and drought also takes a toll on these resources.

Despite the danger of depletion, the SADC region is still richly endowed in biodiversity. For instance, the region boasts of a total of 23,404 taxa, and it is the only region in the world in which there is an entire plant kingdom.[7] It has the highest recorded species diversity for any temperate or tropical region of similar size in the world. The highest species diversity occurs in equatorial areas of the region, such as in the Democratic Republic of the Congo, because species diversity tends to be highly correlated with annual rainfall.[8] Endemism is also high in the region. Madagascar, for example, is very rich in endemic species,[9] as are other islands such as Mauritius. On the mainland, areas rich in endemic species include mountain forests (mainly in the eastern part of the Democratic Republic of the Congo) and coastal areas such as Tanzania and Mozambique. In the arid areas, major centres of endemism include Botswana and Namibia.

1.4 Socio-Economic Conditions

The key economic and social indicators of the region depict a general increase in economic performance. In 1981, the regional gross national product (GNP) per capita was US$880, while in 1991 it was US$1,020, representing an average annual rate of growth of 3 percent. Regionally, the GDP (in millions) in 1981 was US$11,496, and in 1991 it was US$138,400. Agriculture contributed 25 percent of the GDP in 1991, industry contributed 32 percent of the GDP, and the service industry contributed 43 percent of the GDP.[10]

Bilateral aid in 1992 comprised 28.5 percent of the GNP, or approximately US$73 per capita. External debt in 1991 constituted 126 percent of the GNP, and the debt service ratio was 22 percent of the exports of 1991.[11]

In 2000, the SADC region had a total population of 204.5 million people, and the average annual population growth rate from 1992 to 2000 was 2.9 percent. The total urban population in 2000 was 41 percent of the total population, and the urban population average growth rate was 6 percent between 1992 and 2000.[12] Botswana has the lowest population density estimated at 2.7 people per km^2, while Malawi has the highest at 109.2. The region's population growth is higher than the average annual rate of growth for Africa, which is 2.4 percent per year—more than double the average world rate of 1.3 percent.[13]

There are presently about 50.1 million people living in absolute poverty, and 68 percent of the population had access to health care in 1991. An estimated 42 percent of the population in 1991 had access to safe water, and 35 percent had access to sanitation.[14] The general wealth status in the region, as informed by indicators such as GDP, is low. There is, however, a disparity in levels of wealth among the SADC countries, such as between Malawi and South Africa. According to the World Bank, countries such as Seychelles, Botswana, Mauritius, and South Africa have per capita levels of more than US$2,500, while the rest of the SADC countries have per capita incomes of less than US$1,000.[15]

4 M. Chenje (ed.), Reporting the Southern African Environment (1998).

5 See *supra* n. 3.

6 See, *e.g.*, Table 1.

7 See ch. 16 of this volume.

8 Chenje, *supra* n. 4.

9 See ch. 12 of this volume.

10 *Id.*

11 *Id.*

12 *Id.*

13 See Robert Prescott-Allen, The Well-Being of Nations (2001).

14 Chenje, *supra* n. 4

15 See Prescott-Allen, *supra* n. 13.

The inflation rates are also high for a number of countries, with triple and double digits for Angola (107 percent), Malawi (29.8 percent), Zambia (24.5 percent), and Zimbabwe (32.3 percent).

The region has enormous potential to develop and improve the livelihoods of the people as envisioned by the SADC Treaty. The treaty provides a general framework through which regional development can be pursued in all areas of economic and industrial development, such as trade, agriculture (including biodiversity), and tourism.

2. STATUS OF ABS SYSTEMS IN SADC

Access and benefit sharing of biological resources (ABS) cannot be discussed in recent times outside the context of the Convention on Biological Diversity (CBD), the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), and related instruments.[17] This is particularly true of national systems, but equally applicable to sub-regional organisations. As a sub-regional organisation, SADC coordinates implementation of the CBD among its member countries through several projects, such as the Biodiversity Support Program (BSP).[18] Tangible results of this effort with regards to developing and streamlining ABS mechanisms are not yet clear. Most countries in the region—such as Botswana, Malawi, Seychelles, and Zambia—have yet to comply with article 15 of the CBD. That notwithstanding they have endeavoured to invoke existing legislation to regulate ABS, albeit with only minimal effectiveness in some cases.

The advent of the concept of regional integration brought with it the need to harmonise legislative, policy, and institutional systems among SADC countries. Regional integration is arguably the overriding objective of SADC. In the context of ABS, there is a clear need for a harmonised sub-regional system that regulates and integrates at the sub-regional level. However, SADC does not yet have a single sub-regional legislative, policy, or institutional framework that regulates or governs bioprospecting. National governments are presently responsible for formulating their systems with the assistance of SADC (the coordinating agency), as mentioned above.

SADC has recognised the need for a harmonised sub-regional system on ABS and is working to formulate such a framework, with the assistance of international donors, local institutions, and international NGOs. Such an initiative was spurred by the recognition of the lack of harmonisation in existing national systems governing ABS in the region. This section outlines the current status of the sub-regional ABS legislative, policy, and institutional frameworks in Southern Africa. The purpose of this survey is to highlight opportunities by which a regional framework can be developed.

2.1 INTERNATIONAL CONVENTIONS

International treaties and conventions contain norms and rules to which states agree to abide. They are

TABLE 1: THREATENED SPECIES IN SOUTHERN AFRICA (2000)[16]

COUNTRY	MAMMALS	BIRDS	REPTILES	AMPHIBIANS	FISHERIES	INVERTEBRATES	PLANTS	TOTAL
Angola	18	15	4	0	0	5	19	52
Botswana	5	7	0	0	0	0	0	12
Lesotho	3	7	0	0	1	1	0	12
Malawi	8	11	0	0	0	8	14	41
Mozambique	15	16	5	0	3	7	36	82
Namibia	14	9	3	1	3	1	5	36
South Africa	41	20	19	9	30	111	45	275
Swaziland	4	5	0	0	0	0	3	12
Tanzania	43	33	5	0	15	47	236	379
Zambia	12	11	0	0	0	6	8	37
Zimbabwe	12	10	0	0	0	2	14	38

16 IUCN Species Survival Commission, IUCN Red List of Treatened Species (2001).

17 *See generally* ch. 4 of this volume.

18 Until it concluded operations in 2001, the Biodiversity Support Program was funded by the United States Agency for International Development (USAID).

usually ineffective unless incorporated into domestic law and implemented. That notwithstanding, they are a major influence of government policy and play an important role in shaping a nation's legislative, policy, and institutional framework. In these ways, international instruments have contributed to the current ABS regulatory framework in the SADC sub-region.

SADC countries are signatories to 70 regional and international agreements. Most, if not all, SADC countries have ratified major multilateral environmental agreements (MEAs) of the 1990s.

For purposes of this chapter, the relevant MEAs entered into by SADC states include:

- Convention Relating to the Preservation of Fauna and Flora in their Natural State (1933).
- International Plant Protection Convention (1979).
- International Convention for the Protection of New Varieties of Plants (as amended, 1991).
- Convention on Biological Diversity (CBD) (1992).
- International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) (2001).

The Convention Relating to the Preservation of Fauna and Flora in their Natural State of 1933 seeks to preserve natural fauna and flora of certain parts of the world, especially Africa, by means of national parks and reserves and by regulating hunting and collection of species. South Africa and Tanzania are parties to this convention.

The International Plant Protection Convention of 1979 seeks to maintain and increase international cooperation in controlling pests and diseases of plants and plant products, and in preventing their introduction and spread across national boundaries. The convention requires each party to set up an official plant protection organisation to undertake the following activities:[19]

- inspect areas under cultivation and consignments of plants in international traffic for existence or outbreak of plant pests or diseases;
- issue certificates relating to the phytosanitary condition and origin of plants and plant products; and
- carry out research in the field of plant protection.

Parties are also obliged to regulate the import and export of plants and plant products by prohibitions, inspections, and destruction of consignments when necessary. Countries party to this agreement include Malawi, Mauritius, South Africa, and Zambia.

[19] Art. IV(1).

The International Convention for the Protection of New Varieties of Plants (as amended) of 1991 seeks to recognise and protect the rights of breeders of new varieties of plants and their successors in title, and to do so in a harmonised way. The convention provides for the creation of a Union for the Protection of New Varieties of Plants (UPOV) and sets up its organs. Plant breeders have the right to authorise specified acts of production or commercial marketing of the new variety. These rights may only be restricted for reasons of public interest, and the breeder must receive equitable remuneration in certain cases. The convention also provides for annulment and forfeiture of the protected rights as well as for the denomination of new varieties. So far, only South Africa is a member of UPOV, while Zimbabwe's application to join the 1991 version is still pending.

The CBD promotes the conservation and sustainable use of biological diversity, and seeks to create an enabling environment for the fair and equitable sharing of benefits from genetic resources. The convention entrenches the principle of state sovereignty by recognising the right of states over resources found within their boundaries. It also ingrains private and individual rights over biotechnological innovations. All SADC countries are signatories to this convention.

The ITPGR advances the conservation and sustainable use of plant genetic resources for food and agriculture. It also aims to fairly and equitably share the benefits arising out of their use, consistent with the CBD, for sustainable agriculture and food security. These objectives are to be attained by closely linking the treaty to the UN Food and Agriculture Organization (FAO) and to the CBD. While Angola, Namibia, Swaziland, Zambia, and Zimbabwe have signed the treaty, only the Democratic Republic of the Congo, Malawi, and Mauritius are parties to this treaty, having either ratified or acceded to it.

These instruments, especially UPOV, form the basis through which access and benefit sharing with respect to genetic resources is regulated in the region. Recently concluded instruments such as the CBD and the ITPGR, which contain contemporary approaches to ABS, have yet to be fully incorporated into domestic law.

2.2 General National Frameworks

There are varying systems through which ABS is regulated in Southern Africa countries. These systems are informed by, amongst other things, the international conventions to which these countries are signatories and parties. In Botswana, for instance, there is no single pol-

icy on biological diversity except a policy paper passed by the government in 1990 that deals with the sustainable use of natural resources, conservation, and the environment for the benefit of present and future generations of the people of Botswana.[20] Legislation directly and indirectly regulating ABS includes the Agricultural Resources Conservation Act, Wildlife Conservation and National Parks Act, Forest Act, Fisheries Act, and the Anthropological Act. These pieces of legislation are not necessarily consistent with the spirit of the CBD and in many cases are open to abuse by, for example, exploitation of genetic resources without permits or approval.

The above system is similar to the context in Zimbabwe prior to the enactment of the Environmental Management Act, which incorporates article 15 of the CBD.[21] However, in Zimbabwe, there is an effort supported by national policy to decentralise control of biodiversity to communities under a programme of community-based natural resources management (CBNRM). Under this programme, resource management institutions such as conservation committees and resource management committees at the village level exist throughout the country to empower communities.[22] Local authorities such the rural district councils are empowered to exploit natural resources for the development of local areas, and the resulting benefits are distributed and shared among the communities directly associated with the resources.

Swaziland operates a system akin to the CBNRM programme implemented in Zimbabwe. Under this arrangement, ABS is implemented through community outreach programmes. Authorities governing national parks and nature reserve management consult with communities that are located around parks or protected areas to identify collaborative projects that will benefit the communities. Proceeds from such projects are channelled back to the community.[23]

Malawi has a somewhat different approach. The Genetic Resources and Biotechnology Committee (GRBC) under the National Research Council of Malawi (NRCM) is tasked with granting approvals for the collection and exportation of genetic resources. The committee is mandated to monitor and document genetic material collected and researched by foreign scientists. However, it has been noted that this system is not flawless. Local researchers have been exporting and exchanging genetic resources without the approval of the committee.[24] As a result, Malawi has lost potential benefits from research on genetic resources and the commercialisation of the research results. To address this gap, the government developed and adopted guidelines on collection and exportation of genetic resources by foreign and local scientists and research institutions. These were introduced in 2000, and their effectiveness is still to be seen.

The Seychelles has a system that has been utilised to address access to genetic resources and traditional knowledge. Access is granted through the Seychelles Bureau of Standards after it receives comments from relevant government ministries. There is, however, no obligation on the part of the proponent (applicant) to furnish information on the specimen(s) after the research is completed. There is also no mechanism that protects the property rights of the indigenous and local people. Like research-oriented permitting processes in a number of other African nations, this general system was not developed with ABS in mind. Accordingly, it lacks the key elements proposed by the CBD and the ITPGR, as well as other control and monitoring mechanisms, which are normally associated with ABS systems.

Other countries in the region have more advanced ABS systems. South Africa, for instance, has ABS programmes that control access to indigenous genetic resources. The draft biodiversity legislation will, among other things, regulate prospecting related to genetic resources; protect genetic resources; develop and control commercialisation, beneficial use, and application of genetic resources; and ensure the equitable sharing of benefits accruing from bio-prospecting.[25]

2.3 General Principles

Ownership of natural resources in the region is generally vested in the state, although this scenario may be qualified. A particular use right usually depends on the land tenure regime upon which the resource is found. For example, if the resources are found on private land, the owner of such land can utilise the resources found therein subject to the relevant laws. These relevant laws can constrain resource use. For example, in Zimbabwe, the Parks and Wildlife Act prohibits the picking and hunting of certain classified indigenous plants and animals without a valid permit regardless of where they are found, even on private land.[26] The permit is issued by the minister responsible for the environment. To obtain

20 *Country Report Presentation*, *in* Seventh Southern African Biodiversity Forum Workshop Proceedings (Nov. 27-29, 2002), at 9.

21 The Environmental Management Act has not been fully implemented.

22 BSP, *supra* n. 20.

23 *Id.*

24 *Id.*

25 Biodiversity Bill of South Africa; *see also* ch. 16 of this volume.

26 Parks and Wildlife Act, ch. 20:14.

a permit, a collector or bioprospector must first submit an application outlining the reasons for collection or hunting. Permits are only issued for purposes of export, cultivation and propagation, scientific use, providing a specimen for museums, and other reasons that the minister deems fit.[27]

If the natural resources are found within protected areas such as national parks, botanical reserves, and sanctuaries, permission to utilise these resources must be sought. Failure to do so usually invites criminal sanctions.

Generally, there are no benefit-sharing mechanisms except where an agreement to exploit or use the resources is concluded between the appropriate government authority and the bioprospector, as illustrated in the preceding sub-section. The inclusion of benefit-sharing arrangements is usually not a mandatory condition. When concluded, it can be based upon mutual understanding. Most countries lack specific institutional structures to deal with bioprospecting, and there are no such structures at the sub-regional level. Where they exist nationally, they lack the capacity to monitor exploitation and proceeds arising from such exploitation.

SADC countries generally recognise plant breeders' rights. These laws allow any person who is a breeder of a new variety of plant to register the new variety for purposes of claiming rights over the same. Use of plant variety protection is allowed, subject to being granted a licence.

As can be noted from the above discussion, the current regulatory regimes in SADC countries lack a number of components of a functional ABS framework envisaged by the CBD and the ITPGR. Among other things, existing national regimes frequently do not set certain pre-conditions such as prior informed consent and do not make specific and effective provisions for sharing the benefits arising from the utilisation of biological and genetic resources. This means that genetic (and biological more broadly) resources are not sustainably utilised, as anticipated by the SADC treaty. Moreover, the current system often marginalises the interests of local indigenous communities who are the custodians of the resources.

3. HARMONISING ABS LAWS AND POLICIES IN SADC

Harmonising legislative, policy, and institutional approaches to ABS in SADC is essential to realising sustainable utilisation of biological and genetic resources. As illustrated in the preceding section, there is no single approach to ABS among SADC member countries. Member states pursue their own systems without regard to neighbouring countries' initiatives. The result is a patchwork of different and sometimes contradicting systems regulating a landscape that is geographically and ecologically homogenous and includes many cross-border ecosystems. This has dire consequences for shared natural resources.

The first step in harmonisation is for member countries to agree on a set of common goals and ideals that will guide them. In most situations, this entails a series of discussions to arrive at an agreed position. In the context of ABS in SADC, this consensus is not difficult to arrive at since SADC member countries are signatories to similar international conventions dealing with ABS, including the CBD, TRIPs, and ITPGR. In particular, as members of the African Union (AU), SADC members also have subscribed to the African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources (the Model Law).[28] These shared international commitments form the basis through which a common understanding can be achieved.

3.1 Regional Approaches to ABS

3.2.1 Specific Sub-Regional ABS Legislation, Policies, and Institutions

The 1992 SADC Treaty, as mentioned above, provides a broad framework that engenders cooperation among member states for the improvement of the standard of living of the people. It does not provide for specific issues such as ownership, access, and benefit sharing of biological and genetic resources. However, given the aims and objectives of the treaty, it can reasonably be assumed that it permits a system that enhances the conservation of biological resources and their sustainable use that seeks to improve livelihoods, while keeping with the CBD.[29]

The treaty, through article 22, provides for the promulgation of protocols to the treaty that address particular issues within its ambit. To date about 21 protocols have been concluded. Protocols relating to natural resources management include those on forestry (2002), fisheries (2001), shared watercourse systems (1995/2001), and wildlife management and law enforcement (1999). There is no protocol that specifically addresses access and benefit sharing of biological and genetic resources. To the

27 *Id.,* sec. 51.

