



REPORT OF THE FIRST  
**EASTERN AND SOUTHERN AFRICA  
REGIONAL BIODIVERSITY FORUM**  
*Using Biodiversity to Strengthen Livelihoods*

Mombasa, Kenya  
21-23 February 2000

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**Convened by:**

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African Centre for Technology Studies (ACTS)  
Africa Resources Trust (ART)  
Environment Liaison Centre International (ELCI)  
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United Nations Environment Programme (UNEP)  
World Resources Institute (WRI)

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

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<b>ACTS</b>	African Centre for Technology Studies
<b>ART</b>	Africa Resources Trust
<b>ASAL</b>	Arid and Semi-Arid Lands
<b>CBD</b>	Convention on Biological Diversity
<b>CBO</b>	Community Based Organisation
<b>CHM</b>	Clearing House Mechanism (for the Convention on Biological Diversity)
<b>COP</b>	Conference of the Parties (to the Convention on Biological Diversity)
<b>EAIA</b>	East African Internet Association
<b>ELCI</b>	Environment Liaison Centre International
<b>GBF</b>	Global Biodiversity Forum
<b>GEF</b>	Global Environment Facility
<b>GMOs</b>	Genetically Modified Organisms
<b>IPRs</b>	Intellectual Property Rights
<b>IUCN</b>	The World Conservation Union
<b>LMOs</b>	Living Modified Organisms
<b>MLOs</b>	Mycoplasma-Like Organisms
<b>NBSAP</b>	National Biodiversity Strategy and Action Plan
<b>NGO</b>	Non-Governmental Organisation
<b>RBF</b>	Regional Biodiversity Forum
<b>SBSTTA</b>	Subsidiary Body on Scientific, Technical And Technological Advice (to the Convention on Biological Diversity)
<b>UNCED</b>	United Nations Conference on Environment and Development
<b>UNEP</b>	United Nations Environment Programme
<b>WRI</b>	World Resources Institute

# FORUM CONCLUSIONS AND RECOMMENDATIONS

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The First **Eastern and Southern Africa Regional Biodiversity Forum** (RBF) was held in Mombasa, Kenya, between 21-23 February 2000. More than 125 participants from 20 countries attended the RBF, representing a diverse range of stakeholders in biodiversity, and including representatives from governments, NGOs, CBOs, the private sector, research organisations, and donor agencies.

Within the overall theme of “**Using Biodiversity to Strengthen Livelihoods**”, the RBF addressed four key topics of direct relevance to the implementation of the Convention on Biological Diversity (CBD) in Eastern and Southern Africa. The main conclusions and recommendations arising from these four workshops are summarised below.

The workshop on **Sustainable Use of Dryland Ecosystems** recognised that it is rural people who are ultimately the custodians of much of Eastern and Southern Africa’s rich biodiversity. Because of the important role of biodiversity in most rural livelihood systems, such groups also incur significant social and economic losses if biodiversity is degraded.

Participants pointed to the need to target activities aimed at biodiversity conservation, sustainable use and equitable benefit sharing towards rural people in dryland ecosystems. They highlighted that such activities, begun at the community-level, are likely to succeed provided that policy, institutional and legislative frameworks offer ownership and security of tenure, retention of economic benefits and recognition of the rights and responsibilities of communities.

The workshop also emphasised the important place both of sustainable use, and of dryland ecosystems, in achieving the goals of the CBD, and recommended that both should be reflected, as priority areas, in on-going programmes of work.

The workshop on **Harnessing Private Industry’s Investment in Biodiversity** recognised that investment from private industry can provide a valuable, and currently under-used, means of strengthening biodiversity conservation, sustainable use and equitable benefit-sharing. In line with this importance, they urged governments, donors and other private and community stakeholders in biodiversity to pay greater attention to enhancing private industry’s investment in biodiversity, and to use private investment as a means of operationalising and strengthening the implementation of the CBD, particularly Articles 6, 10e, 11 and 20. They recommended that these issues should be accorded priority in local, national and regional conservation and development planning, and in on-going CBD programmes of work.

Participants highlighted a number of important conditions that must be borne in mind when harnessing private industry’s investment in biodiversity, and which will determine the desirability or otherwise of such actions in conservation, development and equity terms. They recommended strongly that private investment in biodiversity should be encouraged to take place in such a way that, simultaneously:

- /// Positive impacts on community livelihoods are ensured
- /// Commercial profits are maximised
- /// Biodiversity and conservation benefits are maintained



- /// Both positive incentives and regulatory economic, legal and institutional frameworks are set in place, which promote commercially, economically, socially and ecologically sound private investment in biodiversity
- /// Disincentives and perverse incentives that hinder or discourage commercially, economically, socially and ecologically sound private investment in biodiversity are overcome.

The workshop on **Handling of Agricultural Biotechnology and Distribution of its Benefits** provided a valuable experience for participants from different sectors and different countries to learn from each others' experiences and to start to overcome some of the constraints relating to biotechnology research and development in Eastern and Southern Africa.

The workshop highlighted the urgent need for better co-operation and articulation between the different public and private sectors, institutions and countries involved in biotechnology research and practice, within and outside the region. Of particular importance is the strengthening of regional capacity and competence in biotechnology, and the improvement of the scientific base on which research and development is founded.

Participants recommended that supportive policies and institutions should be set in place so as to enable the sound development and harnessing of biotechnology, in ways which are relevant to countries' national development aspirations and at the same time consistent with biodiversity conservation, sustainable use and equitable benefit sharing. It is imperative that these processes are participatory, and include all stakeholders, and that the public is made aware of both the benefits and the potential risks of biotechnology.

The workshop also recommended that activities be set in place to assess national biotechnology innovation systems in Eastern and Southern Africa, to identify the conditions that have favoured successful developments and have enabled constraints to be dealt with effectively, to highlight ways of linking modern biotechnology with indigenous knowledge and to take the varying needs of different stakeholders into account in biotechnology research and development.

The workshop on **National Experiences and Needs in Developing National Biodiversity Strategies and Action Plans** recognised that the development of National Biodiversity Strategies and Action Plans (NBSAPs) is a cyclical and adaptive process that should be based on the provisions of the CBD. The participants recommended that this process requires:

- /// More flexible, creative and adequate financing
- /// Continued collaboration, and clear definition of roles and responsibilities, between different stakeholders and institutions, at all levels, and improved generation and sharing of information
- /// Capacity building of institutions engaged in NBSAP preparation and implementation, which also addresses emerging issues and innovations
- /// Greater use of economic tools, including valuation, incentive measures and innovative financing mechanisms, for biodiversity conservation, sustainable use and equitable benefit sharing
- /// Integration of regional and cross-border ecosystem concerns, and mainstreaming of biodiversity concerns into broader sectoral and cross-sectoral planning
- /// Greater political commitment at both national and sub-national levels



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It is the hope of the organisers and participants of this First Eastern and Southern Africa Regional Biodiversity Forum that the results of discussions held, experiences exchanged, issues raised and ways forward identified will prove instrumental in strengthening local, national and regional attempts to conserve biodiversity, to use it sustainably and to equitably share the benefits arising from such use.

It is also important that these conclusions and recommendations serve to ensure that concerns and priorities relating to biodiversity in Eastern and Southern Africa are reflected in the on-going deliberations and work programmes of global biodiversity processes, including the upcoming Fifteenth Global Biodiversity Forum and the Fifth Meeting of the Conference of the Parties to the Convention on Biological Diversity, both to be held in Nairobi, Kenya in May 2000.

# BACKGROUND TO THE GLOBAL BIODIVERSITY FORUM

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The Convention on Biological Diversity (CBD) has as its objectives the conservation of biodiversity, the sustainable use of biological resources and the equitable sharing of benefits from the use of these resources. It was adopted on 22 May 1992 in Nairobi, Kenya. On 5 June 1992, during the United Nations Conference on Environment and Development (UNCED – “The Earth Summit”) in Rio de Janeiro, more than 150 states signed the CBD, and on 29 December 1993 it entered into force.

By May 1998 a total of 174 states had ratified the CBD, including most countries in Eastern and Southern Africa, making it one of the most widely adopted environmental treaties in history. However, the process prior to and following the development of the CBD had not always allowed for the full participation of all those interested and affected by the Convention.



In order to broaden public participation in CBD processes, the 1992 WRI-IUCN-UNEP Global Biodiversity Strategy called for the establishment of a forum that would allow governments, the private sector, non-governmental organisations, research institutions, indigenous groups, local communities and other international, national and community-based organisations to meet together and to guide international discussions and decisions concerning biodiversity.

The Global Biodiversity Forum (GBF) was therefore developed as an independent and strategic mechanism to foster analysis and open debate on priority ecological, economic, institutional and social issues related to conservation of biodiversity. Its mission is to provide a multi-stakeholder forum to support and enhance the conservation of biodiversity, sustainable use of biological resources and equitable sharing benefits from the use of these resources.

The GBF process is thus designed to contribute to the further development and implementation of the CBD and other biodiversity-related instruments at the international, regional and national levels by:

- /// Providing a broad spectrum of perspectives, proposals and experiences from all stakeholders;
- /// Building diverse partnerships among stakeholders;
- /// Providing an impetus to key issues and areas that require further development and attention.

The GBF was first tested by the African Centre for Technology Studies (ACTS) in Nairobi in January 1993. Since then, the founders of the GBF (IUCN, WRI, UNEP and ACTS) have convened the following sessions of the GBF:



- /// **GBF1-Gland** was held in October 1993 prior to the first meeting of the Intergovernmental Committee on the CBD.
- /// **GBF2-Nassau** was held in November 1994 prior to CBD's first Conference of the Parties (COP1).
- /// **GBF3-Jakarta** was held in November 1995 prior to CBD COP2.
- /// **GBF-Latin America** was held in Colombia in May 1996 (GBF regional session).
- /// **GBF4-Montreal** was held in August 1996 prior to CBD's second meeting of the Subsidiary Body on Scientific, Technical And Technological Advice (SBSTTA2).
- /// **GBF-East Africa 1** was held in Kenya in September 1996 (GBF regional session).
- /// **GBF5-Buenos Aires** was held in November 1996 prior to CBD COP3.
- /// **GBF6-New York** was held in April 1997 in association with a CSD meeting.
- /// **GBF7-Harare** was held in June 1997 prior to CITES COP10.
- /// **GBF8-Montreal** was held in August 1997 prior to CBD SBSTTA3.
- /// **GBF-East Africa 2** was held in Kenya in November 1997 (GBF regional session).
- /// **GBF9-Kyoto** held in December 1997 during the Climate Change Convention COP3.
- /// **GBF-Asia** was held in China in March 1998 (GBF regional session)
- /// **GBF10-Bratislava** was held in May 1998 prior to CBD COP4.
- /// **GBF11-Buenos Aires** was held in November 1998, prior to the UNFCCC COP4
- /// **GBF12-Dakar** was held in December 1998 during the Desertification Convention COP2.
- /// **GBF13- San Jose** was held in May 1999 prior to the Ramsar COP.
- /// **GBF Russia** was held in Moscow in May 1999 .
- /// **GBF14-Montreal** was held in June 1999 prior to CBD SBSTTA4.
- /// **GBF-South and South East Asia 1** was held in Sri Lanka in October 1999 (GBF regional session).

The following report is a summary of the first regional session of the GBF to be held for Eastern and Southern Africa. The views and recommendations in this report, while envisaged to stimulate a regional perspective on the themes covered, do not necessarily represent a consensus among all participants at the Forum or reflect the official position of the Forum organisers. Rather, they aim to capture the diverse range of viewpoints and issues that need to be addressed in implementing the Convention on Biological Diversity in Eastern and Southern Africa.

# THE EASTERN AND SOUTHERN AFRICA REGIONAL BIODIVERSITY FORUM

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The Global Biodiversity Forum continues to prove itself an innovative and inclusive mechanism for promoting open dialogue among a broad range of stakeholders. To date, the majority of GBF sessions have been held at the international level. However, the GBF concept is increasingly being used at the regional level, through a process of Regional Biodiversity Forums, where it provides a multi-stakeholder mechanism for facilitating critical regional debate and input into global discussions.

The first regional session of the GBF for Eastern and Southern Africa was held in Mombasa, Kenya between February 21-23 2000. The Forum brought together more than 125 participants from 20 countries, representing local communities, non-governmental organisations, the private sector, government institutions and international agencies.



## Using Biodiversity to Strengthen Livelihoods in Eastern and Southern Africa

21-23 February 2000, Mombasa, Kenya

### THEME

The theme of the Eastern and Southern Africa Regional Session of the GBF was “*Using Biodiversity to Strengthen Livelihoods*”. The Forum explored ways and means of integrating poverty alleviation considerations into local, national and regional actions aimed at conserving, using sustainably and sharing equitably the benefits of biodiversity. Its principal aim was to enable broad discussion and dialogue on a range of key biodiversity issues, prior to the 5<sup>th</sup> meeting of the Conference of the Parties to the CBD (COP5), to be held in May 2000 in Nairobi, Kenya. The Forum also sought to encourage regional collaboration and to broaden the constituency for the implementation of the CBD in the region, especially among non-governmental and community-based organisations and the private sector.

### WORKSHOPS

The Forum consisted of four parallel workshops, each focusing on a key theme which is of particular concern to Eastern and Southern Africa and is also relevant to the thematic areas and cross-cutting issues to be considered by COP5:

- ▣ **The sustainable use of dryland ecosystems;**
- ▣ **Harnessing private industry’s investment in biodiversity;**
- ▣ **Handling of agrobiotechnology and distribution of its benefits;**
- ▣ **National experiences and needs in developing biodiversity strategies and action plans.**

Three special sessions were also held during the Forum:

- ▣ **Biodiversity Conservation in Production Forests;**
- ▣ **GEF-NGO Partnerships for Biodiversity Conservation;**



/// **Cyberkiosk – Using the Internet as a Tool to Strengthen Biodiversity Conservation.**

**ORGANISERS**

The Forum was convened by the African Centre for Technology Studies (ACTS), Africa Resources Trust (ART), Environment Liaison Centre International (ELCI), the Global Environment Facility (GEF), IUCN – The World Conservation Union, United Nations Environment Programme (UNEP), and the World Resources Institute (WRI), in collaboration with the Secretariat to the Convention on Biological Diversity.

The Forum was generously supported by the Canadian International Development Agency (CIDA), Cordaid, the Global Environment Facility (GEF), the Finnish International Development Agency (FINNIDA), the International Development Research Centre (IDRC), the MacArthur Foundation, the Rockefeller Foundation, the Swiss Agency for Development Co-operation (SDC), and the United States Agency for International Development (USAID).

**FORUM AGENDA**

**MONDAY FEBRUARY 21**

- 0830-0900 Registration
- PLenary: OPENING OF THE REGIONAL BIODIVERSITY FORUM**
- 0900-0910 *Welcome to participants* Misael Kokwe, IUCN Regional Office for Southern Africa
- 0910-0925 *Opening address* Honourable Mathias Keah, Assistant Minister, Ministry of Lands and Settlement, Kenya and GEF Councillor
- 0925-0935 *Welcome from the Government of Kenya* Mr. B. K’Omodho, Director, National Environment Secretariat, Ministry of Environment and Natural Resources
- 0935-0945 *Welcome from UNEP and GEF* Ms. Sheila Aggarwal-Khan, UNEP-GEF
- 0945-1005 *Background to the CBD; COP, SBSTTA and GBF processes* Dr. John Mugabe, Executive Director, ACTS
- 1005-1025 *Overview of the Eastern and Southern Africa RBF and its workshops* Dr. Barbara Gemmill, Director, ELCI
- BREAK INTO WORKSHOPS (SEE INDIVIDUAL AGENDAS)**
- 1100-1730
1. Sustainable Use of Dryland Ecosystems
  2. Harnessing Private Industry’s Investment in Biodiversity
  3. Handling of Agricultural Biotechnology and Distribution of its Benefits
- 1600-1800 Special Session: *Biodiversity Conservation in Production Forests* Led by Kanta Kumari, GEF
- 1830 Cocktail Reception, hosted by IUCN

**TUESDAY FEBRUARY 22**

- WORKSHOPS CONTINUE (SEE INDIVIDUAL AGENDAS)**
- 0900-1245
1. Sustainable Use of Dryland Ecosystems
  2. Harnessing Private Industry’s Investment in Biodiversity
  3. Handling of Agricultural Biotechnology and Distribution of its Benefits
  4. National Experiences and Needs in Developing Biodiversity Strategies and Action Plans
- 1400-1730
- 1245-1400 Special Session: *GEF-NGO Partnerships for Biodiversity Conservation* Led by Hemanta Mishra, GEF; Sheila Aggarwal-Khan, UNEP-GEF; Edward Alitsi, ELCI
- 1930 Dinner, hosted by ACTS and WRI

**WEDNESDAY FEBRUARY 23**

- WORKSHOPS CONTINUE (SEE INDIVIDUAL AGENDAS)**
- 0900-1230
1. Sustainable Use of Dryland Ecosystems
  2. Harnessing Private Industry’s Investment in Biodiversity
  3. Handling of Agricultural Biotechnology and Distribution of its Benefits
  4. National Experiences and Needs in Developing Biodiversity Strategies and Action Plans
- PLenary: CLOSING OF THE REGIONAL BIODIVERSITY FORUM**
- 1400-1530 Presentation of workshop findings and recommendations
- 1600 Forum close

## OPENING PLENARY

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**The opening plenary** (From left to right: Lynda Mujakachi ART, Misael Kokwe IUCN, Sheila Aggarwal-Khan UNEP, Honourable Matthias Keah Ministry of Lands and Settlement/GEF Councillor, Mr K'Omudho NES)

Chaired by Lynda Mujakachi of the Africa Resources Trust (ART), the opening plenary welcomed participants to the First Eastern and Southern Africa Regional Biodiversity Forum, and provided an overview of its background, aims and content.

First of all, Misael Kokwe of IUCN Regional Office for Southern Africa welcomed participants to the Forum. He stressed that this Regional Biodiversity Forum, the first to include both Eastern and Southern Africa, provided a great opportunity to share common issues, aims and experiences, as well as to ensure that matters relating to the conservation and sustainable use of African biodiversity to strengthen livelihoods are reflected in global CBD agendas.

Mr K'Omudho, the Director of the National Environment Secretariat (NES) of the Ministry of Environment and Natural Resources of the Government of Kenya then welcomed the Honourable Mathias Keah, Assistant Minister for Lands and Settlement, and invited him to make an opening address. During this address, the Honourable Keah expressed satisfaction at the diverse range of countries and institutions represented in the Forum and voiced his hopes that this meeting would foster improved dialogue and co-operation between Eastern and Southern African managers and users of biodiversity. He commented that perhaps nowhere else in the world is biodiversity tied so intimately to people's livelihoods as in this region, and emphasised the fact that finding ways of sustainably using biodiversity to the benefit of the poorest and most vulnerable sectors of the population is indeed a key challenge, now and in the future.

Mr. K'Omudho proceeded to welcome the participants to the Forum, and to Mombasa, on behalf of the Government of Kenya. Giving a brief overview of Kenya's participation in CBD processes to date, he described the recently-completed National Biodiversity Strategy and Action Plan and spoke of a number of recent positive developments in the country's legal, policy and institutional frameworks for biodiversity conservation, sustainable use and equitable benefit-sharing. He pointed out that this Forum forms the first step in a series of international biodiversity meetings which will be taking place in Kenya over the coming months, and expressed hope that it would provide an important opportunity for participants to prepare themselves for these meetings, and to take back experiences and information that can help others in their countries to also prepare for them.

Ms Sheila Aggarwal-Khan welcomed participants on behalf of the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF). She gave a short explanation of



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the role of the GEF in the implementation of the CBD, and in the organisation of this and other Biodiversity Forums taking place at global and regional levels.

Dr. John Mugabe, the Executive Director of the African Centre for Technology Studies (ACTS) described to participants the background to the CBD process, including meetings of the Conference of the Parties (COP) and Subsidiary Body on Technical, Technological and Scientific Advice (SBSTTA), and the Global Biodiversity Forum (GBF) and Regional Biodiversity Forum (RBF) processes. He explained the key role of regional gatherings such as the Forum in these processes, and emphasised the synergies between activities aimed at implementing the CBD which are currently taking place at national, regional and global levels.

In conclusion, Dr. Barbara Gemmill, Director of the Environment Liaison Centre International (ELCI) presented an overview of the Forum's aims, content and workshops. Placing particular stress on the role of civil society in biodiversity conservation, she expressed the belief that meetings such as the Regional Biodiversity Forum play a key role in bringing the workings of the CBD to a wide audience, and ensuring that this wider audience – and especially NGO and CBO stakeholders in biodiversity – in turn are given a voice with which to influence global processes. She went on to explain that the Forum would be composed of four parallel workshops, each dealing with a key regional concern in biodiversity conservation and sustainable livelihoods – those dealing with sustainable use and drylands, with private industry's investment, with agrobiotechnology and with national biodiversity planning processes.

# WORKSHOP 1:

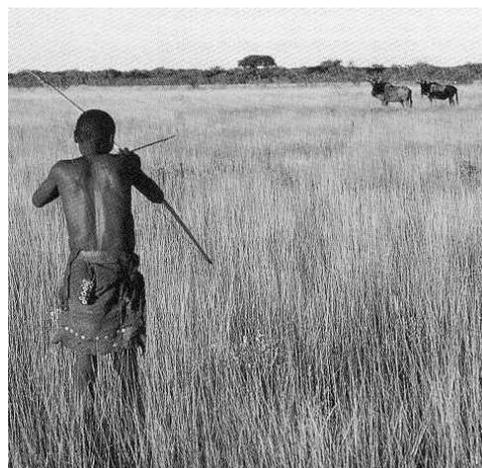
## SUSTAINABLE USE OF DRYLAND ECOSYSTEMS

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<b>ORGANISERS</b>	Environment Liaison Centre International Africa Resources Trust IUCN The World Conservation Union, Regional Office for Southern Africa
<b>SUPPORTED BY</b>	Cordaid FINNIDA IDRC USAID-NETCAB SDC
<b>OBJECTIVES</b>	To foster an open dialogue between the various stakeholders involved in managing and using dryland ecosystems

### INTRODUCTION TO THE WORKSHOP: ISSUES AND AIMS

This workshop aimed to foster an open dialogue between the various stakeholders involved in managing and using dryland ecosystems. Specific issues addressed were:



- /// What biodiversity do people who live in drylands value, and why?
- /// What are the critical roles of disadvantaged groups (women and youth, for example) in the management and use of these fragile ecosystems?
- /// What are the management systems, rules and regulations which dryland peoples have to regulate use of their natural resources/biodiversity?
- /// Does this complement or conflict with official policies? Savannah drylands biodiversity components: how can we sustainably optimise their contribution to communities' economic and social benefits?
- /// What strategies exist for managing risk (such as drought preparedness in the face of climate change) and enhancing resilience in such dryland systems? Are these being enhanced or undermined?
- /// What externalities are forcing changes to these systems? Do they contribute to enhancing the management of biodiversity or to its destruction?
- /// How do international conventions (Convention on Biological Diversity, Convention to Combat Desertification, Convention on Climate Change) hinder or help?
- /// What is the role of rich patch (hilltops, forests, riparian areas) vegetation in dryland natural resource management?
- /// How can we best monitor the health of drylands? What has been the role of remote sensing vs. on-the-ground assessment?



## **DRYLAND BIODIVERSITY: ISSUES AND LINKAGES**

*This first session looked at the overall linkages and issues arising in the sustainable use of dryland biodiversity as it relates to the implementation of the Convention on Biological Diversity and to the Eastern and Southern Africa region.*

### **The CBD and Drylands**

One of the starting points for looking at these issues was to investigate the ways that the CBD deals with drylands. It was pointed out that a CBD working group has been convened to examine drylands, and that this group is co-ordinating with the Convention on Desertification. As most of Africa can be categorised as dryland ecosystems, it is clear that the region should be at the heart of the activities of the programme of work drawn up by this group.