28 During the Summit in Ougadougou in May 1998, the Organization of African Unity (now the AU) endorsed the draft Model Law. The OAU recommended that African countries enact national legislation based on the draft Model Law to enable them to regulate access to their genetic resources and to legally protect the rights of their local communities.

29 SADC Treaty, *supra* n. 1, art. 21.

extent that SADC protocols regulate ABS, it is on a resource-by-resource basis under the existing protocols. Even then, not all resource-specific instruments contain provisions relating to access and benefit sharing. Only the protocols on forestry and fisheries contain such provisions.

3.2.1.1 Protocol on Forestry

Article 17 of the forestry protocol regulates access and benefit sharing of forest genetic resources. The protocol defines forest genetic resources as "any material of plant, animal, microbial or other origin, derived from a forest, containing functional units of heredity and which has actual or potential value within or outside the Region." It commits member states to adopt national policies and to implement mechanisms that ensure that access to the forest genetic resources is subject to prior informed consent and mutually agreed terms. It further obligates them to guarantee equitable sharing of the benefits derived from the use of such resources.

The protocol mandates member states to develop a regional approach and harmonised legislation that regulates access to, and the management and development of, forest genetic resources. In addition, it provides for equitable sharing of resources that are common to two or more countries (i.e., that are transboundary in nature). Article 17 requires all member states to support any member state that asserts its rights over access and benefit sharing of forest genetic resources against a third party.

The protocol further provides for the sharing of germplasm from genetic resources, upon mutually agreed terms. It obligates member states to cooperate to further the development of forest germplasm collection in the SADC Plant Genetic Resource Centre.[30]

The protocol contains some principles found in article 15 of the CDB. In particular, it stresses the prior informed consent of a member state providing the resource and highlights the condition of mutually agreed terms before access is granted.

That notwithstanding, article 17 of the protocol goes further than the CBD. It provides for the equitable sharing of forest genetic resources that are shared by two or more member states or that are of a transboundary nature. It also provides a framework for the development of a "peer" support system by member states if a member state asserts a right against a third party. It further authorises the harmonisation of national laws regulating access and benefit sharing of forest genetic resources.

[30] The SADC Plant Genetic Resources Centre (SPGRC) is non-profit intergovernmental institution that was established by SADC member states for purposes of conserving plant genetic resources.

3.2.1.2 Protocol on Fisheries

Article 10 of the Protocol on Fisheries regulates access agreements to fish resources. An access agreement is defined in the instrument as "an agreement between one Member State or several Member States and a no-SADC State or non-SADC States to exploit the fishery resources of a Member State or Member States." This provision does not specifically regulate fish genetic resources. Rather, it broadly regulates access to fish resources found in member states. Since fish genetic resources are a biological component of fish, this section of the protocol will be discussed as regulating fish genetic resources.

The protocol commits member states to cooperate in establishing minimum terms and conditions for access to fish resources found in member states by fishing vessels flagged in non-SADC states. It allows for the establishment of minimum restrictive conditions for non-SADC states to access fish resources in the region. The protocol entrenches the most favoured nation (MFN) principle by obligating member states to place similar terms and conditions for accessing fish resources on SADC flagged ships as on non-SADC flagged ships.

It further provides for joint negotiation of foreign fish access agreements of a sub-regional nature with regard to highly migratory species.

The above provisions do not fully comply with article 15 of the CBD. They are restricted merely to access agreements. Moreover, they do not provide for the sharing of benefits arising from the exploitation of fish resources.

3.2.1.3 SADC Plant Genetic Resources Centre

The SADC Plant Genetic Resources Centre is a regional institution that seeks to coordinate activities relating to ex situ plant genetic resources, namely their conservation and exchange of information in the region. Article 5(1)(g) of the SADC Treaty stipulates one of the objectives of the treaty as "[achieving] sustainable utilisation of natural resources and effective protection of the environment." This objective is achievable through, among other things, the establishment of appropriate institutions and mechanisms for mobilising resources to implement SADC programmes and operations.[31] Article 5 endorses the creation of institutions to implement programmes for the conservation and sustainable use of plant genetic resources.

With funding from the Nordic countries, SADC established the SADC Plant and Genetic Resources Centre (SPGRC) as one institution to promote sustain-

[31] SADC Treaty, *supra* n. 1 at art. 5(2)(c).

able utilisation of plant genetic resources. The SPGRC was established in 1988 by the SADC member states as a non-profit intergovernmental institution, and it is located in Zambia.

The aim of the Nordic Support was to assist the Southern African Centre for Co-operation in Agricultural Research and Training (SACCAR) to establish the SPGRC and a network of National Plant Genetic Resources Programmes (NPGRPs). These included National Plant Genetic Resources Committees (NPGRComs) that coordinate activities at national level and National Plant Genetic Resources Centres (NPGRCs) that preserve indigenous plant genetic resources (PGR) material.[32]

One of the main outputs of the SPGRC is conservation of plant genetic resources. This includes ex situ seed conservation, ex situ field conservation, in vitro conservation, in situ conservation, and on-farm conservation. Ex situ seed conservation involves the maintenance of active seed samples for research and other activities. The base collection sample is meant for long-term conservation, and the base safety duplicate is a backup against unforeseen events such as wars or natural disasters.

Ex situ field conservation involves the preservation of plant species whose mode of propagation is vegetative, as opposed to seed. Field genebanks—wherein duplicate samples of sweet potato, cassava, and similar crops are planted—have been established. In vitro conservation, on the other hand, involves preservation of vegetatively propagated species.

In situ conservation seeks to enhance the preservation of genetic resources of wild crop relatives and wild plants that are important to food and agriculture in their natural environments. This is done through improved management of genetic resources in protected areas and on other lands not listed as protected areas. On-farm conservation involves assisting farmers to manage plant genetic resources.

3.2.2 Initiatives to Establish a Sub-Regional Framework

While there is no specific sub-regional legal, policy, or institutional framework that regulates ABS of biological and genetic resources in SADC, the question of whether to establish such a framework has had its share of debate. Stakeholders generally recognise that there is need for a sub-regional framework to link the national initiatives,[33] and the calls for a harmonised, common approach ultimately could culminate in a sub-regional framework.

3.2.2.1 SADC Regional Strategy on ABS

The Southern Africa Biodiversity Forum (SABDF) at its 7th Workshop on "Enhancing Regional Co-operation in the Conservation and Sustainable Use of Biodiversity in Southern Africa" discussed the need to develop a regional strategy on ABS.[34] It was suggested that the process for development of the strategy should be debated and proceed in a participatory manner. Key elements to be included in developing the strategy were identified as:

- Develop a viable process;
- Proceed in a participatory and consultative manner:
- Recognise the different levels of access such as subsistence, domestic, commercial, research, regional, and international access;
- Take heed of shared resources and knowledge;
- Refer to market forces and commoditisation of resources;
- Acknowledge socio-economic dynamics;
- Illustrate different structures such as national and local governance structures on the different responsibilities in resources management, and state and non-state management; and
- Depict the synergies and relationships with other conventions and protocols.

The strategy is expected to provide a coordinated framework for SADC member countries to develop common or uniform legislation on ABS.

In addition to this SADC-coordinated initiative, stakeholders—such as civil society, governments, the private sector, agricultural research institutions, farmers' organisations, plant breeders, and traditional healers' associations—in the region have commissioned initiatives aimed at repealing the present laws and replacing them with laws based on principles found in the CBD, article 27(3)(b) of TRIPs, and the ITPGR.[35] These initiatives include the African Model Law and the SADC Sui Generis Legislation Initiative. If well-developed, these programmes have the potential to form the foundation for a SADC regulatory regime on ABS.

---

32 See SADC PRG Project, *available at* http://www.ngb.se/sadc (last visited Aug. 22, 2003).

33 Cecil Machena & Gracian Banda (eds.), Community, Farmers' and Breeders' Rights in Southern Africa: Towards a Framework for a Sui Generis Policy and Legislation (2002).

34 The SABDF is funded by GEF and the Norwegian government and implemented by UNDP, IUCN, and SADC.

35 L.T. Chitsike, *Policy and Legislative Guidelines on Benefit Sharing, in* Machena & Banda, supra n. 33.

3.2.2.2 (OAU) African Model Law on Rights for Communities, Farmers and Breeders and Access to Biological Resources

The quest for a sub-regional framework on ABS for biological and genetic resources might have been answered by the OAU's commissioning of the African Model Legislation on Rights for Communities, Farmers and Breeders and Access to Biological Resources.[36] This legislative framework was an outcome, among other processes, of a workshop held for east and southern African countries in Lusaka in January 1999.[37] The Model Law is based on the CBD, in particular articles 8(j) and 15, as well as article 12 of the ITPGR.

The scope of the Model Law extends to in situ and ex situ biological resources, the derivatives of biological resources, community knowledge and technologies, and plant breeders. It generally recognises and protects the rights of local communities, including farming communities, over their biological resources and the rights of breeders. It further provides an appropriate system of access to biological resources and community knowledge, and promotes fairness and equitable sharing of benefits from biological resources.

With regards to access, the Model Law states that access to biological resources, knowledge, or technologies of local communities in any part of the country should be subject to an application for the necessary prior informed consent (PIC) and written permit. Applications should be directed to the national competent authority (NCA).[38] When applying for access, the applicant should provide the following information:

- Identity of the applicant and documents that testify legal capacity to enter into a contract;
- Resources to which access is sought, including the sites from which it will be collected, its present and potential uses, its sustainability, and risks which may arise from access;
- The purpose for which access to the resource is requested including the type and extent of research, teaching, or commercial use expected to be derived from it;
- Description of the manner and extent of local and national collaboration in the research and development of the biological resource concerned;
- The primary destination of the resource and its probable subsequent destination; and
- The proposed mechanisms and arrangements for benefit sharing.[39]

The collector or applicant should:

- Guarantee to deposit duplicates of each specimen taken;
- Not apply for any form of intellectual property rights (IPRs) over biological resources or community innovations without the prior informed consent from the original providers;
- Provide for benefit sharing;
- Base access on a commitment to regenerate and conserve biological resources and maintain indigenous knowledge;
- Abide by national laws on sanitary control, biosafety, and environmental protection, and by the cultural practices, traditional values, and customs of local communities; and
- Conduct research in a country in a manner that will facilitate local participation as far as possible.

The Model Law does not recognise patents over lifeforms and biological processes. It authorises the NCA to withdraw consent and repossess any issued written permit where there is evidence that the collector violated the law or has not complied with the agreed terms.

Institutionally, the Model Law establishes the NCA, the national inter-Sectoral co-ordination body (NISCB), the technical advisory body (TAB), and the national information system (NIS). The NCA is tasked with ensuring a regulatory system that regulates access to biological resources. The function of the NISCB is to guarantee that collectors observe the minimum conditions for the agreements. The duty of the TAB is to list taxa that are threatened by extinction or depletion and to identify habitats or places threatened by loss of biodiversity. The NIS will enable local communities to establish databases on their biological resources and concomitant components and derivatives.

3.2.2.3 SADC Sui Generis Legislation Initiative

A sui generis legislative system entails legislation that recognizes the unique context (historical, economical, and ecological) in which it will be applied. The SADC region, as noted above, is rich in biodiversity as well as systems of traditional conservation knowledge that were attained through years of practice. Prior to the conclusion of the CBD, there was no protection offered to local

36 *See generally* ch. 19 in this volume.

37 *See also supra* n. 28 and accompanying text.

38 The NCA is the institution tasked with authorising applications related to access to biological resources, their derivatives, community knowledge, technologies, or practices.

39 L.T. Chitsike, *Intellectual Property Rights and Genetic Resources: Guidelines for Developing Sui Generis National Policies and Legislation to Promote Community and Farmers' Interests in Southern Africa, in* MACHENA & BANDA, *supra* n.33.

communities over the biological resources they were in custody of and the knowledge they employed in conserving the same. Foreign corporations had almost free access to these resources with no acknowledgement or benefits flowing to the local inhabitants who conserved the resources.

The SADC Sui Generis Legislation Initiative intends to protect local communities in the region by providing them with control over their biological resources (both wild and domesticated) and to offer them an opportunity to share in the benefits that may arise from the exploitation of such resources and knowledge. The initiative produced guidelines that following a regional workshop held in Zimbabwe in late 2000, which brought together stakeholders in the SADC region.

The guidelines can be synthesised into a number of core elements representing the contents of the sui generis system. These include:

- Recognising and protecting the rights of local communities through setting requirements such as allocating value for cultivation and use, and the declaration of origin for purposes of determining whether prior informed consent was obtained;
- Excluding harvested crops from the restriction of breeders' rights;
- Limiting the concept of an essentially derived variety;
- Enhancing farmers' privileges such as the saving of seeds;
- Broadly construing the notion of "public interest" over plant breeders' rights;
- Enhancing plant breeders' exceptions such as research;
- Providing for compulsory licensing;
  Fully considering environmental and ethical concerns; and
- Promoting food and health security.

These core elements form the base for allocating property rights to local innovators and related stakeholders. In particular, they address community rights, farmers' rights, breeders' rights, and benefit sharing. The initiative expanded on the nature of these rights. Community rights should encompass:

- Definition of a community as a legal entity referring to a group of people having a long-standing social organisation, which includes indigenous people and local communities;
- The expression of rights of a community over its biological resources, innovations, practices, knowledge, and technology as inalienable rights;
- Recognition of community IPRs without the requirement of registration;
- Customary laws and practices of communities being applicable to community rights;
- Prior informed consent of the community being a condition for access to biological resources;
- Imposition of a duty to conserve and sustainably use biological resources as a condition to the right of use of biological resources;
- Prohibition of patents over biological resources as a way of ensuring the communities' ownership;
- Protection extended to local communities to cover innovations that are new and industrially applicable but not novel;
- Permitting the existence of concurrent rights such as permitting a number of persons in a community to each hold a right or a bundle of rights; and
- Vesting community rights in the state to keep them in trust for concerned communities.

Farmers Rights should include:

- The recognition and protection of farmers' rights as arising from the past, present, and future contributions of farmers in conserving, improving, and making available plant genetic resources;
- Apparent recognition of farmers' rights as a form of IPR without the requirement of prior declaration or registration. These rights will extend to the products of farmer selection and breeding, as well as the traditional resources that contribute to the conservation, development, and sustainable use of plant and animal genetic resources;
- Recognition and inclusion of rights such as the right to use, exchange, and market farm-saved seed; protection of traditional knowledge; benefit-sharing; and participation in decisionmaking at the national level; and
- Customary laws and practices of the concerned communities being applied in protection of farmers' rights.

Breeders' rights involve:

- Recognition and protection of local communities' rights such as the establishment of prior informed consent and the exclusion of rights in favour of third

- parties with respect to local varieties without need for registration;
- Additional requirements such as the value for cultivation and use and the declaration of origin;
- Criteria of distinctness of the new variety as the only criteria for eligibility for recognition and protection;
- Restriction of breeders' rights to exclude harvested crops and limit the concept of an essentially derived variety;
- A framework of non-monopoly rights that will facilitate the development of small and large-scale industries;
- Compulsory licensing, which should also contain a limitation on the number or type of varieties in the public interest;
- Limitation on the duration of protection of plant varieties for commercial breeders in conformity with the socio-economic context and circumstances of the relevant jurisdiction;
- Consideration of environmental and ethical concerns; Prohibition of plant, animals and traditional knowledge patenting;
- Biosafety provisions; and
- Food and health security.

Benefit sharing should cover:

- Definition of mechanisms for benefit sharing;
- Definition of fair and equitable sharing of benefits (including the principles of prior informed consent and declaration of origin);
- Custodian of resources (benefits) being either the government, community trusts or funds, and community group representatives; and
- Development of contractual agreements for access to biological resources.

Some SADC legislative, policy, and institutional frameworks contain provisions relevant to ABS of biological and genetic resources. However, as noted above, these frameworks are not adequate or effective in addressing the broad range of genetic resources or the contexts in which access and benefit sharing arise. The forestry protocol and the fisheries protocol are only relevant to the resources that they regulate, while the institutional framework provided by SPGRC is restricted to mainly agricultural genetic resources for research purposes.

There is, therefore, an apparent gap with regards to ABS in the existing sub-regional instruments. The regional initiatives aimed at creating a single harmonised system on ABS, ranging from the regional model law to the development of a sui generis system, are attempts to address that gap. While these are noble efforts, the effectiveness of the initiatives may be compromised if developed exclusive of each other. If not coordinated, the result could be a contradictory, haphazard, and disjointed framework, reminiscent of the current patchwork of national regulatory systems among SADC member states.

4. CONCLUSIONS

It is entirely accurate to argue that there is no legislative, policy, or institutional framework on ABS in Southern Africa. For example, this chapter has described SADC protocols on forestry and fisheries as well as institutions such as the SPGRC, all of which govern or otherwise address ABS to some extent. However, it is safe to say that there is no adequate legislative, policy, and institutional framework to effectively regulate ABS.

4.1 Weakness of the Current Framework

The current framework is fragmented because it was not designed to govern ABS. Rather, it was born from uncoordinated sectoral efforts aimed at regulating particular resource sectors, which sometimes included issues relating to genetic resources. Thus, the nature of ABS provisions found in the forestry protocol is different from those found in the fisheries protocol.