Despite a growing focus on dryland ecosystems, it has however also become apparent that there exist a number of inconsistencies in the CBD relating to the sustainable use of drylands, especially as regards varying interpretations of fundamental issues. Participants expressed particular concern that, although the CBD acknowledges that the causes of environmental degradation are anthropogenic, COP decisions have to date failed to put “people” at the centre of the proposed solutions. Also, while acknowledging that 80% of Africa’s population is rural, and that it is in these rural areas where most biodiversity is located, there is also an over-emphasis on protected areas – which in fact represent only a tenth of the biodiversity-rich areas in Africa.

Another key area of concern was seen to be the difficulty in accessing funds for action in dryland ecosystems from the financing mechanism of the CBD – the Global Environment Facility. One of the problems faced in applying for such funds is the difficulty in demonstrating the “globally-significant” impacts of national attempts at dryland biodiversity conservation. There is a need to demonstrate that improving national economic indicators, and especially strengthening rural livelihoods and alleviating rural poverty, is key to the conservation of Africa’s globally-significant biodiversity.

A number of recommendations came out of this examination of the role and place of dryland biodiversity within the CBD. One key issue is the valuable case studies that Eastern and Southern Africa can provide, which can highlight ways forward in implementing the CBD. Another is the need to highlight responsibilities and areas of institutional collaboration – including synergies with the Convention on Desertification – that are necessary to tackle dryland issues. It will also be necessary to pay increased attention to issues and areas that are currently under-emphasised by proposed workplans, including ambiguity concerning definitions, a recognition of the impacts of exogenous actors and circumstances (for example global and national economic processes such as those promoted by the World Trade Organisation and Structural Adjustment Programmes, and various globalisation influences) and the very important issue of water stress.

### **Recognizing and sharing dryland benefits**

Benefit-sharing, especially that targeted at the rural communities who live in Africa’s drylands, was highlighted as a particularly important area of activities that could be carried out under the CBD’s programme of work on dryland ecosystems. One key prerequisite for successful benefit-sharing is the need to simultaneously establish a broader supportive environment, especially relating to land and resource tenure and to the recognition of local-level management mechanisms, knowledge and



values and their representation in national and international decision-making. Dryland ecosystems are often marginalised in development decision-making because their economic benefits – although crucial to local populations – are typically so difficult to quantify.

These values are also reflected in local methods of managing dryland biodiversity. Ownership and appropriate tenure empowers communities to assume full control and management of drylands, enhancing the success of many community based natural resources management programmes. It is therefore imperative that policies and measures that enhance community ownership and tenure be developed and promoted. A work programme, which openly embraced such initiatives, would be among the most effective intervention to conserve dryland biodiversity.

## **SUSTAINABLE USE OF SAVANNAH ECOSYSTEM COMPONENTS: WILDLIFE**

*In this session, experiences of the sustainable utilisation of wildlife were presented from Southern and Eastern African perspectives.*

### **Examples from the region**

Discussion followed on from three country presentations on Botswana, Kenya and Uganda, each of which represents a very different situation as regards the utilisation of wildlife and yet together epitomise many of the issues and conditions facing dryland biodiversity conservation. These presentations focused on the key areas of control over wildlife, policies regarding utilisation, experiences in benefit-sharing and areas of wildlife-human conflict, especially as they related to local communities in dryland ecosystems.

The case of Botswana exemplifies a situation where much of the richest wildlife resources are located in dry, low agricultural potential areas of the country where levels of rural poverty are high. Wildlife management policies are based on low-volume, high-value, wildlife tourism – including both wildlife viewing and tourist hunting, as well as on subsistence and commercial wildlife cropping, farming and hunting. A number of interesting examples of joint community-private sector management and utilisation of wildlife resources (for example those taking place in the Chobe Enclave, see Box 1) were presented. Despite a relatively liberal approach to wildlife management and utilisation, a number of policy gaps and threats relating to wildlife still remain in Botswana. Key examples of these

#### **Box 1: Wildlife Utilisation in Chobe, Botswana**

Chobe National Park is 10,698 square kilometres. It has a population of 45,000 elephants growing at 6% per annum, and has a well developed tourist infrastructure. The park is unique in that it offers extreme contrasts in habitats ranging from the tropical Linyati swamp, the desert like landscape of the Savuit and from the Chobe flood plain grasslands to the deep sands of the Chobe. This diversity of habitats is home to one of greatest concentrations of game in southern Africa. It is a prime tourist destination. Wildlife utilisation practices in Chobe are largely based on the country's wildlife management policies which include the concept of low volume, high value tourism. The utilisation types in Chobe include both consumptive and non-consumptive, subsistence and commercial uses.

Safari hunting is implemented through private sector and community partnerships. There are two conservation trusts: KALEPA Conservation Trust (a rather new organisation), and Chobe Enclave Conservation Trust. Chobe Enclave Conservation Trust is made up of five villages, each one with a trust committee. The trust has its own constitution, and any one over 18 is a member. Anyone who has lived in the communities for more than two years, is also a member, and receives full benefits. The community is given a quota each year, and they must decide what to do with it.

Botswana has a policy for high value/low volume tourism, but seems to be doing just the opposite. It may be that the price of photographic safaris is not set correctly. In any case, the tourism carrying capacity needs to be better determined. In 1999, 728,000 tourists came to the delta in 1999. The downside of this is that tourist activities tend to be congested at the moment. For example, 17 boats were noted passing by a popular spot in the river at Chobe within a few minutes of each other. This defeats the concept of low volume, high value tourism.

*Sustainable wildlife utilisation in Chobe District, Botswana, Excellent Hachileka*



threats include the prevalence of drought, which is largely ignored when wildlife quotas and plans are set, the establishment of cordon fences for the control of disease among domestic stock and their consequent impacts on wild animal migrations, the high incidence of wildlife-landholder conflicts and the weak consideration of social sustainability in the ways that wildlife tourism enterprises operate.

Unlike Botswana, much of Uganda consists of fertile, high-potential agricultural lands. Due to the fragility of these lands, Uganda is attempting to promote low-impact tourism and to ensure that wildlife developments are subject to proper environmental impact assessment before their approval. One problem with this approach, despite its desirability in terms of ecological conservation, is that it is often criticised because it is seen to generate below-potential financial returns. For a long time – between 1979 and 1996 – consumptive wildlife utilisation was banned in Uganda so as to allow populations to recover after the heavy poaching and hunting that took place during the upheavals of the Amin area. Since 1996 limited consumptive wildlife utilisation has been permitted, but is not yet widespread. Because of Uganda's high population density, and the prevalence of arable agriculture as a land use, human-wildlife conflict is intense in many parts of the country. In order to offset some of these locally-borne costs and opportunity costs, community revenue-sharing and benefit-sharing forms a keystone of government wildlife management efforts in the country.

In Kenya, hunting has been prohibited since 1977. Since the 1990s limited forms of wildlife utilisation have been piloted – mainly wildlife cropping on large ranches and communal lands in dry areas of the country. There is however still no clear national policy on wildlife utilisation. At present the Kenyan government is vested with control of all wildlife, which has proved contentious.

### **Common Themes and Issues**

One theme common to both Eastern and Southern Africa is that of “leakages”. While wildlife utilisation should serve to sustain the communities that are ultimately responsible for maintaining dryland biodiversity, in many cases this does not occur. Frequently these benefits accrue to traders and large commercial operators, often in Northern Europe and North America. One of the most basic issues is the need to ensure that wildlife benefits accrue to an adequate level to communities, and to simultaneously take steps to ensure that alternative, sustainable, production systems are made available in areas of rich wildlife and high human poverty.

Another common issue pertaining to wildlife specifically, and to dryland biodiversity in general, is the fragmentation (and often contradiction) between the national government institutions and policies that are responsible for its management. There also tends to be, although to varying degrees, heavy state control (and often monopoly) over wildlife ownership, management and use. There is, in fact, little devolution of authority over wildlife to the local level, and little participation of private and community stakeholders in decision-making.

### **ROLE OF RICH PATCHES IN DRYLANDS: IMPLICATIONS OF INTRODUCING IRRIGATED AGRICULTURE INTO DRYLANDS**

*This session looked at the ecological and economic roles of rich patches in drylands, and focused especially on the threats posed by the expansion of irrigated agriculture into drylands.*



## Policies which impact on dryland biodiversity

Three presentations were made that investigated the ways in which historical and current government policies, especially those relating to arable agriculture and human population, can impact on dryland biodiversity. Examples were given of the expansion of irrigation into Kenya's drylands, of desertification in Sudan and of the influence of population growth on arid and semi-arid parts of Ethiopia.

As is the case in many parts of the African continent, Kenya's arid and semi lands have long been seen as "marginal" or "waste" lands (see Box 2). Since colonial times such areas have been seen as being of little use to human populations, and have been designated as "ownerless". Indigenous populations, and their land and resource management and utilisation techniques, have tended to be ignored in favour of the expropriation of dryland areas by government in order to establish protected areas, resettle upland populations, expand arable production and develop commercial irrigation schemes. Many of these large-scale agricultural and settlement schemes have failed, and at the same time have caused massive disruptions both to dryland populations and livelihood systems, and to biodiversity. This should not necessarily be the case – if carefully planned and managed, with the active participation of local stakeholders, irrigation can actually present opportunities in both economic and conservation terms.

A similar set of aims informed the development of the Gezira Scheme, the largest irrigation scheme in Sudan. Covering an area of nearly 1 million hectares of reclaimed dryland, the scheme is currently facing a serious threat of desertification, as sands are blown up to form dunes which cover formerly productive land. Entire soil types have changed as sands have encroached, forcing villagers to migrate from their buried villages and fields to nearby cities or to unaffected parts of the scheme. Both tree and grass biodiversity has also declined drastically.

The case of a small freshwater lake in the Ethiopian Highlands was also used to illustrate the potential conflicts between water and land "developments", rich patch biodiversity and the maintenance of local livelihoods. Here, the draining of the freshwater lake was undertaken to provide household, municipal and irrigation water to nearby settlements, while diversion of river water into a small saline lake was undertaken so as to convert it into a reservoir for irrigated

### **Box 2: Impacts of colonial agricultural policy on Kenya's drylands**

The colonial government in Kenya considered arid and semi-arid lands (ASAL) of Kenya to be "ownerless", the justification being that "since Africans owned land only in terms of occupational rights, it followed that unoccupied land reverted to the territorial sovereign.". Transhumant livestock movements were not appreciated in the context of regular episodes of drought and the need for key resource areas. The Maasai, for instance, were characterised by the second Governor of Kenya as "straggling over far more land than they can utilise". This stereotype fails to recognise the variable nature of non-equilibrium environments, the need to have access to a variety of ecotypes for dry-season browse, and the nature of reciprocal networks which function due to the geographical coverage of the social system.

Large areas of land previously used by pastoralists (particularly the Maasai, over 10,000 of whom were moved to the Southern Maasai Reserve) were expropriated by the government for use by settlers of European origin. The establishment of wildlife reserves also contributed to the loss of grazing land and areas of high biodiversity. The most fertile and well-watered areas were taken, and "most of the important water courses were removed from Maasai control."

Colonial ASAL development policy specified that irrigation was to be developed wherever feasible. However, irrigation development in the ASALs during the colonial period was marked by frequent failure. Large amounts of money were invested in an irrigation scheme in the Omo River Delta, Northern Turkana, during the 1940s, but it was a complete failure. A flood irrigation scheme constructed near Lodwar in Turkana in the 1950s was also abandoned after a few years. Yet, colonial policies related to dryland development have been generally continued after independence. At present, the Ministry of Agriculture has sweeping powers to expropriate land for the purposes of irrigation, generally without compensation for the communities that previously used the land.