The disjointed nature of the framework renders it non-functional because there are no common principles upon which it was established. The various principles found in the protocols were coined independent of each other.

The solution lays in the creation of a sub-regional unitary system based upon common principles informed from national consultation processes. Once common principles are agreed upon, harmonisation of national systems can ensue.

4.2 Toward a Single Regulatory Framework

The need for a single ABS sub-regional regulatory framework is apparent. It should however be considered in the context of the objectives of SADC. The framework ought to be consistent with the salient concerns of the region—such as poverty alleviation, HIV/AIDS, and environmental degradation—for it to be relevant. At the same time, it should reflect the spirit of international conventions that the SADC member states have signed and ratified, such as the CBD, TRIPs, and the ITPGR.

Having a sub-regional ABS system that is in tandem with the developmental goals of the region also entails effective coordination between the SADC directorates of Food, Agriculture and Natural Resources (FANR) and Trade, Industry, Finance and Investment (TIFI). This will ensure the effective and sustainable utilisation of biological and genetic resources through trade and the use of investment and finance mechanisms to effectively utilise the resources.

A word of caution, however, should be sounded on the various sub-regional initiatives, notwithstanding their importance. The initiatives are being pursued without much coordination. They are proceeding along parallel lines to each other, as illustrated in the preceding sections. This has the potential for creating complications rather than resolving them. It would seem appropriate—indeed prudent—for all stakeholders to consult each other with the aim of consolidating their different efforts, lest there be duplication of effort or contradictions.

APPENDICES

APPENDIX A
CONTRIBUTORS

Susan Bass is a Senior Attorney at the Environmental Law Institute, where she also directs its Inter-American Program. Her research has examined various aspects of biological diversity. Ms. Bass is the co-editor of "Protecting Biodiversity: National Laws Regulating Access to Genetic Resources in the Americas" IDRC 2000. Ms. Bass has also conducted research on mining, protection of private lands, deforestation, public participation, deforestation, and non-point sources pollution, and developed training programs on environmental management systems, enforcement and environmental impact assessment. She has worked throughout Latin America and in the U.S. and Africa as well. Before joining ELI, Ms. Bass was a corporate, securities and banking attorney in private practice in Washington, D.C. and New York.

Environmental Law Institute
1616 P Street, NW Suite 200
Washington, D.C. 20036
Tel: +1-202-939-3809
Fax.: +1-202-939-3863
E-mail: bass@eli.org

Carl Bruch is a Senior Attorney at the Environmental Law Institute, where he also co-directs its Africa Program. His research has examined various aspects of biological diversity, constitutional environmental law, public participation and good governance, and the environmental consequences of armed conflict. He has worked throughout Africa, as well as in Europe, Latin America, and the United States. Before joining ELI, Mr. Bruch was a law fellow and attorney with the Environmental Law Alliance Worldwide (E-LAW).

Environmental Law Institute
1616 P Street NW, Suite 200
Washington, DC 20036
Tel: +1-202-939-3240
Fax: +1-202-939-3868
E-mail: bruch@eli.org

Nyasha E. Chishakwe is an environmental law programme officer for IUCN - The World Conservation Union (Regional Office for Southern Africa). He also consults part time in international trade and development law, including environmental law. He holds a Bachelor's degree in Law, and a Master of Laws (LL.M) degree in International Trade Law from Erasmus University Rotterdam, in the Netherlands. Mr. Chishakwe's published work includes "The Legal Issues of TBNRM in SADC;" "Highveld Biodiversity Legislation in Zimbabwe;" "Laws and Policies Affecting TBNRM in Botswana;" "Legal Framework for E-Commerce in Zimbabwe;" and the "Extraterritorial Effect of Competition Laws." He is a member of the Zimbabwe Environmental Law Association and an associate member of the Chartered Institute of Arbitrators.

18 Wansford Mansions
66 J. Chinamano Avenue
Harare, Zimbabwe
Tel: +263-91-249-658
E-mail: Nyashac@iucnrosa.org.zw

J.A. Ekpere served as the Executive Secretary of the Organization of African Unity (African Union), Scientific, Technical and Research Commission (OAU/STRC). A former professor at the University of Ibadan (Nigeria), he is now retired, and consults on WTO TRIPs issues, as well as CBD issues relating to biodiversity, access and benefit sharing, and biosafety. His published work includes the *African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources: An Explanatory Booklet.*

University of Ibadan
Post Office Box No. 21824
Ibadan, Nigeria
Tel: +234-1-262-9199
Mobile: +234-0803-3230430
E-mail: jekpere@hyperia.com

Ossama M. El-Tayeb, Ph.D., is Professor Emeritus of Microbiology and Director of the Microbial Biotechnology Center at the Faculty of Pharmacy, Cairo University. He served with UNEP from 1977-1983, was the Science Advisor to the Egyptian Environmental Affairs Agency, and was Egypt's chief negotiator for the Cartagena Protocol on Biosafety. He specialises in bio-process development and the socio-economic impacts of bioresources and biotechnologies.

Fax: +202-362-0122
E-mail: omtayeb@link.net

Abraham Gadji is a lawyer and consultant with the Ministry of State and the Ministry of the Environment, charged with developing and finalising of the policies and interpreting of the Environmental Code and other legal texts. He received his international environmental law degree from the Faculty of Law and Economic Sciences of the University of Limoges in France. Gadji has been solicited for his expertise by the International Center for Trade and Sustainable Development (ICTSD); ENDA; OXFAM GB; the Network for the Environment and the Sustainable Development in Africa (REDDA) as a participant in the World Summit on the Sustainable Development (WSSD); and the German Cooperation (GTZ). He is a member of the Network of African Environmental Lawyers and serves as assistant secretary of the Ivory Coast Association for Environmental Law (SIDE).

20 BP 650 Abidjan 20
Ivory Coast
Tel: +225-20-21-05-98/ 07-80-47-36
Fax: +225-20-21-04-95

Michael Kidd, B Com LLB LLM PhD (Natal), is a Professor of Law and the Director of the Institute of Environmental Law at the University of Natal, Pietermaritzburg.

E-mail: kidd@nu.ac.za

Sarah King is a Program Associate with GLOBE USA (Global Legislators Organization for a Balanced Environment). Prior to joining GLOBE USA, she was a Senior Research Associate at the Environmental Law Institute, where she worked on a variety of projects related to African environmental law and policy including this volume on genetic resources in Africa. She studied economics and environmental policy at Carleton College, and international development with the School for International Training in Madagascar.

GLOBE USA
1636 R Street, NW, 3rd Floor
Washington, DC 20009
Tel: +1-202-265-8283 ext. 2#
Fax: +1-202-265-8291
E-mail: sarahbking@hotmail.com

Robert J.L. Lettington is Deputy Director of SEAPRI with particular responsibility for its agricultural policy activities. He also contributes to the Institute's activities relating to traditional knowledge, intellectual property, and legislative analysis.

Southern Environmental and Agricultural Policy Research Institute (SEAPRI)
International Centre of Insect Physiology and Ecology (ICIPE)
P.O. Box 30772
00100 GPO
Nairobi, Kenya
E-mail: rlettington@icipe.org

Ibrahima Ly is a Full Professor and Head of the Public Law and Political Science Department at Cheikh Anta Diop University of Dakar (Senegal). He has worked as an international and national consultant for many international institutions. He serves as President of the Senegalese Environmental Law Association and is a member of the National Committee of Biosecurity of Senegal, the IUCN Commission on Environmental Law, the French University Agency Environmental Law Network, and the Network of African Environmental Lawyers.

P.O. Box 15346
Dakar-Fann, Senegal
Tel: +221-632-48-26; +221-824-95-70
E-mail: ibraly@ucad.sn

Mariam Mayet, BA LLB LLM (Wits), is a freelance lawyer based in Johannesburg, South Africa specialising in biosafety and biodiversity policy and legislation.

E-mail: mariammayet@mweb.co.za

Arthur Mpeirwe is a Research Fellow and Head of the Intellectual Property and Biotechnology Policy Program at Advocates Coalition for Development and Environment (ACODE). He is a lawyer with a Master's degree in intellectual property rights and human rights law. His specialties include biotechnology, biosafety, and intellectual property rights issues.

Advocates Coalition for Development and Environment
P.O. Box 29836 Kampala, Uganda
Tel: +256-41-530798; +256-77-404799
E-mail: ampeirwe@acode-u.org

Godfrey L.P. Mwila was the Programme Team Leader under the National Plant Genetic Resources Programme within the Zambian Ministry of Agriculture until April 2003, when he began an eight-month secondment with the SADC Plant Genetic Resources Centre. He holds a Master's degree in Plant Genetic Resources Conservation and Utilisation from the University of Birmingham in the United Kingdom and specialises in agriculture and plant genetic resources at the national, regional, and international levels. He participated in the negotiations leading to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR).

Prior to December 2003:
SADC Plant Genetic Resources Centre
Private Bag CH 6
Lusaka, Zambia
Tel: +260-1-233816/23391-2
Mobile: +26096745604
Fax: +260-1-230515

After December 2003:
Mt. Makulu Research Centre
Private Bag 7
Chilanga, Zambia
Tel: +260-1-278380
Mobile: +260967456
Fax: +260-1-278130

Samuel Nguiffo is the Director of the Center for Environment and Development (CED), an NGO based in Cameroon. He holds a degree in Law and Political Science and specialises in forest management, oil development, indigenous peoples' rights, and governance. In 1999, he was awarded the Goldman Environmental Prize.

Tel: + 237-222-38-57
E-mail: snguiffo@cedcameroun.org

Kent Nnadozie is a lawyer and is currently the Director of the Southern Environmental and Agricultural Policy Research Institute (SEAPRI), an initiative of the International Centre for Insect Physiology & Ecology (ICIPE), in Nairobi, Kenya. A regular member of the Nigerian delegation to the CBD, he was also a member of a Special Task Force set up by the Federal Government of Nigeria to review its IPR laws and to prepare new draft legislation in compliance with its national objectives and international obligations. He is also a member of the IUCN Commission on Environmental Law and its Specialist Group on Indigenous Peoples and Environmental Law; the Earth Circle, an indigenous people's initiative; and the expert group involved in the programme of the African Union to assist member states in establishing legal and policy frameworks for the conservation and sustainable utilisation of biological diversity.

E-mail: kent@netlane.com

Rolph A. Payet is the Director General of the Policy, Planning and Services Division within the Ministry of Environment, Seychelles, and is currently pursuing his doctorate in Biology and Environmental Science at the University of Kalmar in Sweden. His primary research interests include impact of global climate change, biodiversity, sustainable coastal tourism, coral reefs, and marine/ocean resource management. He holds a Bachelor's Degree (Hons.) in Biochemistry and Molecular Biology from the University of East Anglia (UK), an MBA from Surrey University, and a Master's Degree in Integrated Coastal Zone Management from the University of Ulster. He currently serves as Chairman of the Board of the Seychelles Centre for Marine Research and Technology and the Marine Parks Authority in Seychelles.

P.O. Box 677
Victoria, Mahe, Seychelles
Tel: +248-224644
Fax: +248-322945
E-mail: rolph@seychelles.sc

Nat Quansah, Ph.D., is a botanist by training and an ethnobotanist by profession. He has worked extensively in local, national, and international programs on environment, health, biological, and cultural (biocultural) diversity conservation, as well as capacity reinforcement and building. Dr. Quansah created the Integrated Health Care for Conservation Program, a program that emphasises the importance of access to and reaping of benefits from biodiversity as a means to meet socio-economic needs and conserve biocultural diversity simultaneously. Dr. Quansah's work earned him the 2000 Goldman Environmental Prize for Island Nations.

Noir Éclair
Morondava Centre
Morondava 619
Madagascar
Tel: +261-20-95-527-22
E-mail: quansah@dts.mg; natquansah@hotmail.com

Lovemore Simwanda is the Chairman for the Environmental Conservation Association of Zambia (ECAZ) and currently the Chair of the Zambia National Farmer's Union board on GMOs and issues related to trade and biotechnology. For the past 15 years, he has worked with the provision of professional, technical and management services to bilateral and multilateral development agencies, namely IFAD, IUCN, FAO, EU, World Bank, SIDA, CIDA, NORAD, USAID, and SADC in the region. Within Zambia, he has worked on community-based natural resources management, forestry, water resources, agriculture, rural poverty alleviation and nutrition, forestry out-grower schemes, impact assessment studies, and monitoring and evaluation. He also has extensive experience in the implementation of projects emphasising institutional development, management issues in regional development planning, agriculture, and forestry rural development project cycle activities.

Tel: +260-1-252677/252649
Fax: +260-1-252648
E-mail: ecaz@zamnet.zm

Godber Tumushabe is an independent environmental law and trade policy analyst engaged in research on a broad range of environmental, trade, and human rights issues in Eastern and Southern Africa. Mr. Tumushabe is currently Executive Director of Advocates Coalition for Development and Environment (ACODE), a Uganda-based independent public policy research and analysis thinktank. He also teaches environmental law, international law, and the science of law at Makerere University, Kampala. Mr. Tumushabe formerly worked as a Senior Research Fellow at the African Centre for Technology Studies (ACTS) in Nairobi, Kenya. He co-edited, with Professor Okoth-Ogendo, *Governing the Environment: Political Change and Natural Resources Management in Eastern and Southern Africa* (ACTS, 1999).

Advocates Coalition for Development and Environment (ACODE)
Plot 96, Knjokya Street
P.O Box 29836, Kampala, Uganda
Tel: +256-41-530-798
Mobile: +256-77-590642
E-mail: gtumushabe@acode-u.org; acode@acode-u.org

Worku Damena Yifru is an environmental lawyer currently specialising in biosafety issues. He is a Legal Affairs Officer at the Secretariat of the Convention on Biological Diversity. Prior to joining the Secretariat in 2001, he worked with the Environmental Protection Authority of the Ethiopian government. He was a member and a legal advisor of the Ethiopian delegation in several biodiversity-related international environmental negotiations, including the negotiations for the Cartagena Protocol on Biosafety and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR).

393 Saint-Jacques St.
Suite 300
Montreal, Quebec
Canada, H2Y 1N9
Tel: +1-514-287-7006
Fax: +1-514-288-6588
E-mail: worku.damena@biodiv.org

APPENDIX B
PEER REVIEW MEETING PARTICIPANTS

On January 23-24, 2003, at the ICIPE Headquarters Seat in Nairobi, Kenya, a panel of independent, external experts was convened to review an early draft of the manuscript that became this volume. Some of the editors and contributing authors also participated. The following people participated in their personal capacity; institutional affiliations are included for identification purposes only.

Kolawole O. Adeniji
Executive Director a.i.
Scientific, Technical, and Research Commission of the African Union (AU/STRC)
Nigeria Ports Authority Building (4th floor)
26/28 Marina
PMB 2359, Lagos, Nigeria
Tel: +234-1-263-3430
Fax: +234-1-263-6093
E-mail: oaustrcl@hyperia.com

Kwesi Atta-Krah
Regional Director
International Plant Genetic Resources Institute
Regional Programme for Sub-Saharan Africa
C/o ICRAF
PO Box 30677
Nairobi Kenya
Tel: +254-2-524507
Fax: +254-2-524501
E-mail: k.atta-krah@cgiar.org

Shakeel Bhatti
Associate Officer
WIPO
34 Chemin des Colombettes
CH-1211 Genève 20
Switzerland
Tel. +41-22-3389846
Fax +41-22-3378120
E-mail: shakeel.bhatti@wipo.int

Susan Bragdon
Senior Scientist, Law and Policy
Genetic Resources Science and Technology Group
International Plant Genetic Resources Institute (IPGRI)
c/o Northwestern School of Law of Lewis & Clark College
10029 NW Terwilliger
Portland, OR 97219
Tel: +1-503-768-6714
Fax: +1-503-768-6751
E-mail: s.bragdon@cgiar.org

Carl Bruch
Environmental Law Institute
1616 P St NW, Suite 200
Washington, DC 20036
Tel: +1-202-939-3240
Fax: +1-202-939-3868
E-mail: bruch@eli.org

David Cooper
Seeds and Plant Genetic Resources Services
Food and Agriculture Organization (FAO)
Rome, Italy
Tel: +39-06-57055004
E-mail: David.Cooper@fao.org

Ossama El-Tayeb
Director, Microbial Biotechnology Center
Faculty of Pharmacy
Cairo University
Scientific Advisor, Nature Protection Sector
Egyptian Environmental Affairs Agency
9 Omar Ibn Abdelaziz Street
Mohandeseen, Cairo, Egypt
Postal Code 12411
Tel : +202-336-3222
Fax : +202-362-0122
Email: omtayeb@link.net

Francois Gasengayire
IDRC
Eastern and Southern Africa Regional Office
P.O.Box 62084
Nairobi, Kenya
Tel: +254-2-2713160/1
Fax: +254-2-2711063
E-mail: fgasengayire@idrc.or.ke

Jan Glazewski
Institute of Marine and Environmental Law
Street address: Room 6.18 Kramer Law Building
Middle Campus
University of Cape Town
Postal address: Institute of Marine and Environmental Law
Private Bag
University of Cape Town
7700 RONDEBOSCH
South Africa
Tel: +27-21-650-3075/5642
Fax: +27-21-650-5660
E-mail: glaz@law.uct.ac.za

Robert Lettington
ICIPE
P.O. Box 941-0060
Sarit Centre
Nairobi
Kenya
Tel: +254-733-745-540
E-mail: rlettington@ICIPE.org

Elizabeth Mrema
United Nations Environment Programme
Division of Environmental Policy Implementation
PO Box 30552
Nairobi, Kenya
Tel: +254-2-624-252
Fax: +254-2-624-249
E-mail: Elizabeth.Mrema@unep.org

Arthur Mpeirwe
Advocates Coalition for Development and Environment (ACODE)
Plot 96, Kanjokya Street, Kamwokya
P.O Box 29836, Kampala
Tel. +256-41-530798
E-mail. ampeirwe@acode-u.org

Paul Mungai
Kenya Wildlife Service
P.O. Box 40241
Nairobi, Kenya
Tel: +254-2-506169
Fax: +254-2-505866
E-mail: emu@kws.org

Khungeka Njobe
Director: Biodiversity Policy and Planning
National Botanical Institute
Private Bag X101
Pretoria 0001
South Africa
Tel: +27-12-804-3200
Fax : +27-12-804-5343
E-mail: njobe@nbipre.nbi.az.za

Kent Nnadozie
54 James Robertson St.
P.O. Box 6535
Surulere, Lagos
Nigeria
Tel: +234-1-263 7738 or +234-803-305-3508
Email: kent@netlane.com

Valérie Normand
Programme Officer, Access and Benefit-sharing
Secretariat of the Convention on Biological Diversity
393 St-Jacques St., Suite 300
Montreal, Quebec
Canada H2Y 1N9
Tel: +1-514-287-7033
Fax: +1-514-288-6588
E-mail: Valerie.Normand@biodiv.org

Charles O. Okidi
Professor
Institute for Development Studies
University of Nairobi
P.O. Box 45891
Nairobi, KENYA
Tel: +254-2-337436/583236
Fax: +254-2-583236
E-mail: idsdirector@swiftkenya.com

Evans Olonyi Sikinyi
Kenya Plant Health Inspectorate Service
Waiyaki Way
P.O. Box 49592
Nairobi, Kenya
Tel: +254-2-4440087 or 2-4441804
Fax: +254-2-4448940
E-mail: kephis@nbnet.co.ke or
sikinyi_evans@yahoo.co.uk

APPENDIX C
SELECTED LIST OF FREQUENTLY USED TERMS

The importance of common understanding and definitional coherence in developing the appropriate instruments to govern genetic resources is a theme that recurs throughout this book. Below is a list of terms that are used frequently in discussions of this subject matter, with the definitions drawn from sources that are relied upon by experts in the field. These sources include article 2 of the Convention on Biological Diversity (CBD); the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (the Bonn Guidelines); *Black's Law Dictionary* (*Black's*); the International Treaty on Plant Genetic Resources (ITPGR); the African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources (the Model Law); and The International Convention for Protection of New Varieties of Plants (UPOV Convention).[1]

Access to genetic resources (**AGR**) is defined in the Model Law as "the acquisition of biological resources, their derivatives, community knowledge, innovations, technologies or practices as authorised by the National Competent Authority."

Article 15 of the CBD recognises the "sovereign rights of States over their natural resources," and maintains that they have "the authority to determine access to genetic resources rests with the national governments and is subject to national legislation." Access provisions at the national level are to be aimed at facilitating "environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention," and are to be "subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party."

Some commentators have defined AGR as the practice of obtaining samples of "biological or other material containing genetic materials from areas within national jurisdiction for purposes of research on, conservation or industrial application of the genetic material."[2]

Benefit sharing is defined in the Model Law as "the sharing of whatever accrues from the utilisation of biological resources, community knowledge, technologies, innovations or practices."

Article 15 of the CBD states that "each Contracting Party shall take legislative, administrative or policy measures, as appropriate … with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources."

Biological diversity is the "variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (CBD).

Biological resources "include[s] genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity" (CBD).

Bioprospecting, or biodiversity prospecting, has been defined as the "search for valuable compounds in nature, e.g., active molecules with the potential for use in drug development."[3] It has also been defined as the

[1] Convention on Biological Diversity, U.N. Doc. DPI/130/7, *entered into force* entered into force Dec. 29, 1993, *reprinted in* 31 I.L.M. 818 (1992); Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, *in* DECISIONS ADOPTED BY THE CONFERENCE OF THE PARTIES TO THE CBD AT ITS SIXTH MEETING, *available at* http://www.biodiv.org/doc/decisions/cop-06-dec-en.pdf (last visited Aug. 26, 2003); BRYAN GARNER (ED.), BLACK'S LAW DICTIONARY (1996); International Treaty on Plant Genetic Resources for Food and Agriculture, *opened for signature* Nov. 3, 2001, *available at* http://www.fao.org/Legal/TREATIES/-033s-e.htm (last visited Aug. 26, 2003); African Model Law on he Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Genetic Resources, *formally endorsed* July 1998, *available at* http://www.grain.org/-docs/oua-modellaw-2000-en.pdf (last visited Aug. 26, 2003); The International Convention for Protection of New Varieties of Plants, Dec. 2, 1961, *as revised on* Nov. 10, 1972, Oct. 23, 1978, and Mar. 19, 1991, UPOV Doc. 221(E).

[2] *See* Glossary *in* SARAH LAIRD (ED.), BIODIVERSITY AND TRADITIONAL KNOWLEDGE: EQUITABLE PARTNERSHIPS IN PRACTICE (2002).

[3] THE GLOBAL BIODIVERSITY INSTITUTION/INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE, TRAINING COURSE ON BIODIVERSITY, BIOTECHNOLOGY AND LAW (March 2000), *available at* http://www.aaas.org/international/africa/gbdi/GBDI-Ibadan.pdf (last visited Aug. 26, 2003).

"exploration of wild plants and animals for commercially valuable genetic and biochemical resources."[4]

Breeders' rights are defined in part IV of the Model Law as, "the exclusive right to sell, including the right to license other persons to sell plants or propagating material of that variety … [and] the exclusive right to produce, including the right to license other persons to produce, propagating material of that variety for sale." The rights "stem from the efforts and investments made by persons/institutions for the development of new varieties of plants … being the basis for providing recognition and economic reward."

Article 1(4) of the UPOV Convention defines a breeder as "the person who bred, or discovered and developed, a variety … the person who is the employer of the aforementioned person or who has commissioned the latter's work, where the laws of the relevant Contracting Party so provide, or … the successor in title of the first or second aforementioned person, as the case may be." Article 14 then defines the scope of breeders' rights: "[t]he following acts in respect of the propagating material of the protected variety require the authorization of the breeder: (i) production or reproduction (multiplication); (ii) conditioning for the purpose of propagation; (iii) offering for sale; (iv) selling or other marketing; (v) exporting; (vi) importing; (vii) stocking for any of the purposes mentioned in (i) to (vi), above."

Ex situ conditions or conservation are where the components of biological diversity are found or conserved outside their natural habitats (CBD and ITPGR).

The Model Law defines an ex situ condition as "the condition in which a biological resource is found outside its natural habitat. Under present law, any lineage that is cultivated within its country of origin is not considered to in an ex situ condition."

Farmers' rights[5] are defined in part V of the Model Law as including the right to: "a) protection of the protection of their traditional knowledge relevant to plant and animal genetic resources; b) obtain an equitable share of benefits arising from the use of plant and animal genetic resources; c) participate in making decisions, including at the national level, on matters related to the conservation and sustainable use of plant and animal genetic resources; d) save, use, exchange and sell farm-saved seed/propagating material of farmers' varieties; e) use a new breeders' variety protected under this law to develop farmers' varieties, including material obtained from genebanks or plant genetic resource centres; and f) collectively save, use, multiply and process farm-saved seed of protected varieties." Notwithstanding these protections, the article goes on to state that the "farmer shall not sell farm-saved seed/propagating material of a breeders' protected variety in the seed industry on a commercial scale," but that "Breeders' Rights on a new variety shall be subject to restriction with the objective of protecting food security, health, biological diversity and any other requirements of the farming community for propagation material of a particular variety."

Article 9 of the ITPGR places the responsibility to protect and promote farmers' rights relevant to the conservation and development of plant genetic resources on its Contracting Parties, including: "(a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture; (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture." The article then goes further to state that, "nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange, and sell farm-saved seed/propagating material, subject to national law and as appropriate."

The Commission on Intellectual Property Rights defines farmers' rights simply as, "Rights arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centres of origin/diversity."[6]

Genetic resources are defined in the CBD as "genetic material of actual or potential value," with "genetic material" including "any material of plant, animal, microbial or other origin containing functional units of heredity."

The ITPGR definition tracks the CBD definition very closely by characterising "plant genetic resources for food and agriculture" as "any genetic material of plant origin of actual or potential value for food and agriculture." Genetic material is "any material of plant origin,

[4] World Resources Institute *et al.*, Biodiversity Prospecting: Using Genetic Resources for Sustainable Development (1993).

[5] The term "Farmers' Rights" is sometimes capitalised to denote higher order rights of farmers (for example, to collect, use, and trade seed) as opposed to exceptions within systems, such as the breeder's privilege. This volume utilises the term "farmers' rights" solely as a matter of editorial style—no inference should be drawn from the fact that the editors have chosen not to capitalise the term.

[6] Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development (2002), *available at* http://www.iprcommission.org/papers/text/final_report/reporthtmfinal.htm (last visited Aug. 26, 2003).

including reproductive and vegetative propagating material, containing functional units of heredity."

In situ conservation means "the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated plant species, in the surroundings where they have developed their distinctive properties" (CBD and ITPGR).

The CBD also defines in situ conditions as "conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties."

Intellectual property rights (**IPRs**) are defined by the International Plant Genetic Resources Institute (IPGRI) as "essentially a grant of exclusive marketing rights accorded to promote science, technology, the arts, consumer choice and to encourage investment and secure returns on it."[7]

The Commission on International Property Rights defines IPRs as, "Rights awarded by society to individuals or organisations over inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. They give the titleholder the right to prevent others from making unauthorised use of their property for a limited period."[8]

Material transfer agreements (**MTAs**) are a "special type of contract defining the rights and obligations of all parties, including third parties, during the transfer of biological material from a provider to a recipient."[9]

Plant variety is defined in Article 1(vi) of the UPOV Convention as "a plant grouping within a single botanical taxon of the lowest known rank, which grouping, irrespective of whether the conditions for the grant of a breeder's right are fully met, can be…defined by the expression of the characteristics resulting from a given genotype or combination of genotypes, distinguished from any other plant grouping by the expression of at least one of the said characteristics and considered as a unit with regard to its suitability for being propagated unchanged."

The ITPGR similarly defines a plant variety as a "plant grouping within a single botanical taxon of the lowest known rank, defined by the reproducible expression of its distinguishing and other genetic characteristics."

Prior informed consent (**PIC**) is defined by the Model Law as the "giving by a collector of complete and accurate information, and, based on that information, the prior acceptance of that collector by the government and the concerned local community or communities to collect biological resources, or indigenous knowledge, or technologies."

Other commentators have defined PIC as "the consent of a party to an activity that is given after receiving full disclosure regarding the reasons for the activity, the specific procedures that activity would entail, the potential risks involved, and the full implications that can realistically be foreseen.[10]

Article 15 of the CBD holds that, "Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party."

Sui generis system is defined in *Black's* as a unique or original system. Sui generis is from the Latin for "of its own kind."

7 See http://www.ipgri.cgiar.org/policy/ipgripol.htm (last visited Aug. 26, 2003).

8 WRI *ET AL.*, *supra* n. 4.

9 *Id.*

10 LAIRD, *supra* n. 2.

APPENDIX D
METHODOLOGICAL QUESTIONAIRE

The following questionnaire constitutes a reorganisation of the original based upon the comments of, and discussions with, the review panel.

ACCESS TO GENETIC RESOURCES QUESTIONNAIRE

1. BACKGROUND

Key issue: to what extent has potential or bioprospecting been determined? What have the results been? This section should provide a brief introduction to the physical, geographical, social, and political situation of the country. The aim is to provide a relevant context for the later discussions of issues related to access and benefit sharing and to provide sufficient information to identify any links between a country's ABS priorities and strategies and its situation.

Key points when discussing physical and geographical factors should include: nature of the country, i.e. size; island, landlocked or coastal; range of ecosystems; climate; basic information on biodiversity and levels of endemism; any particular constraints or advantages.

Key points when discussing social and political factors should include: population; education/literacy levels; GDP per capita; key economic sectors; status of agriculture; membership of relevant international organizations; any particular constraints or advantages.

2. CURRENT STATUS OF ACCESS TO GENETIC RESOURCES ACTIVITY AND ASSOCIATED LEGAL, POLICY, AND INSTITUTIONAL STRUCTURES

This section should provide a summarised overview of bioprospecting activities in the country to date. It is not expected that this overview will be exhaustive but, rather, it should cover examples that are either high profile or that the author believes are representative of the general situation or are of some particular interest. Whether the country has an express access and benefit sharing regime or not, the process or experience that those seeking access had to undergo in particular instances should be referred to. **This should clearly iterate the steps an applicant had to take to receive permission for access as well as discussing terms of ownership and benefit sharing, including application of relevant existing laws.** If activities were conducted without any authority, this should be pointed out. To the degree that such activities exist, discussion should cover commercial, domestic public sector, and international activities. **If there has been no activity by any particular sector, or all sectors, this should be stated.**

1) Is there a lead agency(ies) for management of biological resources, including issues related to access and benefit-sharing? If so, please name and briefly describe relevant responsibilities and the process(es) a collector would go through to obtain permission to conduct research regarding and/ or collect biological resources. Is the lead agency and the process different for obtaining permission to collect biological resources to identify, extract or otherwise use genetic resources? If so please describe. Where there is more than one lead agency, is this established along sectoral or geographical lines? If neither, is there a significant risk, or existence, of overlap in mandates? How are these overlaps addressed?

2) Please describe the role played by any international institution, such as the multilateral development banks, the bilateral banks, the U.S. Agency for International Development (USAID), the United Nations, the Consultative Group on International Agricultural Research (CGIAR) or NGOs, in controlling or influencing access to, control or utilization of, and benefit-sharing with respect to, genetic resources.

3) Please describe examples of any attempted or ongoing bioprospecting initiatives by the following parties. For each example, please briefly describe the process used under current laws by the relevant party to obtain access to the biological resources in question. If none, please indicate.

a) Initiatives by the government
b) Initiatives by local or international NGOs
c) Initiatives by the private sector

4) Has there been any realistic assessment of the country's potential value as a center of bioprospecting – diversity, level of endemism, etc. If so, please briefly describe the results of the assessment and who prepared or contributed to the assessment. Existence of secondary facilities (laboratories, gene banks, MS-GC, NMR etc) and expertise may be relevant here. Such an assessment may be formal or informal.

3. LEGAL, POLICY, AND INSTITUTIONAL APPROACHES TO ACCESS TO GENETIC RESOURCES

3.1 Specific Access and Benefit Sharing Legislation, Policies and Institutions

This section should include details of any regulatory regime in place that is expressly related to access to genetic resources or the implementation of Article 15 of the CBD including applicable constitutional, legislative, regulatory, and policy provisions, as well as institutional structures, procedures, and mechanisms for institutional coordination among institutions. It is recognised that almost no African countries have adopted such a regime but any framework statutory provisions allowing for the establishment of such a regime, or any administrative actions to the same effect, should be mentioned. If there are no provisions under this section this should be clearly stated. Please refer briefly to pending changes, but discuss them in detail in Section 3.3, under new initiatives.

A. Norms

1) Please list and briefly describe any provisions in the National Constitution that specifically address:

a) the ownership of genetic resources,
b) access to, control of, and/or utilization of such resources, and
c) benefit-sharing regarding those resources. If none, please indicate.

2) Please list and briefly describe any laws, regulations, or policies that have been enacted or adopted by your country, such as those done to implement the Convention on Biological Diversity, that specifically address:

a) the ownership of genetic resources,
b) access to, control, and/or utilization of genetic resources, and
c) benefit-sharing regarding genetic resources.

Please also list and briefly describe any draft laws, regulations or policies have been prepared and the stage of the process of their enactment. If none, please indicate.

3A) Has your country signed or ratified the International Treaty on Plant Genetic Resources for Food and Agriculture? Please describe the extent to which relevant stakeholders were consulted during the negotiations for the

Treaty and if there has been any multi-stakeholder discussion on the question of ratification? If your country has not signed or ratified the Treaty is there any indication of an intention to do so?

3B) Please list and briefly describe any laws, regulations, policies, or elements thereof, addressing Farmers' Rights, as described in the International Treaty on Plant Genetic Resources for Food and Agriculture, or the conservation and sustainable use of plant genetic resources for food and agriculture? Please indicate if any such instruments are under development, if not please indicate.

4) For each of the laws described in response to questions 2), 3), 3A) and 3B) please list the lead agency(ies) below and further indicate whether the lead agency(ies) has the authority to grant permission to collect biological resources. If so, describe the process for a collector to obtain permission to collect biological resources, including a specific description of any requirements such as prior informed consent.

5) Is there any express or implied policy rationale behind your country's current access to genetic resources regulatory regime? This may be to address poverty alleviation concerns, enhance research and development capacities, support conservation initiatives, etc.