*Irrigation in the drylands of Kenya: impacts on local use of natural resources*, Chris Huggins and Francis Gichuki



agriculture. This resulted both in a significant decrease in the quality of both lakes, and a decline in the diversity of wild plant and animal communities. Both developments also led to negligible human development benefits – the freshwater lake is no longer potable and is disappearing, while the addition of fresh water into the saline lake has not created any reservoir.

### Issues of local knowledge and rights

A more positive set of experiences was shared through the presentation of two papers that described the links between local biodiversity knowledge, utilisation and management in drylands. Farmers living in Tharaka, a semi-arid area of Eastern Kenya, described strategies used to manage environmental stress and conserve dryland biodiversity. Findings show that, over the years, farmers have developed vast skills in biodiversity management, and particularly in the conservation and sustainable use of biodiversity, that has direct implications for their livelihoods. It is these skills that have enabled such farmers to manage biological diversity, for the main part without outside assistance. Of particular importance has been the management of biological diversity to cope with times of stress and drought, and to ensure food security.

There is an urgent need to ensure that such knowledge is protected. Issues relating to the development of legal and social solutions to the protection of community rights and knowledge over dryland biodiversity were illustrated through a case study from Botswana (see Box 3). As is often the case, communities here have little access to the internationally accepted norms of intellectual property right protection, such as patents. On-going attempts in Botswana to investigate the “ownership” of traditional knowledge are based on the thesis that conventional regimes for the protection of knowledge often do not fit with traditional knowledge, both cultural and technical. They make it clear that unique solutions to these unique problems need to be devised, rather than forcing existing mechanisms to adapt to these situations.

#### Box 3: Protecting the traditional knowledge of the !Ko of Botswana

A study published by the Botswana Society specifically examined the botanical knowledge of the !Ko. Activities among the !Ko are divided such that women are the principal gatherers and men the exclusive hunters. Somewhat unsurprisingly, it is the results of gathering that produce the vast majority of the !Ko diet. The study team tried to select a woman who was neither particularly well known for her gathering skills, or known for a lack of them.

What became clear was that this woman, and presumably by extension, the majority of women in the community, possessed a detailed knowledge of several hundred plants that were useful as both key dietary elements and as supplements. Even on a surface level this information can be of great interest when one takes two factors into consideration. The first of these is that the Basarwa have a reputation as being a society that traditionally has one of the healthiest, most nutritionally balanced diets in the world. This combines with the fact that they also spend one of the lowest proportions of their time securing their basic needs of any ethnic group in the world, usually three to four days in an average week. While it is certain that this is possible largely due to their extremely low populations density and consequent large potential range for transhumance it is clear that the plants they gather could hold great promise both as natural nutritional supplements and as food sources in other crisis-hit dryland areas. The second factor to consider is that drought resistance is one of the most sought after qualities in agricultural biotechnology today. A stock of several hundred plants that are known to be safe food sources and that have high drought tolerance could be quite an asset with a little basic research and marketing.

The fundamental point behind this is that groups living in dryland ecosystems naturally tend to have a greater detailed knowledge of their environment than those in ecosystems that provide more easily. Thus while they may have less biodiversity than a rainforest, or some similarly lush ecosystem, they often know more about it. They have to for simple reasons of survival.

*The nature and subjects of traditional intellectual property practices of local communities in north-west Botswana and northern Namibia: a case study, Robert Lettington*

### DRYLAND BIODIVERSITY: INDICATORS AND MONITORING

*In this session, indicators and monitoring systems for dryland ecosystems were presented. Three dryland systems were presented as examples: communal rangelands, dry woodlands, and forest-grassland-agricultural plantation*



For the case of communal rangelands, the importance of rangelands as sites of dryland biodiversity was emphasised, and the concept of rangeland degradation was redefined as “the apparent permanent decline in ecosystem functioning, health, biodiversity and the ability to produce renewable resources”. It was emphasised that there is thus a need to take all of these parameters into account as indicators of rangeland degradation. Relationships between declining biodiversity and ecosystem health were presented for various European grasslands, as well as for arid and semi-arid rangelands, where critical thresholds in terms of responses of fragile and robust rangelands were manifested. These examples pointed to the need to develop research programmes aimed at understanding and characterising the response of communal rangelands, and to establish a monitoring methodology that uses indicators of ecosystem function.

In a presentation dealing with the assessment of dry woodland sustainability, the degradation of natural vegetation cover was emphasised and the criteria and indicators for this degradation assessment shown. The development of criteria was also justified as instrumental in the assessment of trends and changes in the conditions of ecosystems and in the ecological, economic, social, political and environmental context in which ecosystems are managed. The opportunities for implementing criteria on the adequacy of legal, institutional and policy frameworks for sustainable forest management was examined, and a strong argument made for the adoption of new institutional arrangements for assessments which involved all of government, private, NGO and CBO agencies.

A new method for monitoring the health of drylands was introduced during the presentation on forest-grassland-agricultural plantation systems. This new method is based on a computer system, GLOBENET, and has been applied to the monitoring of carabids and cicidelds in South Africa. This study resulted in individual species-environment relations and showed the association of such species with environmental conditions such as soil characteristics.

### **Linkages to other conventions**

Clearly activities for work in drylands proposed under the CBD should complement, not compete with work on other conventions, e.g. Convention to Combat Desertification (CCD) and Framework Convention on Climate Change (FCCC). The convention to combat desertification deals with broader issues of land degradation, and it is important that activities under the two conventions are carried out in concert, not in isolation. There are possibilities for arid lands to participate in the Clean Development Mechanism of the Framework Convention on Climate Change (FCCC). As this could potentially be a source of support for arid land restoration, African countries in the region would be wise to pursue these possibilities. The Ramsar Convention, which focuses on high-diversity rich patches often in drylands, is another convention where synergies need to be elaborated.

## **CONCLUSIONS AND RECOMMENDATIONS**

It is primarily at the rural community level in dryland ecosystems that biodiversity is either conserved or degraded. Conservation measures begun at the local community level are likely to succeed provided that legislative frameworks offer ownership and security of tenure, retention of economic benefits and the recognition of rights and responsibilities of communities.

### **Centrality of Dryland Issues**

Drylands provide entirely unique biological resources, which are of global significance with respect to adaptive strategies under multiple stresses. Drylands should not be marginalised in the CBD

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programme of work, nor relegated to activities carried out solely under the Convention to Combat Desertification.

## **Ownership and Tenure**

In many dryland ecosystems in Africa lack of ownership and tenure has contributed immensely to the loss of biodiversity and degradation of these areas. Imposition of alien land tenure systems has expelled traditional communities from their ancestral lands. Ownership and appropriate tenure empowers communities to assume full control and management of drylands, enhancing the success of many community based natural resources management programmes

It is therefore imperative that policies and measures that enhance ownership and tenure be developed and promoted. A work programme to support such initiatives should be initiated and approved by COP5.

## **Economic Benefits**

The principle of equitable sharing recognises the right of communities to share benefits accruing from drylands whether it is tourism, mining, agriculture, research, etc. - there benefits should be shared equitably with the local communities. Ensuring equitable sharing of benefits from drylands enhances the full participation and involvement of dryland communities in managing these ecosystems.

Many of the programmes designed to provide local economic incentives for community based conservation need to pay greater attention to equity. For example community wildlife management and participatory protected area management have little chance of success where benefits are not distributed equitably among various members of the community. "Equity" should entail the sharing of benefits in a way that is commensurate with the varying sacrifices and contributions made by, or damages incurred in the community (e.g. through lost access to resources, damage to crops and through physical danger presented by many wild animals). The distribution of benefit within the community should also be administered by a local institution that carries out its activities in a transparent way and is accountable to the community. Retention of economic benefits within local communities needs more attention.

Policies and measures that enhance sharing of economic benefits should be supported in the CBD work programme and assistance should be given to parties to develop such policies and measures. There are a number of case studies on benefit sharing from this region- both successful and problematic- which could inform the Parties.

## **Institutional Roles**

There is a need for a coherent and strong institutional framework to coordinate a programme with such overlapping institutional interests. The present program is rather weak on institutional mechanisms.

## **Rights and Responsibilities**

Communities should be actively involved in the improved sustainable management of all of their natural resources. Their rights to this knowledge and responsibilities for this should be clear and unequivocal, and this could include various legal mechanisms.



It is important to build on the local knowledge base as the basis for change and improvement, and not to introduce “new” ideas that may conflict with that knowledge base without the full involvement of those people. Local institutions and organizations form an important entry point for dryland natural resource management, but such institutions need to be understood. It is important, especially in the drylands, to integrate and understand issues of culture, gender and stakeholder rights.

Innovative systems of protection for intellectual property that is held by communities, rather than individuals, need development.

### **Incentives and Perverse Incentives**

People living in the drylands have survived and thrived in spite of a range of perverse incentives that they have had to live on. They have broadly been forgotten in the development and change process, and their livelihood basis not or misunderstood. Where there has been change it has focused on radical changes of production from livestock to irrigation for example. Many of their prime lands have been expropriated for, e.g. National Parks, irrigated and rainfed agriculture. Livestock and wildlife in these areas have been undervalued as the best converters of biomass for people to use. Governments have misunderstood, at best or ignored the importance of risk and resilience, and the coping mechanisms so important to the integrity of such systems. Where the ecological potential has meant that the land users have to be nomadic or semi-nomadic, the pressure has been to settle people for service provision, often with severe negative consequences

Improvements in livestock marketing and pricing, and integrating such markets into mainstream economic planning and budgeting is being increasingly acknowledged. The role of the natural vegetation and biodiversity is key to risk mitigation and the increasing resilience. Wildlife use, both consumptive and non consumptive represents an increasingly important livelihood opportunity in certain areas. Lessons on the positive role of drylands are increasingly being shared between and within countries, as nations strive to build their economic base. Communities and land users should be supported to become fully aware of the cost benefit analyses in the maintenance and sustainable use of their natural resources, either on their own, or in partnership with others.

### **Role of the Private Sector**

In the past there has been little responsible involvement of the private sector in the drylands. Where there has been involvement, it has tended to be extractive and non-community-based. Livestock rearing on large private or company ranches is important, as has wildlife ranching, but this has tended to be separate from most rural people living in such areas. Increasingly the private sector is becoming involved in the marketing and sale of dry land products – livestock, the range of non timber forest products (gums, resins, etc.)

More recently the private sector is entering into more responsible relations with the rural peoples of such areas for, for example joint tourism ventures, hunting, organized collection of dryland products for marketing. Such partnerships are key to diversifying the livelihood basis of the people, spreading and reducing risk, and increasing the resilience of such systems by focusing on a wider range of products as the basis for livelihood security and poverty alleviation.



## Adaptive Management and Indicators

Adaptive management is a holistic integrating approach that allows intervention in the functioning of an ecosystem, as well as monitoring the negative feedback and adapting to a new level of ecosystem function. A number of systems for collecting monitoring and assessment data in dryland ecosystems have been explored within this workshop, indicating that the tools are presently available.

As adaptive management is an evolving process for natural resources management, it is important that communities and rural users are involved, and indeed have some ownership of such activities. Adaptive management principles can form a strategic component of natural resource management planning and implementation in the dryland. In this respect, lessons need to be learnt from similar projects and activities, which use adaptive management principles.

## Recommended CBD Programme of Work

### A. *Socioeconomic*

- Community empowerment as a basis for development of sustainable livelihoods
- Traditional technical knowledge as basis for development of appropriate dryland ecosystem management practices
- Promotion of ecologically sound incentives, and the removal of perverse incentives
- Education and awareness promotion targeted at root causes of dryland biodiversity loss

### B. *Ecological*

- Water resources management as an essential element of programme of work
- Climate variability (droughts) must be included, and not just the climate change mitigation measures
- Transboundary management promotion
- Equal weight to joint work programmes in RAMSAR convention

### C. *Institutional*

- Capacity building promotion emphasis on local institutions (training, institutional support)
- Advocacy and reform of unfavourable terms of trade and assistance through international and regional agreements
- Institutional mechanisms defined on an international level.