6) Please describe any overriding priorities driving government policy-making in this and related fields, e.g., poverty eradication, capacity building? Please describe who prepared or contributed to the development of these priorities. What is the government's objective (cash, experience/training, environmental advantages, etc.)? It is assumed that all of these are likely to appear to some degree but presumably there will be some degree of prioritization, whether expressed or not.

6A) Please describe any initiatives to implement the International Treaty on Plant Genetic Resources for Food and Agriculture in your country. Please describe the extent to which these initiatives involve coordination between the agriculture, trade, and environmental authorities in your country? Please describe the extent to which these initiatives involve consultation with relevant stakeholders, such as agricultural research centres, farmers organisations, plant breeders etc. If none, please indicate.

7) What is the relative priority given by your government to commercialization, conservation, community empowerment and development and equity in the context of your country's access to genetic resources discussions and/or strategies?

8) Please briefly describe any NGO involvement in the policy debate? Please identify whether the NGOs involved are local or foreign organizations.

9) Please describe to what extent have communities been involved in, or are aware of, the policy debate and their positions, if any. If communities have engaged in the process, has this been by means of key representatives, NGOs/CBOs, widespread grassroots debate, or some other means?

10) Is access regulation being used to centralize or decentralize the exercise of government authority? It is recognized that this can be complex such that even a centralized system may have its priorities in decentralized objectives.

11) What has been the nature of benefit-sharing discussions? There are several aspects of this. The most obvious is what kind of benefits have been focused on and for whom. Also significant is the means of distribution of any benefits, are they likely to be directed to major institutions or more to communities. Direct versus indirect benefits. Finally, who is seen to be defining the parameters of benefit-sharing, communities, government, potential bioprospectors, NGOs or some other group?

3.2 Legislation, Policies, and Institutions with Relevance to Access and Benefit Sharing

This section is expected to constitute the bulk of the country study and should provide the detail of the various legal, policy and institutional approaches to access to genetic resources in a country that may, or may not, have been referred to in section 2. These laws should be discussed **only to the extent that they directly affect an applicant or an institution seeking access to genetic resources (or having to share benefits derived from the genetic resources)**. This will normally mean that the laws address questions such as: the ownership of, or rights over, biodiversity; the removal of anything from various categories of protected area; and, licenses that may be required for the conducting of particular activities (such as research). Where appropriate, this section should address different laws in order of their relevance or legal significance. For example, if the section is approached in terms of legal significance it should follow a pattern along the lines of:

– relevant constitutional provisions. These may relate to the environment, categories of land tenure, customary laws, scientific research or other similar matters that may impact upon access.
– framework statutory provisions, including any regulations issued pursuant to them. These will normally be framework environmental laws enacted to implement the CBD or the African Convention on Nature and Natural Resources.
– sectoral legislation, including any regulations issued pursuant to them. These will normally include laws such as:
  protected areas
  forestry
  intellectual property
  community rights, Farmers' Rights etc.
  agricultural research and production
  science and technology
  marine and freshwater/coastal management
  tribal rights
  land tenure
  wildlife
  natural resource management
– administrative orders or actions. These often include processes for the issuance of research permits.
institutional authority; policies and procedures; coordination mechanisms
judicial decisions

This section should also discuss any laws, policies, and institutions that the author believes are important to the question of access to genetic resources but that have not, thus far, had any effect on the issue. To the extent that these are discussed, their **relevance to access to genetic resources should be the basis of any discussion**. Examples of laws that may be discussed in this section are:

– constitutional provisions that could be interpreted as impacting access to genetic resources but where no explicit action has been taken for this, or similar, purposes.
– framework or sectoral laws that provide powers to manage any particular type of natural resources, or those of any particular area.
– Laws, policies or institutions that might be realistically adapted to address access to genetic resources

1) Please list and briefly describe any laws, regulations, or policies, including constitutional provisions, that your country has in place regarding biological resources in general that affect or could affect the ownership of genetic resources, access to, control of, and utilization of genetic resources, and benefit-sharing with respect to genetic resources? (e.g., general laws governing fisheries, seeds, forestry, wildlife, protected areas, quarantine, produce marketing, etc.) If none, please indicate.

2) For each of the laws described in response to question 1) please list the lead agency(ies) below and further indicate whether the lead agency(ies) has the authority to grant permission to collect biological resources. If so, describe the process for a collector to obtain permission to collect biological resources, including a specific description of any requirements such as prior informed consent.

3) Do your laws, regulations and/or policies treat genetic resources differently from other biological resources? Are any distinctions, such as special treatment for economically significant crops, etc. made within the field of genetic resources? I f so, please briefly describe how.

4) Is your country a member of the WTO? If so, is it required to implement the full provisions of the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPs) by 2000 or 2006 (is the country classified as developing or least developed)? If required to comply by 2000, has this been fulfilled?

5) Please briefly describe your country's official position with respect to the compatibility of the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPs) with the CBD and the African Group position as presented at the Seattle inter-ministerial conference in December 1999. If no position exists, please indicate.

6) Please briefly describe any current laws, regulations, or policies that address the rights of indigenous peoples or local communities to control access, ownership and utilization, and benefit-sharing with respect to genetic and biological resources? If none exist, please indicate. "Are Farmers' Rights/Privileges formally recognised or provided for under any laws or regulations?"

7) Please briefly describe any legal, regulatory, or policy changes your country has made to conform to Article 27.3(b) of TRIPs (i.e., Do you allow for patenting of plant varieties or are there other legal forms of protection, such as UPOV, for the protection of plant varieties? Are plants generally, animals and microorganisms patentable or are there other legal forms of protection for these categories?). If none, please indicate. If your country is not in compliance with these provisions of TRIPs, please indicate the nature of the conflicts.

8) Please indicate which Act of the UPOV Convention (International Convention for the Protection of New Varieties of Plants) your country has acceded to or ratified (i.e.,1991, 1978, 1972, or 1961) and when such accession or ratification occurred. If none, please indicate.

8A) Please briefly describe any laws relating to intellectual property, or other, rights over farmers varieties, landraces or crop wild relatives in your country. If none, please briefly describe how farmers varieties, landraces or crop wild relatives are treated by intellectual property laws in your country.

9) Please briefly describe the patent protection system in your country for botanical genera. If none, please indicate. Please indicate the species of plants that are excluded from protection under your plant variety protection system, if any.

10) Please briefly describe the patent protection system in your country for product inventions. If none, please indicate. Please specify which, if any, inventions are not eligible for protection under this system and the grounds therefore. If the exclusions simply mirror those included in TRIPs, please indicate.

11) Please briefly describe any distinctions in patentability under your law or in practice based on the source of the genetic information (i.e., viruses, bacteria, plants, animals, humans, and human organs or human-derived products, including cell lines and genes) or the form of the nucleic acid sequence.

12) Does your examining authority exclude biotechnological inventions from patentability based on ethical or moral concerns? If so, please describe the specific concerns that have been the basis of exclusions.

3.3 New Initiatives

In this section, please describe any new initiatives that are under discussion, regardless of their stage of implementation

1) Please briefly describe any draft laws currently under consideration addressing the sui generis protection of plant varieties. If none, please indicate.

2) Please describe any draft statutes or institutional initiatives that may be relevant.

4. CONCLUSION: STRENGTHS AND WEAKNESSES

The conclusion should address any issues which the author believes need to be highlighted from the discussion in the earlier sections. This may include; institutional issues, questions of the current leakage of genetic resources and lost opportunities; as well as particular interest shown by pharmaceutical or other commercial companies in a countries resources.

1) Please identify what you would consider as the main drawbacks of the access to genetic resources regulatory system as currently applied in your country.

2) What are the major strengths and weaknesses of your country relevant to access to genetic resources – e.g., high level of endemism, existence of expertise, facilities, financial resources, collaborative relationships, etc. Please describe who identified or contributed to the identification of these strengths and weaknesses. The strengths and weaknesses should be judged principally relative to other African and developing countries rather that to developed countries.

APPENDIX E
AFRICAN MODEL LAW

Organization of African Unity

AFRICAN MODEL LAW FOR THE PROTECTION OF THE RIGHTS OF LOCAL COMMUNITIES, FARMERS AND BREEDERS, AND FOR THE REGULATION OF ACCESS TO BIOLOGICAL RESOURCES

Please send all comments and enquiries to:
Prof. J.A. EKPERE, Project coordination / consultant,
Organization of African Unity, Scientific,
Technical, and Research Commission (OAU/ STRC)
PMB 2359
Lagos, Nigeria
E-mail: jekpere@rcl.nig.com

OAU MODEL LAW, ALGERIA, 2000 — RIGHTS OF COMMUNITIES, FARMERS, BREEDERS, AND ACCESS TO BIOLOGICAL RESOURCES

AFRICAN MODEL LAW FOR THE PROTECTION OF THE RIGHTS OF LOCAL COMMUNITIES, FARMERS AND BREEDERS, AND FOR THE REGULATION OF ACCESS TO BIOLOGICAL RESOURCES

Whereas, the State and its people exercise sovereign and inalienable rights over their biological resources;
Whereas, the rights of local communities over their biological resources, knowledge and technologies that represent the very nature of their livelihood systems and that have evolved over generations of human history, are of a collective nature and, therefore, are *a priori* rights which take precedence over rights based on private interests;
Whereas, the vital role that women play in the generation, conservation, and sustainable use of biological diversity and associated knowledge and technologies is self evident, and it thus becomes essential to make it possible for their full participation at all levels of policy-making and implementation in relation to biological diversity, and associated knowledge and technologies;
Whereas, it is necessary to protect and encourage cultural diversity, giving due value to the knowledge, technologies, innovations and practices of local communities with respect to the conservation, management and use of biological resources;
Whereas, it is the duty of the State and its people to regulate access to biological resources and to community knowledge and technologies;
Whereas, the State recognizes the necessity of providing adequate mechanisms for guaranteeing the just, equitable and effective participation of its citizens in the protection of their collective and individual rights and in making decisions which affect its biological and intellectual resources as well as the activities and benefits derived from their utilization;
Whereas, there is the need to promote and support traditional and indigenous technologies for in the conservation and sustainable use of biological resources and to complement them by appropriately developed modern technologies;
Whereas, there is the need to implement the relevant provisions of the Convention on Biological Diversity, in particular Article 15 on access to genetic resources, and Article 8(j) on the preservation and maintenance of knowledge, innovations and practices of indigenous and local communities;
Whereas, all forms of life are the basis for human survival, and, therefore, the patenting of life, or the exclusive appropriation of any life form or part or derivative thereof violates the fundamental human right to life;
Now, therefore, it is hereby legislated as follows:

PART I
OBJECTIVES

The main aim of this legislation shall be to ensure the conservation, evaluation and sustainable use of biological resources, including agricultural genetic resources, and knowledge and technologies in order to maintain and improve their diversity as a means of sustaining all life support systems.
The specific objectives of this legislation shall be to:

a) recognize, protect and support the inalienable rights of local communities including farming communities over their biological resources, knowledge and technologies;

b) recognize and protect the rights of breeders;

c) provide an appropriate system of access to biological resources, community knowledge and technologies subject to the prior informed consent of the State and the concerned local communities;

d) promote appropriate mechanisms for a fair and equitable sharing of benefits arising from the use of biological resources, knowledge and technologies;

e) ensure the effective participation of concerned communities, with a particular focus on women, in making decisions as regards the distribution of benefits which may derive from the use of their biological resources, knowledge and technologies;

f) promote and encourage the building of national and grassroots scientific and technological capacity relevant to the conservation and sustainable use of biological resources;

g) provide appropriate institutional mechanisms for the effective implementation and enforcement of the rights of local communities, including farming communities and breeders, and the conditions of access to biological resources, community knowledge and technologies;

h) promote the conservation, evaluation and sustainable utilisation of biological resources with a particular focus on the major role women play;

i) promote improvements in the productivity, profitability, stability and sustainability of major production systems through yield enhancement and maintenance of biological diversity;

j) promote the supply of good quality seed/planting material to farmers; and

k) ensure that biological resources are utilised in an effective and equitable manner in order to strengthen the food security of the nation.

PART II
DEFINITIONS AND SCOPE

1. Definitions

The use of the following terms shall take the meanings in this legislation, as defined below:

Access is the acquisition of biological resources, their derivatives, community knowledge, innovations, technologies or practices as authorised by the National Competent Authority.

Benefit Sharing is the sharing of whatever accrues from the utilisation of biological resources, community knowledge, technologies, innovations or practices.

Biological resource includes genetic resources, organisms or parts thereof, populations, or any other component of ecosystems, including ecosystems themselves, with actual or potential use or value for humanity.

Collector is any natural or legal person, entity or agent obtaining access to biological resources, local practices, innovations, knowledge or technologies under authority given by the National Competent Authority.

Community Intellectual Rights are those rights held by local communities over their biological resources or parts or derivatives thereof, and over their practices, innovations, knowledge and technologies.

Community Knowledge or indigenous knowledge is the accumulated knowledge that is vital for conservation and sustainable use of biological resources and/or which is of socioeconomic value, and which has been developed over the years in indigenous/local communities.

Derivative is a product developed or extracted from a biological resource; a derivative may include such products as plant varieties, oils, resins, gums, proteins etc.

***Ex Situ* Condition** is the condition in which a biological resource is found outside its natural habitat. Under the present law, any lineage that is cultivated within its country of origin is not considered to be in an *ex situ* condition.

Innovation is any generation of a new, or an improvement of an existing, collective and/or cumulative knowledge or technology through alteration or modification, or the use of the properties, values or processes of any biological material or any part thereof, whether documented, recorded, oral, written or in whatever manner otherwise existing.

***In Situ* Condition** is the condition in which a biological resource is found in its ecosystem or natural habitat. In the case of a domesticated or cultivated variety, its condition is *in situ* when that variety is found in the cultural context in which its specific properties have been developed.

Local Community is a human population in a distinct geographical area, with ownership over its biological resources, innovations, practices, knowledge, and technologies governed partially or completely by its own customs, traditions or laws.

National Competent Authority is the entity authorised by the State to supervise and watch over the implementation of one or more of the components of the present law.

Prior Informed Consent (PIC) is the giving by a collector of complete and accurate information, and, based on that information, the prior acceptance of that collector by the government and the concerned local community or communities to collect biological resources, or indigenous knowledge, or technologies.

2. Scope

This legislation applies to:

i) Biological resources in both *in situ* and *ex situ* conditions;

ii) The derivatives of the biological resources;
iii) Community knowledge and technologies;
iv) Local and indigenous communities; and
v) Plant breeders

2) This legislation shall not affect the following:

i) The traditional systems of access, use or exchange of biological resources;
ii) Access, use and exchange of knowledge and technologies by and between local communities;

3) The sharing of benefits based upon the customary practices of the concerned local communities, provided that the provisions of paragraph 2 shall not be taken to apply to any person or persons not living in the traditional and customary way of life relevant to the conservation and sustainable use of biological resources.

PART III
ACCESS TO BIOLOGICAL RESOURCES

3. Application for access to biological resources and to the knowledge and technologies of local communities

1) Any access to any biological resources and knowledge or technologies of local communities in any part of the country shall be subject to an application for the necessary prior informed consent and written permit.

2) Any access to any biological resource in a protected area shall be subject to an application for the necessary prior informed consent and written permit.

3) All applications for the necessary consent and written permit to access any biological resource, community knowledge or technology, shall be directed to the National Competent Authority unless otherwise explicitly provided for by law.

4. Prior informed consent (PIC)

1) In making an application for access as provided in article 3 above, the following information shall be provided by the applicant:

i) the identity of the applicant and the documents that testify to her/his legal capacity to contract, including, where appropriate, the identity of all partners with the contracting party;
ii) the resources to which access is sought, including the sites from which it will be collected, its present and potential uses, its sustainability and the risks which may arise from access to it;
iii) whether any collection of the resource endangers any component of biological diversity and the risks which may arise from the access;
iv) the purpose for which access to the resource is requested including the type and extent of research, teaching or commercial use expected to be derived from it;
v) description of the manner and extent of local and national collaboration in the research and development of the biological resource concerned;
vi) the identification of the national institution or institutions which will participate in the research and be in charge of the monitoring process;
vii) the identity of the location where the research and development will be carried out;
viii) the primary destination of the resource and its probable subsequent destination(s);
ix) the economic, social, technical, biotechnological, scientific, environmental or any other benefits that are intended, or may be likely to, accrue to the country and local communities providing the biological resource as well as the collector and the country or countries where he/she operates;
x) the proposed mechanisms and arrangements for benefit sharing;
xi) description of the innovation, practice, knowledge or technology associated with the biological resource; and

xii) an environmental and socio-economic impact assessment covering at least the coming three generations, in cases where the collection is in large quantities.

2) Nothing in paragraph (1) shall prevent the National Competent Authority requesting for any other information which it may deem necessary for the effective implementation of this legislation.

5. Requirement of Consultation and Prior Informed Consent (PIC)

1) Any access to biological resources, knowledge and or technologies of local communities shall be subject to the written prior informed consent of:

i) the National Competent Authority; as well as that of
ii) the concerned local communities, ensuring that women are also involved in decision making.