### D. *Programme Implementation*

- Programme target areas specificity
- Clear commitment of CBD financing mechanisms in support of programme of work. Collaborative/joint programmes not to be used to prejudice support from CBD
- Assessment framework that captures both ecosystems condition and human well being

## Key Activity Areas

1. Elaboration of case studies on benefit sharing from the region.
2. Targeted programmes on ownership and tenure in dryland ecosystems.
3. Development of innovative IPR systems for community-held knowledge.



4. Targeted programmes to bring marginalised dryland communities into mainstream economic relationships, with local retention of benefits, with promotion of ecologically sound incentives.
5. Adoption of adaptive management systems, with bottom-up structures.
6. Water resource management programs developed as integral to any dryland programme of work.

## AGENDA

### **MONDAY FEBRUARY 21**

#### Session I: Dryland Biodiversity – Issues and Linkages (Chair: Lynda Mujakachi; Rapporteur: Chris Huggins)

- 1100-1120 *Drylands in Africa: Biodiversity, threats and sustainable livelihoods* Cecil Machena, ART  
1120-1140 *Programme of Work in the CBD in dryland biodiversity* Misael Kokwe, IUCN  
1140-1200 *Sustainable use principles in a dryland context* Barbara Gemmill, IUCN  
1200-1230 Discussion

#### Session II: Sustainable Use of Savannah Ecosystem Components (Chair: Rashid Amman; Rapporteur: Barbara Gemmill)

- 1330-1400 *Sustainable use of wildlife resources in Chobe District, Botswana* Excellent Hachileka  
1400-1500 Views from East Africa  
1530-1700 Discussion: Key issues, including policy environment for wildlife conservation

### **TUESDAY FEBRUARY 22**

#### Session III: Role of Rich patches in Drylands; Implications of Introducing Irrigated Agriculture into Drylands (Chair: Dr. Mwandotto, Rapporteur: Jeff Odera)

- 0800-0830 *Irrigation in the drylands of Kenya: impacts on local uses of natural resources* Chris Huggins and Francis Gichuki  
0830-0900 *Desertification on the edges of Gezira Irrigation Scheme* Ahmad Imad-El Din  
0900-0930 *The influence of population growth and climatic change on water resources in Alemaya, Eastern Ethiopia* Brooks Lemma  
0930-1000 *Sustainable use of plant genetic resources for agriculture in dryland ecosystems* Lucy Mathenge  
1000-1030 Tea and coffee  
1030-1100 *The nature and subjects of traditional intellectual property practices of local communities in north-west Botswana and northern Namibia: a case study* Robert Lettington  
1100-1230 Discussion

#### Session IV: Dryland Biodiversity: Indicators and Monitoring (Chair: Justus Tindigarukayo-Kashagire; Rapporteur: Ahmad Imad-El Din)

- 1400-1430 *Communal rangelands: and ecosystem approach to sustainability, biodiversity and thresholds of potential concern* Derek Berliner  
1430-1500 *Development and use of indicators for dryland ecosystems* Jeff Odera  
1500-1530 *Monitoring the health of drylands: management to maintain biodiversity* Joan Jaganyi  
1530-1600 Discussion: Assessment, monitoring and indicators of drylands  
1630-1700 Discussion: Assessment, monitoring and indicators of drylands

### **WEDNESDAY FEBRUARY 23**

#### Session V: Linkages (Chair: Misael Kokwe; Rapporteur: Robert Lettington)

- 0800-0900 *Carbon offset projects as a strategy for sustainably utilising and conserving dryland ecosystems: case study of Kenyan coastal rangeland* Stephen Mutimba  
0900-0930 Discussion: Drylands and desertification in the Framework Convention on Climate Change  
0930-1000 Dryland wildlife populations and the CITES convention  
1020-1040 Drylands and rich patches: Ramsar and freshwater resources  
1040-1200 Workshop recommendations

# WORKSHOP 2:

## HARNESSING PRIVATE INDUSTRY'S INVESTMENT IN BIODIVERSITY

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<b>ORGANISERS</b>	IUCN – The World Conservation Union, Eastern and Southern Africa Economics Programmes Africa Centre for Technology Studies
<b>SUPPORTED BY</b>	CIDA GEF MacArthur Foundation SDC
<b>OBJECTIVES</b>	To identify and promote specific measures for enlarging private industry's participation in the implementation of the Convention on Biological Diversity, and to discuss ways of attracting and increasing private industry's investment in the conservation and sustainable use of biodiversity

### INTRODUCTION TO THE WORKSHOP: ISSUES AND AIMS

Although most actions to implement the CBD in Eastern and Southern Africa have, to date, been dominated by governments, it is becoming increasingly apparent that it is also necessary to take account of the role of private industry. Private industries have often been vilified by conservationists as degraders of biodiversity, polluters of ecosystems and exploiters of local community interests. They have tended to be excluded from the workings of the CBD, and from national attempts to conserve biodiversity. Yet there are pressing needs to widen the participation of civil society in the implementation of the CBD, to find new and sustainable sources of finance for biodiversity, to mainstream biodiversity into the workings of all sectors of the economy, and to present a strong justification for biodiversity conservation and sustainable use in economic, financial and development terms. Governments are unable, alone, to meet these needs. While it is undoubtedly necessary to take actions to mitigate or overcome the negative impacts that private industrial activities can have on biodiversity, it is also clear that their involvement in the implementation of the CBD can provide a valuable source of support, and funding, for biodiversity. To date, few opportunities have been provided for private industry to become involved in biodiversity conservation. This workshop looked at the ways in which private industry's investment could be harnessed to the advantage of biodiversity, for the gain of biodiversity-rich Eastern and Southern African countries and for the benefit of the people who live in areas of high biodiversity.



### Aims of the workshop

Drawing together a diverse range of government, private sector and NGO representatives from Eastern and Southern Africa, the objectives of the workshop were to identify and promote specific measures for enlarging private industry's participation in the implementation of the Convention on



Biological Diversity, and to discuss ways of attracting and increasing their investment in the conservation and sustainable use of biological diversity in the region.

## Private industry and the CBD

Surprisingly, the linkages between private industry and biodiversity conservation have tended to be underemphasised in attempts to implement the CBD. From the start, it is important to recognise the ways in which the Articles of the CBD rely on private industry's participation and compliance. The workshop was concerned especially with the way in which four key aspects of the CBD relate to private industry – Article 6b (mainstreaming of biodiversity into sectors), Article 10e (encouraging co-operation between government authorities and the private sector in developing methods for sustainable use), Article 11 (adopting economically and socially sound measures that encourage private businesses, among others, to conserve biodiversity, use it sustainably, and share equitably the benefits arising from such use) and Article 20 (providing financial support to biodiversity, and generating new and additional financial resources). Although not forming the main focus of this workshop, it was noted that issues and opportunities relating to private industry's investment are also tied intimately to other Articles of the CBD – for example those relating to *in situ* and *ex situ* conservation, research and training, impact assessment, access to genetic resources, access to and transfer of technology, exchange of information, technical and scientific co-operation, handling of biotechnology and distribution of its benefits.

## Cross-cutting concerns

Little is known about the level or scope of private industry's investment in biodiversity in Eastern and Southern Africa, and little thought has been given either to its potential advantages, or to avoiding its negative impacts. The workshop formed a first step in addressing these concerns – the need to share experiences and to identify needs relating to private industry's investment in biodiversity in the region. Because of the diversity of workshop participants, in terms of countries, organisations and sectors represented, many different perspectives and experiences were voiced in this information sharing.

As well as sharing information, the workshop focused on identifying ways forward and concrete actions that can be undertaken by donors, governments, conservation and development agencies, local communities and private industry themselves. Here, two major concerns informed the workshop's deliberations – identification of ways in which private industry's investment can be encouraged and attracted to biodiversity, and investigation of the types of economic, policy, legal and institutional arrangements that are required to ensure that this investment is used to maximise social, economic, commercial, development and conservation benefits for the peoples of the Eastern and Southern African region.

## EXPERIENCES TO DATE

Discussions made it clear that, to date, there has been only limited experience of private industry's investment in biodiversity in Eastern and Southern Africa, and especially there have been few attempts to link this to conservation goals or to maximise local community benefits. Certain sectors, such as wildlife tourism, have a history of private involvement, and there has long been industrial consumption of plant and animal products with high commercial values. In addition, most rural communities in the region have for centuries depended on the utilisation and trade of wild products for both income and subsistence. Until recently, there have however been few cases of private industry's investment being harnessed explicitly for the conservation or sustainable use of



biodiversity, and scant experiences either of the linking of local and global markets or of partnerships between large commercial industries and small-scale traders and community members.

## Emerging initiatives and developing markets

Slowly this situation is changing. Workshop participants shared a number of experiences and examples of the ways in which private industry's investment in biodiversity is starting to be harnessed in new ways, and for new products and markets. Investment has diversified beyond the traditional major market of wildlife tourism, particularly into the uses and applications of wild plant species. Increasingly, the incorporation of conservation and

sustainable use considerations into private industry's investment has also moved away from that which is motivated by largely philanthropic or voluntary goals to arrangements which are based on maximising commercial profits (see Box 1).

A number of experiences were also shared where primary producers, harvesters and small-scale traders of biodiversity products are starting to actively seek their own markets and investment funds, and to develop partnerships with large industries and exporters. Interestingly, few of these initiatives have been prompted by or are linked to government, but have emerged from private and community interests in biodiversity products and markets. One example, spearheaded by a Zimbabwean NGO the Southern Alliance for Indigenous Resources, is a five-country initiative that aims to identify new opportunities in, and market, natural resource products from the Southern Africa region. Other groups are focusing on particular species, ecosystems and products – for example the Miombo Forum, formed to promote the marketing of natural woodland products. The Kijani Initiative is attempting to link biodiversity entrepreneurs in Eastern and Southern Africa with potential foreign investors, and with export markets in Europe, the United States and Japan, through the development of a venture capital fund for biodiversity businesses.

## Partnerships between private industry and local communities

Participants also presented a range of

### Box 1: Bamburi Cement Quarry and Nature Trail: private industry's investment in biodiversity restoration

The Bamburi Nature Trail is a private enterprise located in a former limestone quarry, used for cement manufacture, on Kenya's coast. It has restored this former quarry site by replanting trees and reintroducing plant and animal species. Today the area is used for eco-tourism, game farming, aquaculture and environmental education. Profits, and other funds raised, are retained in the Baobab Trust. As well as contributing to the environmental activities of the Nature Trail, funds from the Trust have also been used to finance other biodiversity conservation activities in Kenya, including marine turtle conservation, afforestation of drylands and mangrove rehabilitation.

*Bamburi Quarry and Nature Trail: private sector investment in biodiversity restoration, René Haller, Enlarging private industry's investment in biodiversity in Eastern Africa: experiences and needs in Kenya. Winfred Nelson*

### Box 2: Ways forward in the agro-industrial exploitation of cinnamon to strengthen rural livelihoods in Madagascar

The Landscape Development Intervention (Développement Agro-Ecologique Regional) seeks to combat poverty in rural areas and to protect unique natural resources in Madagascar. On the East Coast of Madagascar *Cinnamomum zeylanicum* grows spontaneously in natural forests, within *Ravinala* and *Goyava* trees. Unfortunately the quality of this cinnamon, and the status of the forest, is threatened by slash and burn agriculture and indiscriminate harvesting of young plants. One initiative, working with local farmers and with PHAEL FLOR, a Malagasy society which produces and commercialises extracts of aromatic and medicinal plants, is developing the commercial potential of cinnamon through tapping new products and new markets in essential oils from cinnamon. This sustainable exploitation and marketing of biological resources has had the effect not just of strengthening existing rural agro-based livelihoods, but has also taken pressure off natural resources by slowing the expansion of slash and burn agriculture into forest land.

*There is no development without conservation and no conservation without development: experiences of private industry's investment in cinnamon in Madagascar, Lucienne Tsilavirany, Harlyns Rabarison and Roland Rambotiana*



interesting examples of cases where demand for biodiversity products is leading to the successful integration of private and community interests in biodiversity investment and where private industry's investment is being used as a means of strengthening local livelihoods.