2) Any access carried out without the prior informed consent of the State and the concerned local community or communities shall be deemed to be invalid and shall be subject to the penalties provided in this legislation or any other legislation that deals with access to biological resources.

3) The National Competent Authority shall consult with the local community or communities in order to ascertain that its/their consent is sought and granted. Any access granted without consultation with the concerned community or communities shall be deemed to be invalid and in violation of the principle and requirement for prior informed consent as required under this Article.

6. Placement of Completed Application Form in Public Registry

1) Upon completion of the application, the National Competent Authority shall place or cause to be placed, the said application in a public registry or gazette, or cause it to be published in a newspaper that is reasonably accessible to the public for a period of x days.

2) Any person may consult the public registry and comment on the application.

3) The National Competent Authority shall cause the wide and effective dissemination of the relevant information to the communities concerned and to other interested parties.

7. Granting of Access

1) The granting of an access permit shall be carried out by the National Competent Authority or any person duly authorised to do so under the provisions of this legislation within a specified time limit.

2) Any access permit shall be granted through a signed written agreement , between the National Competent Authority and the concerned local community or communities on the one hand and, the applicant or collector on the other hand.

3) The access permit shall only be valid if there is a written prior informed consent.

8. Contents of the Agreement

1) The agreement referred to in article 7 shall contain commitments undertaken or to be undertaken by the collector, as follows.

i) to adhere to a limit set by the National Competent Authority on the quantity and specification of the quality of the biological resource that the collector may obtain and/or export;
ii) to guarantee to deposit duplicates of, with complete field information on, each specimen of the biological resource or the records of community innovation, practice, knowledge or technology collected with the duly designated governmental agencies and, if so required, with local community organizations;
iii) to inform immediately the National Competent Authority and the concerned local community or communities of all findings from research and development on the resource;

iv) not to transfer the biological resource or any of its derivatives or the community innovation, practice, knowledge or technology to any third party without the authorization of the National Competent Authority and the concerned local community or communities;
v) not to apply for any form of intellectual property protection over the biological resource or parts or derivatives thereof and not to apply for intellectual property rights protection over a community innovation, practice, knowledge or technology without the prior informed consent of the original providers;
vi) to provide for the sharing of benefits;
vii) access shall be conditioned upon a commitment to contribute economically to the efforts of the State and concerned local community or communities in the regeneration and conservation of the biological resource, and the maintenance of the innovation, practice, knowledge or technology to which access is sought;
viii) submit to the National Competent Authority a regular status report of research and development on the resource concerned and where the biological resource is to be collected in large quantities on the ecological state of the area; and
ix) abide by the relevant laws of the country particularly those regarding sanitary control, biosafety and the protection of the environment as well as by the the cultural practices, traditional values and customs of the local communities.

2) All efforts should be made for the research to be done in the country and in a manner that facilitates the participation of actors in the country of the provider of the biological resource.

9. Patents over Life Forms and Biological Processes

1) Patents over life forms and biological processes are not recognized and cannot be applied for.

2) The collector shall, therefore, not apply for patents over life forms and biological processes under this legislation or under any other legislation relevant to the regulation of access and use of a biological resource, community innovation, practice, knowledge and technology, and the protection of rights therein.

10. Approval of Granting of Access

The National Competent Authority shall approve the granting of access to the biological resource or the community innovation, practice, knowledge or technology in question with any conditions it may deem necessary. In granting access the National Competent Authority shall ensure that all the requirements under this legislation have been fulfilled.

11. Conditions Pertaining to Academic and Research Institutions, Public Agencies and Intergovernmental Institutions

1) The National Competent Authority shall subject all applications for access to a biological resource, a community innovation, practice, knowledge or technology to the prior informed consent of the concerned community or communities.

2) The National Competent Authority shall determine the appropriate conditions to be met under the written agreement referred to in Article 8, by academic and research institutions, public agencies and inter-governmental institutions.

3) The application for access for research purposes shall clearly state the objective of the research and the relation of the applicant to industry. Neither the sample nor the associated information shall be transferred without a material transfer agreement reserving the prior rights of the State and/or community or communities.

4) Where the institutions referred to in this Article change their activities to be predominantly the commercialisation of a biological resource, the National Competent Authority shall cause the conditions and terms to be varied accordingly.

12. Benefit Sharing

1) The access permit should be subject to the payment, made before commencement of collection, of a fee the sum of which will depend on whether or not the collection is to be used for commercial purposes, and the number of samples, the area of collecting, the duration of collection and whether or not the collector is granted exclusive rights.

2) The State and the community or communities shall be entitled to a share of the earning derived from when any biological resource and/or knowledge collected generates, directly or indirectly, a product used in a production process.

13. Types of Permit to be Granted for Access

1) Having ascertained that the conditions set by the prior informed consent procedure have been fulfilled, the National Competent Authority shall grant the applicant/collector the appropriate permit for access. This may be an academic research permit, a commercial research permit, or a commercial exploitation permit.

2) No person shall be in possession of and use two types of permit at the same time for the same resource unless granted written permission to do so.

3) Nothing in this Article shall be deemed to limit the National Competent Authority's power to issue any other type of access permit.

14. Revocation of Access Permit

1) The National Competent Authority may unilaterally withdraw consent and repossess the written permit under the following conditions:

   i) when there is evidence that the collector has violated any of the provisions of this legislation;
   ii) when there is evidence that the collector has failed to comply with the agreed terms; and
   iii) when there is failure to meet any of the conditions of access;
   iv) for reasons of overriding public interest; or
   v) for the protection of the environment and biological diversity.

2) Any termination or withdrawal of consent shall be done in consultation with the concerned local community or communities.

15. Restrictions on Activities Related to Access or Introduction of Biological Resources

The National Competent Authority should establish restrictions to or prohibitions on those activities which are directly or indirectly related to access to or introduction of a biological resource, particularly in cases of:

i) endangered taxa;
ii) endemism or rarity;
iii) adverse effects upon human health or upon the quality of life or the cultural values of local communities;
iv) environmental impacts which are undesirable or difficult to control;
v) danger of genetic erosion or loss of ecosystems, their resources or their components, which arise from undue or uncontrolled collection of biological resources;
vi) non-compliance with rules on bio-safety or food security; and
vii) use of resources for purposes contrary to national interest and to relevant international agreements entered into by the country.

PART IV
COMMUNITY RIGHTS

16. Recognition of the Rights of Local and Indigenous Communities

The State recognizes the rights of communities over the following:

i) their biological resources;
ii) the right to collectively benefit from the use of their biological resources;
iii) their innovations, practices, knowledge and technologies acquired through generations;
iv) the right to collectively benefit from the utilisation of their innovations, practices, knowledge and technologies;
v) their rights to use their innovations, practices, knowledge and technologies in the conservation and sustainable use of biological diversity;
vi) the exercise of collective rights as legitimate custodians and users of their biological resources;

17. Application of the Law on Community Rights

The State recognizes and protects the community rights that are specified in Article 16 as they are enshrined and protected under the norms, practices and customary law found in, and recognized by, the concerned local and indigenous communities, whether such law is written or not.

18. Prior Informed Consent (PIC) of Local Communities

Any access to a biological resource, innovation, practice, knowledge or technology, shall be subject to the prior informed consent (pic) of the concerned community or communities ensuring that women fully and equally participate in decision making.

19. Right to Refuse Consent and Access

Local communities have the right to refuse access to their biological resources, innovations, practices, knowledge and technologies where such access will be detrimental to the integrity of their natural or cultural heritage.

20. Right to Withdraw or Place Restrictions on Consent and Access

Local communities shall have the right to withdraw consent or place restrictions on the activities relating to access where such activities are likely to be detrimental to their socio-economic life, or their natural or cultural heritage.

21. Right to Traditional Access, Use and Exchange

1) Local communities shall exercise their inalienable right to access, use, exchange or share their biological resources in sustaining their livelihood systems as regulated by their customary practices and laws.

2) No legal barriers shall be placed on the traditional exchange system of the local communities in the exercise of their rights as provided for in paragraph (1) above and in other rights that may be provided by the customary practices and laws of the concerned local communities.

22. Right to Benefit

1) The State shall ensure that at least fifty per cent of benefits provided for in Article 12.2 shall be channeled to the concerned local community or communities in a manner which treats men and women equitably.

2) The sharing the benefits in paragraph 1) above shall involve the full participation and approval of the concerned local community or communities.

23. Recognition of Community Intellectual Rights

1) The Community Intellectual Rights of the local communities, including traditional professional groups, particularly traditional practioners, shall at all times remain inalienable, and shall be further protected under the mechanism established by this legislation.

2) An item of community innovation, practice, knowledge or technology, or a particular use of a biological or any other natural resource shall be identified, interpreted and ascertained by the local communities concerned themselves under their customary practice and law, whether such law is written or not.

3) Non-registration of any community innovations, practices, knowledge or technologies, is not to mean that these are not protected by Community Intellectual Rights.

4) The publication of a written or oral description of a biological resource and its associated knowledge and information, or the presence of these resources in a genebank or any other collection, or its local use, shall not preclude the local community from exercising its community intellectual rights in relation to those resources.

PART V
FARMERS' RIGHTS

24. Recognition of Farmers' Rights

1) Farmers' Rights are recognized as stemming from the enormous contributions that local farming communities, especially their women members, of all regions of the world, particularly those in the centres of origin or diversity of crops and other agro-biodiversity, have made in the conservation, development and sustainable use of plant and animal genetic resources that constitute the basis of breeding for food and agriculture production; and

2) For farmers to continue making these achievements, therefore, Farmers' Rights have to be recognized and protected.

25. Application of the Law on Farmers' Varieties

1) Farmers' varieties and breeds are recognized and shall be protected under the rules of practice as found in, and recognized by, the customary practices and laws of the concerned local farming communities, whether such laws are written or not.

2) A variety with specific attributes identified by a community shall be granted intellectual protection through a variety certificate which does not have to meet the criteria of distinction, uniformity and stability. This variety certificate entitles the community to have the exclusive rights to multiply, cultivate, use or sell the variety, or to license its use without prejudice to the Farmers' Rights set out in this law.

26. Farmers' Rights

1) Farmers' Rights shall, with due regard for gender equity, include the right to:

   a) the protection of their traditional knowledge relevant to plant and animal genetic resources;
   b) obtain an equitable share of benefits arising from the use of plant and animal genetic resources;
   c) participate in making decisions, including at the national level, on matters related to the conservation and sustainable use of plant and animal genetic resources;
   d) save, use, exchange and sell farm-saved seed/propagating material of farmers' varieties;
   e) use a new breeders' variety protected under this law to develop farmers' varieties, including material obtained from genebanks or plant genetic resource centres; and
   f) collectively save, use, multiply and process farm-saved seed of protected varieties.

2) Notwithstanding sub-paragraphs c) and d), the farmer shall not sell farm-saved seed/propagating material of a breeders' protected variety in the seed industry on a commercial scale.

3) Breeders' Rights on a new variety shall be subject to restriction with the objective of protecting food security, health, biological diversity and any other requirements of the farming community for propagation material of a particular variety.

27. Certification of Farmers' Varieties

1) Any product derived from the sustainable use a biological resource shall be granted a certificate or label of recognition.

2) A certificate of fair trade shall be granted to a product derived from a biological resource or knowledge or technology, when a significant part of the benefits derived from the product go back to the local community.

PART VI
PLANT BREEDERS' RIGHTS

28. Recognition of Plant Breeders' Rights

Plant Breeders' Rights stem from the efforts and investments made by persons/institutions for the development of new varieties of plants, as defined in Article 41, being the basis for providing recognition and economic reward.

29. Characteristics of New Varieties

A variety will be considered new if it:

a) is, by reason of one or more identifiable characteristics, clearly distinguishable from all varieties the existence of which is a matter of common knowledge at the effective date of application for the grant of a Plant Breeders' Rights.
b) is stable in its essential characteristics, in that after repeated reproduction or propagation or, where the applicant has defined a particular cycle of reproduction or multiplication, at the end of each cycle, remains true to its description;
c) is, having regard to its particular features of sexual reproduction or vegetative propagation, a sufficiently homogenous variety or is a well-defined multiline.

30. Rights of Plant Breeders

1) A Plant Breeders' Rights, in respect of a new variety, is:

   a) the exclusive right to sell, including the right to license other persons to sell plants or propagating material of that variety;
   b) the exclusive right to produce, including the right to license other persons to produce, propagating material of that variety for sale;

2) A Plant Breeders' Rights in respect of a plant variety is subject to the conditions provided in Part V, the Farmers' Rights Part of this Act.

31. Exemptions to the Rights of Breeders

1) Notwithstanding the existences of Plant Breeders' Rights in respect of a plant variety, any person or farmers' community may:

   a) propagate, grow and use plants of that variety for purposes other than commerce;
   b) sell plants or propagating material of that variety as food or for another use that does not involve the growing of the plants or the propagation of that variety;
   c) sell within a farm or any other place at which plants of that variety are grown any plants or propagating material of that variety at that place.
   d) use plants or propagating material of the variety as an initial source of variation for the purpose of developing another new plant variety except where the person makes repeated use of plants or propagating material of the first mentioned variety for the commercial production of another variety.
   e) sprout the protected variety as food for home consumption or for the market.
   f) use the protected variety in further breeding, research or teaching.
   g) obtain, with the conditions of utilization, such a protected variety from genebanks or plant genetic resources centres.

2) Farmers will be free to save, exchange and use part of the seed from the first crop of plants which they have grown for sowing in their own farms to produce a second and subsequent crops subject to conditions specified in Part V, the Farmers' Rights Part of this Act.

32. Application of Breeders' Rights

1) Subject to this Act, a breeder of a new plant variety may make an application to the National Competent Authority for a Plant Breeders' Rights in respect of the variety.

2) A breeder of a new variety, or his successor, has the right to make an application for a Plant Breeders' Rights in respect of that variety, whether or not the breeder is a citizen or foreigner, or is resident or not and whether the variety was bred locally or abroad.

3) Where two or more persons are entitled to make an application for a Plant Breeders' Rights in respect of a new variety, whether by reason that they bred the plant variety jointly or independently or otherwise, those persons or some of those persons may make a joint application for those rights.

4) Where two or more persons breed a new plant variety jointly, one of those breeders or a successor of one of those breeders shall not make an application for a Plant Breeders' Rights in respect of that variety otherwise than jointly with, or with the consent in writing of, the other person, or each other person, entitled to make an application for those Rights.

5) In the case of both public-financed and private institutions, the application can be made in the name of the institution.

33. Restrictions to Plant Breeders' Rights

1) Where the Government considers it necessary, in the public interest, the Plant Breeders' Rights in respect of a new variety shall be subject to conditions restricting the realization of those rights. These restrictions may be imposed, *inter alia*:

   a) where problems with competitive practices of the Rights holder are identified;
   b) where food security or nutritional or health needs are adversely affected;
   c) where a high proportion of the plant variety offered for sale is being imported;
   d) where the requirements of the farming community for propagating material of a particular variety are not met; and
   e) where it is considered important to promote public interest for socio-economic reasons and for developing indigenous and other technologies;

2) Where restrictions are imposed on a Plant Breeders' Rights:

   a) the grantee shall be given a copy of the instrument setting out the conditions of the restriction;
   b) a public notice shall be given;
   c) the compensation to be awarded to the holder of the Rights shall be specified; the Rights-holder may appeal against the compensation award.

In particular, and without prejudice to the generality of the foregoing provisions, the relevant Government authority shall have the right to convert the exclusive Plant Breeders' Rights granted under this Act to non-exclusive Plant Breeders' Rights (compulsory licence of right).

34. Duration of Plant Breeders' Rights

Subject to this Act, a Plant Breeders' Rights in respect of a plant variety shall exist for a period of 20 years in the case of annual crops and 25 years in the case of trees, vines and other perennials commencing on the day on which the successful application for a Plant Breeders' Rights in respect of the plant variety was accepted.

35. Dispute Settlement

Where conflicts arise on whether a plant variety qualifies as a new plant variety under the Act, they will be handled administratively through the National Competent Authority, an *ad hoc* tribunal and finally through the court of law.

36. Infringements of Plant Breeders' Rights

1) An action or proceedings for an infringement of a Plant Breeders' Rights may be instituted in writing in a court or, if agreeable to both parties, it may be submitted to a binding arbitration.

2) A defendant in an action or proceeding for an infringement of a Plant Breeders' Rights in respect of a variety may apply by way of counter-claim for the revocation of that Plant Breeders' Rights:

   a) on the grounds that the variety was not a new plant variety;
   b) on the grounds that facts exist which, if known to the National Competent Authority before the grant of that Plant Breeders' Rights, would have resulted in the refusal of the grant.

3) If, in an action or proceedings for an infringement of a Plant Breeders' Rights in respect of a plant variety in which a defendant has applied by way of counter-claim for the revocation on the grounds referred to in paragraph 2)a) or b), the court is satisfied that the grounds exist, the court may revoke that Plant Breeders' Rights.

4) Where, in an action or proceedings for an infringement of a Plant Breeders' Rights, the court, on an application by the defendant by way of counter-claim, revokes the Plant Breeders' Rights, the court shall order the defendant to serve on the National Competent Authority a copy of the order revoking that Plant Breeders' Rights.

37. National Competent Authority

The State shall designate or establish a National Competent Authority which shall implement and enforce the provisions on Plant Breeders' Rights in this Act.

38. Registration of Plant Breeders' Rights

The National Competent Authority shall:
a) receive and examine applications for the registration of Plant Breeders' Rights;
b) carry out the required trials for testing the applicant's variety;
c) register and issue certificates for Plant Breeders' Rights;
d) publish applications for Plant Breeders' Rights in the Official Gazette;
e) hear opposition on the registration of any Plant Breeders' Rights;
f) maintain the Register for Plant Breeders' Rights.

39. Register of Plant Breeders' Rights

The National Competent Authority shall keep a National Register of Plant Breeders' Rights in which shall be entered particulars required by this Act or regulations.

40. Plant Genetic Resources Centres

The Government shall declare or gazette specified plant genetic resources centre(s), as suitable centre(s) for storage and maintenance of germplasm material for the purpose of this Act.

41. Filing of Applications

1) Where an application is filed in respect of a Plant Breeders' Rights:

   a) the application is accepted if the National Competent Authority is satisfied that:

      i) the application complies with the requirements of Article 29; and
      ii) the specified fees have been paid; or

   b) the application is rejected if the National Competent Authority is satisfied that it does not fulfil the prescribed requirements.

2) Where the National Competent Authority accepts an application it shall, within 30 days after accepting the application, given written notice to the applicant stating that the application has been accepted and it shall give public notice of the application.

3) Where the National Competent Authority rejects an application, it shall, within 30 days after rejecting the application, give written notice to the applicant stating that the application has been rejected and stating the grounds for rejection.

42. Uniform Testing and Assessment Procedures

1) On the acceptance of an application, the National Competent Authority shall stipulate the quantity of seed/planting material that should be made available by the applicant for trials and testing.

2) The National Competent Authority shall arrange to get statistically valid trials conducted to evaluate the suitability of the variety for national release.

3) The assessment criteria shall include important economic, physiological, ecological and nutritive quality attributes.

4) The fees with respect to a Plant Breeders' Rights shall be fixed on the basis of the administrative and examination costs incurred.

43. Characteristics of Plant Varieties Originating from Outside the Country

For the purpose of this Act, where a plant variety in respect of which an application has been accepted has originated from outside the country, the variety shall not be taken to have a particular characteristic unless:

a) statistically valid, multi-locational, variety trials carried out in the country for at least three growing seasons have demonstrated that the variety has the specific characteristic as claimed by the applicant; or
b) an exceptional crises in food production so requires and the National Competent Authority is satisfied that:

    i) statistically valid trials on the variety carried out outside the country have demonstrated that the variety has that specified characteristic; and
    ii) the natural environment outside the country under which the statistically valid trials were carried is similar to the environment in the country.

44. Plant Varieties Trials

1) Where, in dealing with an application in respect of a plant variety, the National Competent Authority considers it necessary that there should be a statistically valid trial or a further statistically valid trial of the variety, trials shall be carried out:

    a) for the purpose of determining whether the plant variety is distinct, homogenous or stable;
    b) for the purpose of determining whether the variety will, if grown in the country, exhibit the claimed distinctiveness, homogeneity and stability;
    c) requiring the applicant to supply sufficient seed or propagation material of the variety, as the case requires, and with any necessary information, to enable the variety to be test grown for the purpose so specified.

2) After the completion of the trials on a plant variety, any plants or propagation material of plants used in, or resulting from, the trials that are capable of being transported shall be removed by the applicant for a Plant Breeders' Rights in respect of that plant variety.

45. Withdrawal of Application

1) An application may be withdrawn by the applicant at any time before the publication of the application.
2) Where an application is withdrawn after its publication in the Official Gazette, but before the granting of a Plant Breeders' Rights, the National Competent Authority shall forthwith publicise that withdrawal.

46. Provisional Protection

1) Where an application for a Plant Breeders' Rights in respect of a plant variety has been accepted, the applicant shall be deemed to be the owner of a Plant Breeders' Rights in respect of that plant variety during the period commencing on the date of filing of the application and ending on whichever of the dates specified in a) and b) occurs first:

    a) when the application is disposed of; or
    b) where the National Competent Authority has given the applicant a notice at the expiration of the prescribed period, after the notice is given.

2) Steps to protect genetic materials of new varieties under testing will be taken, so as to prevent their use for non-research purposes.

47. Opposition to Grant of Plant Breeders' Rights

1) Where official gazettement of an application for a Plant Breeders' Rights in respect of a plant variety or of the variation of such a variety is given, any person who considers that:

   a) commercial or public interests would be negatively affected by the grant of those rights to the applicant;
   b) the application in relation to that variety does not fulfil the prescribed criteria for granting a Plant Breeders' Rights;

   may within 6 months after publication of the application, or any further time before the application is disposed of, lodge with the National Competent Authority a written objection to the granting of the Rights setting out the particulars of the objection.

2) Where an opposition to the grant of a Plant Breeders' Rights is lodged under paragraph 1), the National Competent Authority shall cause a copy of that opposition to be given to the applicant for that Plant Breeders' Rights.

3) Any person may inspect an application, or an opposition lodged, at any reasonable time and is entitled, upon payment of such fee as is prescribed, to be given a copy of the application or of the opposition.

48. Grant of Plant Breeders' Rights

1) Subject to this Article, an application for a Plant Breeders' Rights in respect of a plant variety is granted if the National Competent Authority is satisfied that:

   i) there is such a plant variety;
   ii) the plant variety is a new plant variety;
   iii) the applicant is entitled to the application;
   iv) the grant of those rights to the applicant is not prohibited by this Act;
   v) those rights have not been granted to another person;
   vi) there has been no earlier application for those rights that has not been withdrawn or otherwise disposed of; and
   vii) all fees payable under this Act in relation to the application have been paid;

2) If the National Competent Authority is not satisfied that the conditions in paragraph 1) above have been fulfilled, the National Competent Authority shall refuse to grant that Plant Breeders' Rights to the applicant.

3) The National Competent Authority shall not grant, or refuse to grant, a Plant Breeders' Rights in respect of a plant variety unless a period of six (6) months has elapsed since the publication of the application in the official gazette, or, if the application has been varied in a manner that the National Competent Authority considers to be significant, a period of 6 months has elapsed since the publication of particulars of the variation, or of the last such variation, as the case requires.

4) The National Competent Authority shall not refuse to grant a Plant Breeders' Rights unless it has given the applicant for that Plant Breeders' Rights a reasonable opportunity to make a written submission in relation to the application.

5) Where an opposition to the grant of a Plant Breeders' Rights has been lodged, the National Competent Authority shall not grant the Plant Breeders' Rights unless it has given the person who lodged the opposition a reasonable opportunity to make a written submission in relation to the objection.

6) A Plant Breeders' Rights shall be granted and issued by the National Competent Authority to the applicant in the form specified in its regulations.

7) Where a Plant Breeders' Rights over one variety is granted to persons, that Plant Breeders' Rights shall be granted to those persons jointly.

8) Where a Plant Breeders' Rights is granted to a public or private institution, it shall accrue to the institution represented by the designated person or persons.

9) Where the National Competent Authority refuses to grant a Plant Breeders' Rights in respect of a plant variety, the National Competent Authority shall, within 30 days after refusing, give written notice of the refusal to the applicant clearly setting out the grounds for the refusal.

49. Entry of Plant Breeders' Rights in the Register

1) When the National Competent Authority grants a Plant Breeders' Rights in respect of a plant variety, it shall enter in the Register:

a) a description, or a description and photograph, of the plant variety;
b) the name of the variety;
c) the pedigree of the variety (where possible);
d) the name of the grantee;
e) the name and address of the breeder;
f) the address for the service of documents on the grantee for the purpose of this Act, which is shown on the application for the Rights;
g) the date on which the Plant Breeders' Rights was granted;
h) a description of the communities/localities in the country entitled to Farmers' Rights in relation to the variety;
i) such other particulars relating to the grant as the National Competent Authority considers appropriate.

50. Publication of Grant of Plant Breeders' Rights

Where a Plant Breeders' Rights has been granted, the National Competent Authority shall, within 30 days after granting, publish that Plant Breeders' Rights in the official gazette. The publication will also make reference to the entitlements under Farmers' Rights.

51. Effect of Grant on Certain Persons

1) Where a Plant Breeders' Rights in respect of a plant variety has been granted to a person, another person who was entitled to make an application for that Plant Breeders' Rights, whether or not a person who developed that variety independently of the breeder, or the successor of such another person, is not entitled to any interest in that Plant Breeders' Rights because of the entitlement to make the application or because of the grounds of the entitlement, but nothing in this Article prevents a person from applying to the National Competent Authority for the revocation of that Plant Breeders' Rights or from instituting proceedings before a court in respect of that Plant Breeders' Rights.

2) Where:

a) a Plant Breeders' Rights in respect of a new plant variety has been granted to a person, and
b) another person (in this paragraph referred to as the 'eligible person') was entitled, at a law or in equity to have the right to make an application for that Plant Breeders' Rights assigned to the eligible person, then the eligible person is entitled to have that Plant Breeders' Rights assigned to her/him.

52. Nature of Plant Breeders' Rights

1) A Plant Breeders' Rights is personal property and, subject to any conditions imposed under other paragraphs, is capable of assignment or of transmission by will or by operation of law.

2) An assignment of a Plant Breeders' Rights does not have effect unless it is in writing, signed by or on behalf of the assignor.

53. Assignment of Plant Breeders' Rights

1) Where a Plant Breeders' Rights is assigned or transmitted to a person, that person shall, within 30 days after acquiring it, inform the National Competent Authority in writing that the person has acquired that Plant Breeders' Rights, giving particulars of the manner in which it was acquired, and the National Competent Authority, if satisfied that the Plant Breeders' Rights has been so assigned or transmitted, shall enter the name of that person on the Register as the grantee of that Plant Breeders' Rights.

2) Where in accordance with paragraph 1), the National Competent Authority enters on the Register as the grantee of a Plant Breeders' Rights the name of a person who claims to have acquired that Plant Breeders' Rights, it shall, within 30 days after entering the name in the Register, give written notice to the person newly entered and to the person who was the grantee before the new entry was made stating that the entry has been made.
3) Where the National Competent Authority is not satisfied that a Plant Breeders' Rights has been assigned or transmitted to a person who has informed the National Competent Authority in accordance with paragraph 1) that that Plant Breeders' Rights has been thus assigned or transmitted to the claimant, the National Competent Authority shall forthwith:

   a) give written notice to the claimant:

      i) stating that the National Competent Authority is not satisfied; and
      ii) setting out the grounds on which the National Competent Authority is not so satisfied; and

   b) give written notice to the grantee of those rights:

      i) setting out particulars of the information given by the claimant;
      ii) stating that the National Competent Authority is not satisfied; and
      iii) setting out the grounds on which it is not so satisfied.

4) A person who informs the National Competent Authority in accordance with paragraph that a Plant Breeders' Rights has been assigned or transmitted to her/him shall give written notice to the National Competent Authority of an address in the country for the service of documents in accordance with this Act; and

   a) where the National Competent Authority enters the name of that person on the Register in accordance with paragraph 1) and that address is different from the address already entered in the Register, it shall amend the Register so that the address so given is entered in the Register as the address for service of documents on the grantee for the purpose of this Act; or
   b) where the National Competent Authority is not satisfied that those rights have been assigned or transmitted to that person, the notice to that person under paragraph 3)a) shall be given by being posted.

54. Supply of Propagating Material

1) A Plant Breeders' Rights in respect of a plant variety is subject to the condition that the grantee of the Rights shall comply with any notice given to her/him by the National Competent Authority.

2) Where a Plant Breeders' Rights are granted in respect of a plant variety, the National Competent Authority may give the grantee of the Plant Breeders' Rights written notice requiring the grantee, within 14 days of the giving of the notice or any other time that is allowed, to cause a specified quantity of propagating material of that variety to be delivered, at the expense of the grantee, to a specified plant genetic resources centre and a herbarium.

3) The quantity of the propagating material of a variety specified in a notice under paragraph 2) shall be the quantity that the National Competent Authority considers would be sufficient to enable that variety to be kept in existence if there were no other propagating material of that variety.

4) Where the propagating material is delivered to a plant genetic resources centre in accordance with the conditions imposed on Plant Breeders' Rights by paragraph 1), the National Competent Authority shall, subject to paragraph 6), cause that material to be stored at a specified plant genetic resources centre.
5) The delivery and storing of the propagating material in accordance with this paragraph does not affect the ownership of the material but that the material shall not be dealt with otherwise than for the purposes of this Act.

6) The propagating material stored at a plant genetic resources centre may be used by the National Competent Authority for the purposes set out in this Act.

7) Without limiting paragraphs 5) and 6), where, the propagating material is stored at a plant genetic resources centre as gazetted by the Government according to Article 40 of this Act, the material shall not form part of the national collection, and shall not be used for the purposes of that collection, until a decision on the application for a Plant Breeders' Rights is taken. Once the variety is accorded recognition, the propagating material can be provided for purposes of further research and breeding under the intimation of the depositor of the material.

55. Revocation of Plant Breeders' Rights

1) The National Competent Authority shall revoke a Plant Breeders' Rights in respect of a plant variety if:

   a) it is satisfied that the plant variety was not new or that facts exist which, if known before the grant of that Plant Breeders' Rights, would have resulted in the refusal of the grant; or

   b) the grantee has failed to pay a prescribed fee payable in respect of that Plant Breeders' within 90 days after having been notified that the prescribed fee was due for payment.

2) The National Competent Authority may revoke a Plant Breeders' Rights if it is satisfied that:

   a) the grantee has failed to comply, in relation to that Plant Breeders' Rights, with the prescribed conditions; or
   b) a person to whom that Plant Breeders' Rights has been assigned or transmitted has failed to comply with the provisions of this Act.

3) Where the National Competent Authority revokes a Plant Breeders' Rights in respect of a plant variety in accordance with this Article, it shall, within 7 days after the decision is taken, give written notice of the revocation to the grantee setting out the grounds for the revocation.

4) The National Competent Authority shall not revoke a Plant Breeders' Rights in accordance with this Article unless and until it has given the grantee and any person to whom it believes that Plant Breeders' Rights has been assigned or transmitted, particulars of the grounds for the proposed revocation and given the grantee and any such person a reasonable opportunity to make a written submission in relation to the proposed revocation.

5) The revocation of a Plant Breeders' Rights in respect of a plant variety in accordance with this Article takes effect:

   a) subject to paragraph 4), at the expiration of the period within which an application may be made to a court for a review of the revocation; or
   b) if such an application is made to the court, at the time when the application is withdrawn or finally determined by a court.

6) Nothing in this Article shall be taken to affect the powers or the legal system.

7) Any person whose interests are affected by the granting of a Plant Breeders' Rights in respect of a plant variety may apply to the National Competent Authority for the revocation of that Plant Breeders' Rights in accordance with this section.

8) The National Competent Authority shall consider any application under paragraph 7) for the revocation of a Plant Breeders' Rights. The decision of the National Competent Authority not to revoke the Plant Breeders' Rights shall be communicated to the applicant by a written notice within 7 days after the decision is taken, setting out the grounds for the decision.

56. Surrender of Plant Breeders' Rights

1) Subject to paragraph 2) of Article 34, a grantee of a Plant Breeders' Rights may at any time,
by giving notice to National Competent Authority, offer to surrender that Plant Breeders' Rights: the National Competent Authority, after giving public notice of the offer and giving all interested parties an opportunity to make a written submission in relation to the offer, may, if it finds fit, accept the offer and revoke those rights.

2) Where an action or proceeding in respect of a Plant Breeders' Rights is pending in a court, the National Competent Authority shall not accept an offer for the surrender of, or revoke, that Plant Breeders' Rights, except by leave of the court or by consent of the parties to the action or proceeding.

PART VII
INSTITUTIONAL ARRANGEMENTS

57. Establishment of the National Competent Authority

The State shall designate or establish a National Competent Authority which shall implement and enforce the provisions of this legislation. Its duties shall include those set out in Article 29.

58. Duties of the National Competent Authority

The duties of the National Competent Authority are, while ensuring gender equity, to:

i) create and operate a regulatory mechanism that will ensure effective protection of Community Intellectual Rights and Farmers' Rights, and the regulation of access to biological resources;
ii) carry out the process of consultation and participation of local communities, including farming communities, in the identification of their rights as provided for under the customary practices and laws of the communities;
iii) identify types of Community Intellectual Rights and Farmers' Rights;
iv) identify and define the requirements and procedures necessary for the recognition of Community Intellectual Rights and Farmers' Rights;
v) develop criteria and mechanisms to standardise procedures;
vi) develop a system of registration of items protected by Community Intellectual Rights and Farmers' Rights according to their customary practices and law;
vii) issue licenses for the exploitation and commercialisation of biological resources, including protected species, varieties or lineages, and community innovations, practices, knowledge and technologies;
viii) identify relevant technical institutions that will assist local communities, including farming communities, in the categorisation and characterisation of their biological resources, innovations, practices, knowledge and technologies.

59. Establishment of National Inter-Sectoral Co-ordination Body

A National Inter-Sectoral Co-ordination Body at the highest level, composed of representatives from relevant public sectors, scientific and professional organizations, non-governmental and local community organizations, shall be created as a body to co-ordinate and follow-up the proper implementation of this legislation by the National Competent Authority.