From the examples presented and discussed, it is clear that one way in which private industrial interests in biodiversity can, if properly managed, lead to significant gains at the community level is through the ability of larger commercial concerns to identify high-value products and applications, to access lucrative markets – especially international ones, and at the same time to link rural primary producers to these new opportunities.

While private industry's investment in biodiversity enterprise can provide important value-added within existing livelihood systems (see Box 2), it can also act as a means of diversifying or broadening local peoples' production base. Especially where existing activities are proving harmful to biodiversity – such as through the over-exploitation of resources, the use of damaging harvesting techniques or through ecosystem modification and clearance, these alternatives can also have positive effects in conservation terms. Private investment and enterprises can provide much-needed supplements to existing, frequently limited and often unsustainable, sources of local income and employment (see Box 3).

**Box 3: Generating new forms of rural income and employment through trade in butterflies from Arabuko Sokoke Forest, Kenya**

Arabuko Sokoke forest contains unique plant and animal biodiversity. It is also extremely threatened by clearance for settlement and agriculture. Rural communities living around the forest have few sources of cash income and employment, and have until recently viewed the forest protected area as a wasteful use of scarce land because it yields few tangible benefits to them. Since 1993, the Kipepeo project has been working to diversify local income and employment through the farming of forest butterflies by local residents, for live export to private collectors and traders in Europe and North America. Butterfly farming is particularly suitable as a community enterprise because it requires little investment, and uses simple and already-available equipment and materials. In the seven years since this trade opened up, it has generated earnings of over US\$ 200,000 — over four times the initial funds required to start up the project. Not only have local income and employment opportunities expanded accordingly, and diversified away from forest-damaging activities, but local perceptions of forest conservation have changed considerably.

*Harnessing butterfly biodiversity for improving livelihoods and forest conservation: the Kipepeo project, Ian Gordon and Washington Ayiamba*

## EXISTING CONSTRAINTS AND BARRIERS TO PRIVATE INVESTMENT IN BIODIVERSITY

Despite positive signs that private industry's investment in biodiversity is increasing and diversifying in Eastern and Southern Africa, workshop participants felt that still there remain major constraints. These constraints hinder the extent to which private industry sees biodiversity as a desirable or feasible investment option.

Biodiversity enterprises, products and markets still account for only a tiny proportion of total private investment – for example, in Kenya, it is estimated that biodiversity comprises less than 0.5% of total investments made by private industry. A major reason for this is that little effort has been made, either by governments or by donor conservation and development agencies, to attract private industry's investment to biodiversity or to see biodiversity enterprises as a potential source of economic growth for Eastern and Southern Africa.

One barrier to investment has been that, traditionally, the institutional arrangements under which biological diversity and ecosystems are managed for conservation, and the markets through which biodiversity products are bought and sold, have tended to be heavily controlled by government, or



monopolised by a small number of large commercial actors. While both conservation institutions and product markets have been liberalised throughout the region, there are still many distortions that act against biodiversity investment. Information on potential products and markets is scant, and little research has been carried out on product development. Transport, communications and infrastructure are all poor, especially in the parts of countries that contain high biodiversity. Investment and trade regimes remain restrictive, and many implicit subsidies still exist to other, non-biodiversity, sectors of the economy.

As long as these constraints exist, while there is little demonstration of the potential profitability of biodiversity markets and enterprises, and there are few positive financial or economic instruments in place with which to attract investment, private industry's involvement in biodiversity sustainable use is likely to stay low. While much effort has been made to promote other sectors of Eastern and Southern African economies for private investment, biodiversity has largely been ignored.

## INSTITUTIONAL ARRANGEMENTS AND REGULATORY FRAMEWORKS

Although harnessing private industry's investment can be an important means of strengthening and diversifying biodiversity funding, management and utilisation, and thus taking pressure off the public sector, this does not mean that the government has no part in such processes.

In particular, workshop discussions highlighted that government has a strong role to play in promoting private industry's investment in biodiversity through the use of legal and economic instruments, institutional and policy arrangements and regulatory frameworks. Many of the constraints to socially, commercially and environmentally sound investment in biodiversity either arise because of the nature of existing policies, laws and institutions, or could start to be dismantled if action was taken in these areas.

Three of the most important areas identified as

### Box 4: Private industry's investment in Southern Africa's biodiversity: international biotrade in Devil's Claw from Namibia

Devil's Claw (*Harpagophytum procumbens*) is a vine that is found in drier parts of Southern Africa, primarily in the Kalahari Sands of Namibia, Botswana, South Africa, Angola and to a lesser extent, Zambia and Zimbabwe. Its tubers contain substances that have important medicinal properties, and have long been in use as an analgesic and anti-inflammatory remedy by local people.

In recent decades, there has been growing international market demand for Devil's Claw, as a source of active medicinal ingredients for the production of different commercial phyto-medical drugs. Since 1962, when the first large-scale sales of dried Devil's Claw were made to Germany, Namibian exports have increased to around 600 metric tons per year. At this level and at current international prices, these are generating an estimated US\$ 1.5 million in foreign exchange export revenue. France, Germany, and South Africa have been the main importers in the past 3-4 years, but Spain, Switzerland and UK have also become important destinations.

Although only a very small proportion of earnings accrue at the local level, they provide an important source of income. Most of the Devil's Claw in Namibia is harvested in communal areas – an estimated 10,000-12,000 families depend on the local revenues from this biotrade. These families tend to be among the poorest of the poor, having few if any other livelihood options. Normally, these harvesters sell their products to middlemen (often at very low prices), and Devil's Claw then passes through several stages of the marketing chain before being exported.

In the recent years there have also been concerns that the levels and harvesting of Devil's claw is unsustainable. Harvesting problems and the concerns with associated biological resource degradation have elicited at least four responses from governments, NGOs and the private sector:

- a project aimed at facilitating sustainable harvesting (the 'Sustainably Harvested Devil's Claw' Project) carried out by an NGO;
  - private efforts to propagate and cultivate Devil's Claw commercially;
  - a proposal (originating from Germany) to include Devil's Claw in Appendix II of CITES (among plants and animals whose international trade is to be strictly regulated); and
  - the re-introduction by the Ministry of Environment and Tourism of an (interim) permit system for harvesting.
- International Trade in Devil's Claw from Namibia: A Review of Activities, Trends, Opportunities and Threats*, Hartmut Krugmann



requiring action by workshop participants were the need to set in place positive incentives to encourage biodiversity investment to occur in the first place, the need to discourage industries from degrading biodiversity, and the need to integrate social equity and development concerns into biodiversity investment.

Currently, while there are few inducements for private industry to invest in biodiversity, a wide range of economic instruments — such as tax holidays, soft loans, export promotion and the provision of targeted research and market information — are employed to encourage investment in other sectors of the economy. For example, while extremely favourable domestic and international investment conditions have contributed to Uganda's impressive national economic growth over the last decade, few financial or economic incentives have been provided to the biodiversity sector. It is hardly surprising that biodiversity has made such a small contribution to Uganda's recent investment boom. Unless they can be persuaded that it is profitable, there is no particular reason why private industry should invest in biodiversity. In the absence of positive incentives to do so, there is a danger that private industry will be unwilling to put funds into biodiversity conservation and sustainable use, or to see the value of participating in CBD processes.

The promotion of other investment sectors has sometimes acted to the detriment of biodiversity. Together with inadequate, or non-existent, controls on biodiversity degradation, a number of perverse incentives exist that encourage both biodiversity-impacting and biodiversity-using sectors to deplete, convert or otherwise degrade biological resources and ecosystems. For example, participants gave various examples from throughout the region of cases where not only has a history of heavy subsidies to agricultural, energy and industrial sectors served to decrease the relative profitability of biodiversity enterprise, but has also encouraged economic activities to take place in ways and at levels that harm biodiversity. If private industry's investment in biodiversity is to be encouraged, there is clearly a need to dismantle these perverse incentives and disincentives to conservation and sustainable use that exist in other sectors of the economy. As yet there is however little explicit consideration of biodiversity issues in national economic policy — only experience was presented, which described processes that had been set in place by central government to integrate environmental and biodiversity concerns into South Africa's macroeconomic policy framework.

A major concern, and a recurrent focus of discussion at the workshop, is the wide range of potentially negative impacts that private industry's investment in biodiversity can have on community livelihoods. Equity is a major concern both in the implementation of the CBD and in biodiversity investment. As private industry's investment in biodiversity increases, there is a real danger that it will be at the expense or detriment of, rather than of benefit to, the rural communities who live in areas of high biodiversity in Eastern and Southern Africa. For example, the entry of large commercial businesses into biodiversity investment can often act to crowd out local entrepreneurs and users, or to remove biodiversity products that are important in livelihood terms from local markets (see Box 5). Despite the presentation of several positive examples of mutually-beneficial

**Box 5: Effects of private forest industry on community livelihoods in Kenya**

Private industry is becoming increasingly involved in forestry sector activities in Kenya. In some cases this has had devastating effects on the livelihoods of forest-adjacent communities. For example, commercial logging in and around the Mau Forest has denied the Okiek, a forest-dwelling hunter-gatherer people, access to the biodiversity upon which they depend for their subsistence. Efforts have been made to quantify the costs of these losses, which may be in excess of US\$ 2,000 per household per year. Similar examples exist in other parts of the country — for example the denial of dry-season refuge to pastoralist households in arid and semi-arid northern Kenya, loss of important non-timber forest products and destruction of important ritual and cultural forest sites.

*The effect of private industry's investment in commercial forestry on local livelihoods, Thomas Opande and J. Manyala*



partnerships between private industry and local communities (see above, Boxes 2, 3 and 4), participants recognised that such cases are still relatively unusual. It is far more common for local communities to be involved in biodiversity enterprise only as primary harvesters and processors, often on exploitative terms, while the bulk of profit is received further down the processing or marketing chain.

Social equity considerations also extend to questions relating to the ownership of biodiversity, knowledge about

potential uses and applications, and the proper sharing of benefits arising from this. This has implications at both national and local levels. Although steps are currently being taken to overcome this problem in some countries, at least as it relates to national sovereignty (see Box 6), workshop discussions also highlighted the urgent need to take steps to protect national and local knowledge, ownership and benefits relating to biodiversity components, uses and applications, especially in the emerging sector of bioprospecting.

Motivated primarily by profit, private industry is not obliged to act in a socially responsible manner when investing in biodiversity, and have no particular reason to do so unless it yields clear gains to them. Again, supportive policy, legal and economic instruments set in place by governments can play an important role in ensuring that private industry's investment in biodiversity is socially sound, and occurs to the benefit of rural communities. It is these people who depend most on biodiversity, who have some degree of ownership and right to benefit from it, and who ultimately stand to lose most if they are excluded from the development of new enterprises and markets or are alienated from their production base.

## CONCLUSIONS AND RECOMMENDATIONS

The workshop provided a valuable opportunity for representatives from governments, NGOs and private sector companies to interact and to share experiences. It formed a first step in putting private industry firmly onto the CBD agenda. Private industry – including both small-scale local enterprises as well as larger-scale biodiversity-impacting and biodiversity-using industries – can help both in securing funding for biodiversity conservation and sustainable use, maximising its financial and economic benefits, and broadening the constituency involved in biodiversity management and decisions. It is however clear that there is much work remaining to be done if this potential is to be realised, and used to the benefit of Eastern and Southern Africa's biodiversity and people.

Participants highlighted a number of important conditions and areas for action that must be borne in mind, and which will determine the desirability or otherwise of private investment in conservation, development and equity terms. They recommended strongly that private investment in biodiversity should be encouraged to take place in such a way that, simultaneously, positive

### Box 6: Legislation to regulate private bioprospecting in Ethiopia and Uganda

Ethiopia contains a high level of commercially valuable biodiversity. In 1998 a law was established to regulate access to these genetic resources, aiming to address the problems associated with the low level of benefits accruing at national and local levels from their use and trade. Since the enactment of the law, more than 20 applications have been received for research and export permits. Two of these, made by foreign commercial institutions, were refused because they included no provision for benefit-sharing. A considerable amount of trade, including international trade, also exists in Ugandan plants that have medicinal, culinary and cosmetic value. Until recently no framework for the regulation of this trade, or for sharing its benefits, has been put in place. The National Environment Management Authority and National Council for Science and Technology have however recently initiated a process for the development of a legal and institutional framework for governing access to genetic resources for commercial, research, development and educational purposes.

*Ethiopia's experience in regulating biodiversity prospecting: the involvement of the private sector, Mesfin Bayou, The national framework for the development of biodiversity-based commercial enterprises in Uganda, Telly Eugene Muramira*

its



impacts on community livelihoods are ensured, commercial profits are maximised and biodiversity and conservation benefits are maintained. In turn, this requires that positive incentives and regulatory economic, legal and institutional frameworks are set in place, which promote commercially, economically, socially and ecologically sound private investment in biodiversity, and the disincentives and perverse incentives are overcome. It is such challenges that must be further addressed, through the workings of the CBD as well as through other local, national and international attempts to conserve biodiversity, to use its components sustainably and to distribute its benefits equitably.



## AGENDA

### MONDAY FEBRUARY 21

#### Session I: Setting the Scene – Key Issues and Themes

- 1100-1115 *Overview of the workshop theme: linking private industry to the implementation of the CBD in Eastern and Southern Africa* Lucy Emerton, IUCN EARO
- 1115-1135 *Harnessing private industry's investment in biodiversity: the global picture* Andrea Bagri, Economics Unit, IUCN HQ
- 1135-1205 *Views on the needs for private industry investment in Eastern and Southern Africa biodiversity* Workshop participants
- 1205-1235 Discussion: what are the key issues, themes and outputs of this workshop?

#### Session II: Experiences and Needs in the Region (Chair: Samuel Bonti-Akomah; Rapporteur: Andrea Bagri)

- 1400-1420 *Options for the development of a Southern African regional initiative to promote private investment in biodiversity* Gus le Breton, SAFIRE
- 1420-1440 *Harnessing private industry's investment in biodiversity: overview of experiences from Eastern Africa* Winfred Nelson, ACTS
- 1440-1500 *International biotrade in Devil's Claw from Namibia – a review of activities, trends, opportunities and threats* Hartmut Krugman, Southern Sustainable Development Corporation
- 1500-1530 Discussion: experiences and needs for private industry's investment in biodiversity

### TUESDAY FEBRUARY 22

#### Session III: Private industry's Investment in Biodiversity: Impacts on Community Livelihoods (Chair: Lovemore Simwanda; Rapporteur: Kaleb Mwendwa)

- 0900-0920 *Harnessing butterfly biodiversity for improving livelihoods and forest conservation: the Kipepeo project* Washington Ajiemba and Ian Gordon, National Museums of Kenya
- 0920-0940 *There is no development without conservation and no conservation without development: experiences of private industry's investment in cinnamon in Madagascar* Lucienne Tsilavirany, Ministry of Environment, Madagascar
- 0940-1000 *Impacts of private industry investment in commercial forestry on local livelihoods in Kenya* Thomas Opande, Kenya
- 1000-1030 Discussion: how can local communities' involvement and benefits from private biodiversity investment be maximised?

#### Session IV: Views from Private Industry (Chair: Karente Kyaratunge; Rapporteur: Jon Barnes)

- 1100-1120 *Biodiversity conservation in civil engineering works* Courtney Brooks, Gibb Eastern Africa
- 1120-1140 *Bamburi Quarry and Nature Trail: private sector investment in biodiversity restoration* René Haller, Baobab Farm
- 1140-1200 *European demand for biodiversity products from Eastern and Southern Africa* Till Stoll, Kijani Initiative/IFC
- 1200-1230 Discussion: how can governments and NGOs work better with private industry to manage biodiversity, what are the common needs and interests?

#### Session V: Institutional Arrangements and Regulatory Frameworks for Private industry's Investment in Biodiversity (Chair: Ransam Mariga; Rapporteur: Hezron Mogaka)

- 1400-1420 *Macroeconomic incentives and disincentives to private investment in biodiversity in Uganda* Eugene Muramira, National Environment Management Authority
- 1420-1440 *Ethiopia's experience in regulating biodiversity prospecting: the involvement of the private sector* Mesfin Bayou, Institute of Biodiversity Conservation and Research
- 1440-1500 *Integrating biodiversity into macroeconomic policy: experiences from South Africa* Esther Koch, Department of Environmental Affairs and Tourism
- 1500-1530 Discussion: what policy, institutional and legal arrangements are necessary to regulate and enhance the level and quality of private industry's investment in biodiversity?

#### Session VI: Ways Forward and Recommendations for Enhancing Private Industry's Investment in the Biodiversity of Eastern and Southern Africa (Chair: Esther Koch; Rapporteur: Winfred Nelson)

- 1600-1630 Summary of main issues arising in the workshop Session rapporteurs
- 1630-1700 Discussion of workshop issues and formation of breakout groups

### WEDNESDAY FEBRUARY 23

- 0900-1030 Breakout discussions on key issues arising from the workshop
- 1100-1230 Preparation of workshop recommendations and statement

# WORKSHOP 3: HANDLING OF AGRICULTURAL BIOTECHNOLOGY AND DISTRIBUTION OF ITS BENEFITS

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## ORGANISERS

Africa Centre for Technology Studies  
World Resources Institute

## SUPPORTED BY OBJECTIVES

Rockefeller Foundation

To stimulate and enlarge dialogue between the private biotechnology industry and policy-makers on ways and means of assessing and managing risks associated with the development and application of biotechnology in agriculture

## INTRODUCTION TO THE WORKSHOP: ISSUES AND AIMS

As the 21<sup>st</sup> century approaches, the goals of reducing poverty and hunger, while at the same time building social and political security, remain central to any form of development in Africa. It is clear that new technologies will play a significant role in the social, economic and political development of African countries in the new century. Biotechnology, which manipulates micro-organisms and tissues of higher organisms to supply agricultural goods and services, is one dimension of technological change which will drastically influence the state of agriculture worldwide. While industry actors in biotechnology have in the past concentrated on health and pharmaceuticals, there is a marked shift towards agricultural biotechnology. Further, it is clear that agricultural biotechnology



will assume prominence in international and national debates as states embark on implementing the provisions of the recently concluded Biosafety Protocol. From discussions at the workshop and considering the basis of the economies in many Eastern and Southern African countries, it is clear that agricultural biotechnology is very important for countries in this region.

Whereas biotechnology has made substantial progress in the agriculture of some developed countries, it has had little impact in most developing countries, and particularly in Sub-Sahara Africa. The potential value of agricultural biotechnology can be realised in increasing the productivity and adaptability of crops, diversifying agricultural crops, enhancing the nutritional value of foods, reducing environmental impacts of agricultural production and enhancing market competitiveness. Current agricultural biotechnology activities in the six countries represented in the workshop (Ethiopia, Kenya, South Africa, Tanzania, Uganda and Zimbabwe) have addressed these concerns in varying degrees. Most countries cite similar problems in their quest to develop biotechnology. These problems however, need not be bottlenecks. Indeed it was pointed out at the beginning of the workshop that it may be possible for some countries to engage in biotechnology activities without as much resources as others might need.



The workshop sought to bring together a group of main actors in agricultural biotechnology in Eastern and Southern Africa to reflect on key policy issues pertinent to this sector's development. Being a preparatory stage for carrying out national biotechnology systems' assessments, it also sought to have the group agree on key questions that should be asked in national assessments on biotechnology capability.

The overall objective of the workshop was to stimulate and enlarge dialogue between diverse actors in agricultural biotechnology development in Eastern and Southern Africa. It was hoped to ascertain at the end of the workshop whether there are national biotechnology innovation systems in the Eastern and Southern African countries covered; the level of such systems; the main emphasis or thrust of such systems; the main actors in the systems; the resources available for biotechnology development in the countries; and the products of existing biotechnology initiatives. The workshop also aimed to construct a conceptual framework for empirical research aimed at assessing and understanding national technological capabilities for biotechnology management.

### **PRELIMINARY ISSUES**

Discussions at the workshop commenced with two key presentations on how to undertake national biotechnology innovation systems' assessments and policy and institutional considerations in assessing such systems. By way of introduction, participants were informed about ACTS' project on agricultural biotechnology assessment in Sub-Sahara Africa, funded by the Rockefeller Foundation. This project covers six countries, namely Ethiopia, Kenya, South Africa, Tanzania, Uganda and Zimbabwe. The overall aim of the project is to situate Eastern and Southern Africa on the global terrain on management and safe application of biotechnology in agriculture.

The specific objectives of the project are firstly, to assess the extent to which these countries have exploited biotechnology to enlarge their agricultural production and sustainability over a ten-year period. Secondly, the project seeks to identify and analyse existing policy, institutional and legal barriers to the safe application of biotechnology in agriculture. Finally, the project seeks to develop and promote a coherent framework to guide national efforts in agricultural biotechnology risk assessment and management.

The intended outputs of the study include a handbook to guide agricultural biotechnology assessments to be prepared through a core of researchers (two per country) working with ACTS and workshops such as this one. On a more general level, the project should also result in an increased understanding of the agricultural biotechnology innovation processes in the countries under review.

The workshop was a preparatory step towards achieving the broad objectives of the project. In implementing the project, it is anticipated that ACTS will work with some of the participants at this workshop. It was therefore necessary on the general questions that should guide the national assessments.

### **NATIONAL EXPERIENCES IN AGRICULTURAL BIOTECHNOLOGY**

Presentations reviewing the status of agricultural biotechnology research and development in Eastern and Southern Africa were made at the workshop (see Boxes 1 and 2). These reviews provided the information on the nature of the activities taking place in the countries, the names of the actors, the products of the activities and the sources of funding. They also identified and discussed public-public and private-public partnerships for agricultural biotechnology development



in the region. Further, they outlined the policy framework for managing agricultural biotechnology research and development in the respective countries. The discussions assessed the adequacy of existing initiatives, pointed out gaps in those initiatives and identified policy, legal and institutional arrangements required for the safe development and application of biotechnology in agriculture in the region.

The striking feature from most of the presentations is the limited extent and the unevenness of technological capabilities in biotechnology. From the presentations, it is clear that while the countries represented at the workshop have biotechnology activities in place, they are at different levels of biotechnology research and development as the table below shows. The countries represented here fell into three categories. First, there are those countries that are taking the initial moves towards biotechnology development. Second, we have countries that are moving along the development path and are involved in advanced tissue culture activities. Finally, we have countries that are already experimenting with GMOs. In most of the countries, however, the activities in place can be characterised as low-technology or no-technology.

The range of institutions involved in biotechnology research and development is broad and includes both public bodies such as the National Agricultural Research Institutes and public Universities and private bodies. The activities that the institutions are involved in are diverse. The need for inter- and intra-institutional articulations among public institutions cannot be over-emphasised given the need to develop synergistic interactions between different activities to avoid duplication and waste of resources (material, financial and human).