60. Functions of the National Inter-Sectoral Co-ordination Body

The functions of the National Inter-Sectoral Coordination Body shall be to:

i) ensure that the minimum conditions for agreements with collectors are strictly observed and complied with;
ii) ensure that the rights of local communities, including farming communities, are protected, with due regard for gender equity, wherever the activities relating to the accessing, collection or research on biological resources, community innovations, practices, knowledge and technologies are conducted, including verifying that the requirements of prior informed consent by the local communities are complied with;
iii) recommend policies and laws on the sustainable use of biological resources including new laws on intellectual property rights, Community Intellectual Rights and Farmers' Rights over their biological resources, innovations, practices, knowledge and technologies; and
iv) perform such other functions as may be necessary for the effective implementation of this legislation.

61. Composition of the National Inter-Sectoral Co-ordination Body

The National Inter-Sectoral Co-ordination Body shall be composed of the following persons:
Here the functional composition of the body can be outlined, the qualifications, fields of expertise or specialisation, public interest qualities, industry, community based organizations and persons from relevant areas and fields with due regard for gender equity. This section seeks to fulfil the requirements set out in Article 29 above.

62. Appointment of Technical Advisory Body

It is hereby appointed a body to be known as the Technical Advisory Body to support the work of the National Inter-Sectoral Co-ordination Body.

63. Functions of the Technical Advisory Body

The functions of the Technical Advisory Body shall be to:

i) formulate policy options that promote the protection of Community Intellectual Rights, Farmers' Rights, gender equity and the regulation of access to biological resources;
ii) prepare lists of taxa threatened by deterioration and/or extinction and of the places threatened by serious loss of biological diversity;
iii) monitor and evaluate, at regular intervals, the implementation of this legislation or actual or potential threats to biological diversity and the likely impacts on the pursuit towards sustainable development;
iv) develop and recommend a mechanism to enable the identification and dissemination of information regarding threats to biological resources; and
v) perform such other functions as may be necessary to implement this legislation.

64. Establishment of a National Information System

1) It is hereby established that there shall be a National Information System with regard to biological resources, which includes the activities set out in the following Article.

2) Local communities may also establish databases on their biological resources together with their components and derivatives, and the knowledge and technologies of those communities.
3) Access to information in the National Information System and databases shall be regulated by a charter setting out the rights of the owners of the data.

65. Activities of the National Information System

The activities of the National Information System shall include *inter alia* the following:

i) the compilation and documentation of information on Community Intellectual Rights, Farmers' Rights, gender equity and access to biological resources, community innovations, practices, knowledge and technologies;
ii) the maintenance of an up-to-date system of information about research and development activities on biological resources and community innovations, practices, knowledge and technologies; and
iii) the compilation of information on piracy of biological resources, community innovations, practices, knowledge and technologies, and the disseminating of this information to all relevant and concerned bodies.

66. Establishment of a Community Gene Fund

1) The Community Gene Fund shall be established as an autonomous Trust. A Director shall be appointed to administer the Fund. The Director shall report to the National Competent Authority.

2) There shall be an autonomous Trust to administer a Community Gene Fund deriving its funds from the shares due to local farming communities under Article 26.1(b) in Part V on Farmers' Rights. The Fund, which will be exempted from income tax, can receive contributions from national and international bodies and others interested in strengthening genetic conservation by local communities.

3) A royalty to be fixed by the National Competent Authority based on the gross value of the Breeders' Rights protected seeds sold shall be credited to the Community Gene Fund for the benefit of farming communities whose farmers' varieties have been the basis for the breeding of breeders' varieties.

4) The gene fund shall be used to finance projects developed by the farming communities, ensuring equity for women, with or without the participation of experts to help them, aimed at solving their felt problems, including, but not restricted to, the development, conservation and sustainable use of agricultural genetic resources.

5) All salaries and administrative expenses relating to the establishment and administration of the Community Gene Fund will be met by the Government, in order to ensure that the entire proceeds of the Fund go to the farming local communities.

6) The Community Gene Fund will have a Fund Management Committee, comprising representatives of farming local communities, professionals, non-governmental organizations, and the public and private sector.

PART VIII
ENABLING PROVISIONS

67. Sanctions and Penalties

1) Without prejudice to the existing agencies and authorities, the State shall establish appropriate agencies with the power to ensure compliance with the provisions of this law.

2) Without prejudice to the exercise of civil and penal actions which may arise from violations of the provisions of this legislation and subsequent regulations, sanctions and penalties to be provided may include:

   i) written warning;
   ii) fines;
   iii) automatic cancellation / revocation of the permission for access;
   iv) confiscation of collected biological specimens and equipment;
   v) permanent ban from access to biological resources, community knowledge and technologies in the country.

3) The violation committed shall be publicized in the national and international media and shall be reported by the National Competent Authority to the secretariats of relevant international agreements and regional bodies.

4) When the collector conducts his/her operations outside of national jurisdiction, any alleged violations by such a collector may be prosecuted through the cooperation of the government under whose jurisdiction the collector operates based on the guarantee that the latter has provided.

68. Appeals

Decisions on approval, disapproval or cancellation of agreements regarding access to biological resources, community knowledge or technologies may be appealed through appropriate administrative channels. Recourse to the courts shall be allowed after exhaustion of all administrative remedies.

APPENDIX F
SELECTED INTERNET-BASED RESOURCES

1. INTERNATIONAL INSTRUMENTS AND INSTITUTIONS RELATING TO GENETIC RESOURCES

Convention on Biological Diversity (CBD)
http://www.biodiv.org/default.aspx (homepage for the CBD secretariat, including text of the conventions and Bonn guidelines for implementation of the CBD, including access and benefit-sharing provisions)

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)
ftp://ext-ftp.fao.org/ag/cgrfa/it/ITPGRe.pdf (text of the treaty in pdf format)
http://www.fao.org/Legal/TREATIES/033s-e.htm (status of countries signing and ratifying the ITPGR)

African Model Law on The Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulations of Access to Biological Resources
http://www.blaueninstitut.ch/Tx/tP/tpT/OauModelLaw.pdf (text of the model law in pdf format)

International Union for the Protection of Varieties of Plants (UPOV)
http://www.upov.int/ (homepage of UPOV linking to texts of the convention)

World Intellectual Property Organization
http://www.wipo.int (homepage for WIPO; has links to websites concerning genetic resources)

Inter governmental committee on intellectual property and genetic resources, traditional knowledge and folklore:
http://www.wipo.org/eng/document/govbody/wo_gb_ga/pdf/ga26_6.pdf (paper concerned with matters of genetic resources and other issues)

The position of the Africa Group:
http://www.wipo.org/eng/meetings/2002/igc/pdf/grtkfic3_15.pdf (paper detailing the position of the Africa Group in intellectual property rights and genetic resources)

Cusco Declaration of Access to Genetic Resources, Traditional Knowledge and Intellectual Property Rights of Like-Minded Megadiverse Countries
http://www.comunidadandina.org/ingles/document/cusco29-11-02.htm

Global Biodiversity Forum (GBF)
http://www.gbf.ch/ (homepage to GBF with links to conventions relating to genetic resources)

Implementation Plan for World Summit on Sustainable Development
http://www.johannesburgsummit.org/html/documents/summit_docs/plan_final1009.doc (some sections focus specifically on genetic resources)

Food and Agriculture Organization of the United Nations (FAO)
http://www.fao.org

FAO Commission on Genetic Resources for Food and Agriculture
http://www.fao.org/ag/cgrafa/default.htm

FAO Plant Genetic Resources for Food and Agriculture
http://www.fao.org/ag/cgrafa/PGR.htm

World Trade Organization – Trade Related Aspects of International Property Rights (TRIPs)
http://www.wto.org/english/tratop_e/trips_e/trips_e.htm

II. NATIONAL LAWS, POLICIES, AND REGULATIONS

A. General Resources

FAOLEX (Food and Agriculture Organization of the United States)
http://p5uni.ii.pw.edu.pl/faolex/ (allows searches on legislation concerning food and agriculture in different countries worldwide)

ECOLEX
http://www.iucn.org/themes/law/info03.html (provides a source of information on global environmental law)

International Environmental Law Research Center (IELRC)
http://www.ielrc.org/biodiversity.html (links to biodiversity laws, policies, and regulations in Africa)

United Nations Environment Network
http://www.unep.net (portal to environmental information based on themes and regions)

B. Country-Specific Resources in Africa

Namibia

Directorate of Environmental Affairs (DEA) in Namibia
http://www.dea.met.gov.na/legislation/legislation.htm (about the environmental legislations program in Nambia)

Nigeria

Information on Nigeria
http://www.un.org/esa/agenda21/natlinfo/countr/nigeria/index.htm (biodiversity link goes to information on genetic resources)

South Africa

National Biodiversity Bill
http://www.biowatch.org.za/biodiv_bill.htm (links to Biodiversity Bill for South Africa as well as comments)
Biodiversity and Conservation in South Africa
http://www.sn.apc.org/biodiv/bdchp4_3.htm (discussion of South Africa's policies and laws in Genetic Access to Resources)

Policies, Regulations, Legislation, and Labelling in Africa
http://www.africabio.com/policies.shtml (has links to different environmental policies, regulations, and legislation for South Africa)

III. ANALYTICAL RESOURCES AND OTHER INFORMATION

A. Analytical Resources

Training Course on Biodiversity, Biotechnology and Law in West Africa
http://www.aaas.org/international/africa/gbdi/GBDI-Ibadan.pdf (paper outlining training course from Nigeria)

International Environmental Law Research Center (IELRC)
http://www.ielrc.org/biodiversity.html (articles on biodiversity laws, policies, and regulations in Africa)

TRIPs, Biodiversity, and Commonwealth Countries
http://www.ukabc.org/TRIPs/trips99.pdf (paper on TRIPs Agreement and how it relates to biodiversity and commonwealth countries internationally)

The Status of Public and Proprietary Germplasm and Information: An Assessment of Recent Developments at FAO, in IP Strategy Today, No. 7-2003
http://www.biodevelopments.org/ip/index.htm

Article Analyzing Genetic Resource in the Context of Different Conventions (i.e. TRIPs and CDB)
http://www.ictsd.org/dlogue/2001-07-30/Lettington.pdf

The "Balance Sheet" and the "Sacred Balance": Valuing the Knowledge of Indigenous and Traditional Peoples
http://www.ubcic.bc.ca/docs/Posey_Balance.pdf (explaining how customs of indigenous and traditional peoples that can affect genetic resources)

Biodiversity and the Appropriation of Women's Knowledge
http://www.nuffic.nl/ciran/ikdm/5-1/articles/zweifel.htm (stating how women's knowledge of biodiversity, often discounted, could have an impact on genetic resource policies)

The Convention of Biological Diversity: The Emergence of IPRs in the Field of Access to Genetic Resources and Benefit Sharing
http://www.ictsd.org/dlogue/2002-07-30/docs/Kent.pdf (commentary on the CBD)

Bridges (monthly publication of the International Centre for Trade and Sustainable Development)
http://www.ictsd.org/monthly/index.htm

WIPO's Move Toward a World Patent System: A Revolution in the Making?
http://www.ictsd.org/monthly/bridges/BRIDGES6-6.pdf (paper regarding trade and sustainable development; includes sections on how this affects genetic resources)

Article on Agrobiodiversity
http://www.gtz.de/biodiv/pdf/Agrobiodiv_engl_rgb.pdf (defining agrobiodiversity and its relationship to genetic resources)

IUCN Environmental Law Centre
http://www.iucn.org/bookstore/law-elc3.htm (A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources

Issue Brief on Genetic Resources, Traditional Knowledge and Intellectual Property Rights: Promoting Synergies for Sustainable Development (CIEL)

http://www.ciel.org/Publications/iprights.pdf

Why Genetic Resources Management Matters: Conclusions of a Workshop on Genetic Resources Management in Ecosystems (CIFOR)
http://www.cifor.cgiar.org/grme/grme.pdf

ELDIS - Eldis Biodiversity Resource Guide
http://www.eldis.org/biodiversity/index.htm

TRIPs, the Environment and the Review of Article 27.3 (b) (FOEi)
http://www.foei.org/trade/activistguide/tripenv.htm

Principles on Access to Genetic Resources and Benefit-sharing for Participating Institutions (Royal Botanic Gardens at Kew)
http://www.kew.org/conservation/principles.html

B. Various Organizations

Action Group on Erosion, Technology, and Conservation
http://www.etcgroup.org/

Africa Center for Technology Studies (ACTS)
http://www.acts.or.ke/

Bioresources Development and Conservation Programme
http://www.bioresources.org/

Call of the Earth Circle
http://www.earthcall.org

Commission on Intellectual Property Rights (CIPR)
http://www.iprcommission.org

Consultative Group on International Agricultural Research
http://www.cgiar.org/

Environmental Law Institute (ELI)
http://www.eli.org

Genetic Resources Action International (GRAIN)
http://www.grain.org/about/index.cfm

Genetic Resources Utilization: Critical Issues in Conservation and Community Development
http://www.bcnet.org/bsp/bcn/whatsnew/biopros.html

Institute for Agriculture and Trade Policy (IATP)
http://www.iatp.org

International Centre of Insect Physiology and Ecology (ICIPE)
http://www.icipe.org

International Center for Trade and Sustainable Development (ICTSD)
http://www.ictsd.org/

International Cooperative Biodiversity Groups (ICBG)
http://www.fic.nih.gov/programs/icbg.html

International Development Research Centre
http://www.idrc.ca

International Food Policy Research Institute
http://www.ifpri.org/

International Institute for Sustainable Development (IISD)
http://www.iisd.org/

International Plant Genetics Resources Institute (IPGRI)
http://www.ipgri.cgiar.org/ (homepage for largest non-profit that promotes agricultural diversity)

IUCN (The World Conservation Union)
http://www.iucn.org/

Quaker United Nations Office (QUNO)
http://www.quno.org (contains archives of papers on biodiversity, sustainable development, intellectual property, and genetic resources)

Resources for the Future (RFF)
http://www.rff.org/ (discussion papers, reports, and archives of developments in genetic resources)

Seed Policy-A Widening Area
http://www.icarda.org/News/Seed%20Info/24/news.htm

SINGER—the System-wide Information Network for Genetic Resources
http://www.singer.cgiar.org/

South Centre Intergovernmental Organization of Developing Countries
http://www.southcentre.org/ (homepage with links for documents produced by this organization on genetic resources)

Third World Network
http://www.twnside.org.sg/index.htm

UNEP World Conservation Monitoring Centre (UNEP-WCMC)
http://www.unep-wcmc.org

United Nations University, Institute of Advanced Studies (UNU/IAS)
http://www.ias.unu.edu/

Africa's wealth of resources includes an untapped reserve of genetic resources, including plants, animals, microorganisms, and their components. Some of these resources, such as medicinal plants and food crops, have been used to solve the problems and improve the livelihoods of humanity for centuries, if not millennia. Today, these resources are of ever-increasing importance: they are fundamental to food security and are the basis of significant research in fields as diverse as medicines, dietary supplements, industrial chemicals, and mining. As such, many aspects of Africa's development—and its future—may depend on how wisely, effectively, and equitably these resources are managed. As illustrated on the cover of this book:

- Maize is a staple crop for many Africans, but has its origins in Central America. Its continued viability in all parts of the world, particularly in areas prone to drought, pests, or increasingly saline soils depends on access to varieties that have particular adaptations or resistances to the plethora of problems facing agriculture;
- An extract from Madagascar's rosy periwinkle is the basis of two pharmaceuticals used to treat childhood leukemia;
- Pfizer Inc. is developing a dietary supplement based on the hoodia cactus, a traditional appetite suppressant used by Khoisan hunters in Southern Africa, and expects it to generate significant revenues; and,
- An enzyme discovered under a flamingo's nest in a Kenyan saline lake now bleaches blue jeans in Europe and the United States.

This book examines the lessons learned from the legal, policy and institutional approaches that twelve African countries—Cameroon, Egypt, Ethiopia, Ivory Coast, Kenya, Madagascar, Nigeria, Senegal, Seychelles, South Africa, Uganda and Zambia—have pursued in governing access to genetic resources and benefit sharing. These countries represent different legal, biological, and cultural contexts throughout Africa. Drawing upon national and regional experiences—including those of the African Union (AU) and the Southern African Development Community (SADC)—this book surveys practical mechanisms and approaches for managing effective access to genetic resources while also protecting traditional knowledge and community rights by ensuring equitable benefit sharing among all who have maintained and developed genetic resources for the good of Africa, her people and the World.

African Union/Union Africaine
NP PLC Building, 4th Floor
26/28 Marina, P.M.B.
2359 Lagos, Nigeria
++234-1-2633289 (tel)
++234-1-2636093 (fax)
oaustrcl@rcl.nig.com

ENVIRONMENTAL LAW • INSTITUTE®

Environmental Law Institute
1616 P Street, N.W., Suite 200
Washington, D.C. 20036
++1-202-939-3800 (tel)
++1-202-939-3868 (fax)
law@eli.org

SEAPRI
ICIPE
P.O. Box 30772
00100 GPO
Nairobi, Kenya
++254-20-861680-4 (tel)
++254-2-860110 (fax)
rlettington@icipe.org
kent@netlane.com