**Box 1: National activities in biotechnology**

<b>Ethiopia</b>	Tissue culture research applied to tef; research on bio-fertilisers; micropropagation of forest trees; nitrogen fixation;  Livestock: Disease diagnosis and vaccine production
<b>Kenya</b>	Development of Bt. based biopesticides for crop pests integrated management (target pests are mainly maize and sorghum stem – borers, <i>Busseola fusca</i> and <i>Chilo partellus</i> ); genetic analysis of bean rhizobium in Kenya soils; development of rhizobia-based biofertilizer inoculants; development of monoclonal antibodies against thermostable proteins of hydatid fluid; tissue culture of citrus and banana for production of disease free seedlings; use of white rot fungus technology for waste (saw dust) management; tissue culture activities for supply of disease free planting materials for various plants including, sweet potatoes, Irish potatoes, ornamental flowers, banana, macadamia and pyrethrum; crop improvement through molecular marker research; molecular marker research technology is focussing on the development of Kenyan maize varieties resistant against stem-borer pests and drought tolerance; crop improvement through transformation of sweet potato feathery mottle virus; transformation and regeneration of a transgenic sweet potato that is resistant to feathery mottle virus; tissue culture activities for supply of disease free planting materials for various plants including, sweet potatoes, Irish potatoes, ornamental flowers, banana, macadamia and pyrethrum; tissue culture for rare flora species such orchids; artemia culture fish for food production and Oyster culture for selection of special breeds.  Animal Health: development of vaccines and disease diagnostic kits for rinderpest, Rift valley fever, capripox and Nairobi sheep disease; research on conservation of rare animal species through embryo transfer techniques
<b>Uganda</b>	Plant: Development of protocols for mass propagation of bananas, coffee, yams, pineapples through apical, nodal cuttings and regeneration from callus and cell suspension; sero-diagnosis of common bean mosaic virus for strain identification and banana breeding for host plant resistance, environmental tolerance and yield increase; characterisation of banana starch; research on vitamins and carotenoids in sweet potatoes; use of sweet potato analyses in starch quantification; use of microbial agents particularly bacteria in waste management; scaling up enzymes and secondary metabolites produced by bacteria through DNA methodologies to meet industrial needs; genetic improvement of robusta coffee and bananas; identification and isolation of viruses associated with cassava mosaic virus; molecular markers for banana, cassava and forest products; maize selection for resistance to stem-borer; study of rhizobial interaction in soil plant system; vegetative conservation of selected tree species; generation of rice yellow mottle virus resistant varieties.



<p><b>South Africa</b></p>	<p>Animal: Embryo transfers; bovine hormone research for growth and milk production; DNA mapping in animal breeding; growth promotants and animal nutrition; sero-monitoring of key animal diseases especially rinderpest.</p> <p>Plant: Genetic engineering of maize, developed <i>Maize Streak Virus</i> – resistant maize and grass, developing desiccation-tolerant crop species; genetic engineering of lupins (<i>Lupinus</i> SP) for resistance to anthracnose; genetic enhancement of pearl millet for downy mildew resistance; isolation of genes from finger millet; molecular markers for wheat breeding; molecular markers for pathogen diagnosis in sugarcane; genetically engineered sugarcane for the addition of desirable characters using biolistics; tobacco resistant to <i>cucumber mosaic</i> and <i>Tobacco necrosis</i> viruses; vegetables and ornamentals: potato; tomato; sweet potato; onion and ornamental flowers such as the indigenous ornamental <i>Ornithogalum</i> spp.; fruits: construction of vectors for genetic transformation of deciduous fruit crops; development of protocols for <i>in vitro</i> mass propagation of rare material of deciduous fruit crops; pathogen identification; DNA-fingerprinting to resolve cultivar identity; <i>in vitro</i> mass propagation of rare rootstocks; improvement of deciduous fruits for disease resistance and better shelf life; cloning genetic material for beneficial traits; development of successful transformation protocols for melon; PCR, DNA probes for detection of bacteria and fungi; efficient adventitious shoot regeneration of three apple, 3 pear 2 apricot; 1 strawberry varieties; transformation of and regeneration of transgenic plants from apricot, strawberry, pear, apples expressing the GUS marker gene; development of strawberry plants transgenic for herbicide or fungal resistances; identification of a molecular marker for apple scab resistance generation of unique DNA fingerprints for 17 pear, 15 plum, 13 peach and 16 wine grape cultivars; and forestry crops.</p> <p>Livestock: Development of lumpy skin disease virus as a recombinant veterinary vaccine vector; initiation of <i>Cowdria</i> genome sequencing project; preparation of viral-vectored and DNA vaccines for African horse sickness, Newcastle disease, bovine ephemeral fever and Rift Valley fever viruses.</p>
<p><b>Tanzania</b></p>	<p>Characterisation of Mycoplasma like Organisms (MLOs) associated with lethal yellowing type disease; Tissue culture and cryopreservation for coconut palm; In-vitro mass propagation of disease free plants from selected clones for exotic and indigenous crop varieties; Mass propagation of endangered medical plants through tissue culture; Rapid multiplication of disease free planting materials of banana and sweet potatoes through tissue culture; Developing disease specific DNA probes for use in diagnostic tests on oil palm; Construction of genetic maps using Randomly Amplified Polymerase - DNA techniques (RAPD); Characterisation of coffee germplasm using molecular techniques; Molecular markers for identification of virus resistance in sweet potato, with emphasis on virus disease complex</p>
<p><b>Zimbabwe</b></p>	<p>Genetic engineering of maize, sorghum and tobacco micropropagation of potato, cassava, tobacco, sweet potato, ornamental plants, coffee. Marker assisted selection; Tissue culture of crops, crop improvement through conventional breeding Silage fermentation, <i>Rhizobium</i> inoculant production; Food fermentation; sweet potato, tissue culture and micropropagation; Marker-assisted maize improvement; Energy production through fermentation; Biosafety issues; DNA finger printing. Tobacco transformation with disease resistant genes; screening for genetic markers and molecular characterisation; Plant tissue culture. Transgenic crop research; training of biotechnology researchers; <i>Rhizobium</i> inoculant technology research; Protein engineering; Enzyme and mushroom production; crop and livestock improvement through genetic and metabolic engineering; Genetic finger printing; Water bacteriology and soil fertility; Antibody production; production</p> <p>Livestock tissue culture; Attenuated and recombinant DNA vaccine production; molecular diagnosis; Artificial insemination and embryo transfer; Diagnosis and culture of animal pathogens; Vaccine production;</p> <p>Other biotechnology: Environmental biotechnology; Antibody production; Molecular diagnostics; Herbal drug development and Development of HIV – antisera.</p>

**Box 2: National actors in biotechnology**

<p><b>Ethiopia</b></p>	<p>Ethiopia Agricultural Research Organisation (EARO); Institute of Biodiversity Conservation and Research; National Soil service Project; National Artificial Insemination Centre; Forestry Research Center; National Veterinary Research Institute, Debre-Zeit; Animal Health Research Center, Sebata; Addis Ababa University; and Alemaya University of Agriculture.</p>
<p><b>Kenya</b></p>	<p>Public Universities including University of Nairobi and Jomo Kenyatta University of Agriculture and Technology; Kenya Agricultural Research Institute; Institute of Primate Research; National Museums of Kenya; Coffee Research Foundation; Tea Research Foundation; Kenya Forestry Research Institute; Kenya Marine and Fisheries Research Institute; International Research Institutes.</p>
<p><b>Uganda</b></p>	<p>Department of Animal Science, Makerere University; Department of Crop Science, Makerere University; Department of Food Science, Makerere University; Department of Biochemistry, Makerere University; Makerere</p>



	University Institute of Environment and Natural Resources; Kawanda Agricultural Research Institute; Livestock Research Institute; Namulonge Agricultural and Animal Production Research Institute; Forestry Research Institute; Serere Animal and Agricultural Research Institute
<b>South Africa</b>	Department of Microbiology (University of Cape Town); Forestry and Agricultural Biotechnology Institute (University of Pretoria); Institute for Wine Biotechnology (University of Stellenbosch); Institute for Plant Biotechnology; Agricultural Research Council -Infruitec (fruit biotechnology); Agricultural Research Council-Onderstepoort Veterinary Institute; Agricultural Research Council – Roodeplaat (vegetables and ornamental plants); South Africa Sugar Experiment Station (SASEX); Food Science and Technology Division of the Council for Scientific and Industrial Research (CSIR);
<b>Tanzania</b>	Tengeru Horticulture Research and Training Institute (Hortu-Tengeru); Michocheni Agricultural Research Institute, Dar es Salaam (MARI); Tanzania National Development Company, Arusha (TENADE); Applied Microbiology Unit (AMU) of the University of Dar es Salaam; Faculty of Agriculture, Sokoine University of Agriculture, Morogoro (SUA); animal Diseases Research Institute, Dar es Salaam (ADR); Kizimbani Agricultural Research Centre, Zanzibar.
<b>Zimbabwe</b>	Department of Research & Social Services (DR&SS) works on tissue culture, silage, <i>Rhizobium</i> , CVL works on tissue culture, vaccines, diagnostics. Biotechnology Research Institute on Tissue culture, fermentation, MAS and DNA finger printing. Tobacco Research Board works on Transformation, tissue culture DNA finger printing. The University of Zimbabwe (UZ) Genetic engineering, Rhizobium DNA fingerprinting AI & ET, diagnostics, vaccines, Enzymes technology, mushrooms Cultivation, Environmental biotechnology and capacity building. BRTI works on diagnostics and capacity building on biotechnology.

## Funding for Biotechnology Activities

Most biotechnology activities are funded by the government and by donor agencies. Given the range of activities that state budgets need to finance, the amount of resources available for biotechnology depends on its ranking in the national development priorities.

## Linkages between actors in Biotechnology

### Box 3: Linkages between actors in biotechnology: examples from Uganda and Zimbabwe

Country/Linkages	Public – Public	Public – Private	Public – Donor
Zimbabwe	DR&SS – AGRITEX DR&SS – UZ CVL – DR&SS DR&SS – BRI BRI – UZ	CVL – COPRO UZ/CVL – PIB DR&SS – SEEDS Co DR&SS – AU	CVL - USAID CVL – DGIS DR&SS – DGIS UZ – DGIS/SAREC/EU
Uganda	KARI – MUK/FAF  NAARI – MUK/FAF NAARI – KARI	KARI -	KARI – IITA, CIAT, CIRAD, IPGRI, FAO & ARC South Africa. NAARI – IITA, IPGRI, ROME, Sweden MUK/FAF – University of Gembloux, Belgium, Uppsala – Sweden, Norway (agricultural University), University of Alberta Canada.
KARI	Kawanda Agricultural research Institute		
SAARI	Serere Animal and Agricultural Research Institute		
MUK/FAF	Makerere University Kampala, Faculty of Agriculture and Forestry		
UZ	University of Zimbabwe		
DR&SS	Department of Research and Specialist Services		
CVL	Central Veterinary Laboratories		
AU	Africa University		
PIB	Pig Industry Board		
BRI	Biotechnology Research Institute		
EU	European Union		
AGRITEX	Agriculture Extension Services		
DGIS	Directorate General International Co-operation of the Netherlands'		



There are linkages between biotechnology actors in the countries reviewed and other bodies (see examples of Uganda and Zimbabwe in Box 3). The Kawanda Agricultural Research Institute, for instance, has linkages with the International Institute for Tropical Agriculture (IITA), International Centre for Tropical Agriculture and CIRAD in France. Similarly, Zimbabwean and Tanzanian biotechnology actors have linkages with a diversity of institutions. Some country reviews did not outline the linkages that are there between their biotechnology actors and others. The issue of linkages (their nature, objectives and impacts) is definitely one that should be addressed in the country assessments.

The linkages within the actors or institutions can be categorised as the links between public bodies, public - private and public - donor.

### **POLICY ENVIRONMENT FOR AGRICULTURAL BIOTECHNOLOGY**

The presentations indicated that for the most part, there are no explicit policies on agricultural biotechnology and that countries normally rely on implicit ones such as science and technology policies. Most countries represented at the workshop have no explicit laws and policies governing biotechnology research and development and rely on implicit policies. Only South Africa and Zimbabwe have explicit laws on biotechnology which is a recent phenomenon. Countries like Uganda and Kenya have draft biosafety regulatory frameworks but until these become laws, the use of implicit laws and policies such as the science and technology act and quarantine legislation will continue.

While the role of policies is important for some countries, we noted that some countries may not require policies for biotechnology development and could actually get along with no explicit policies in place. From the South African presentation, for instance, it was pointed that the developments in biotechnology had gone along with implicit policies and it would require time to assess the efficacy of the explicit policy versus implicit ones. Similarly, Zimbabwe which gazetted its Biosafety Legislation in January 2000, has been carrying out agricultural biotechnology activities under the Research Act (1998).

### **THE ROLE OF THE PRIVATE SECTOR: THE EXAMPLE OF AVENTIS CROP SCIENCE**

Most of the presentations intimated that the private sector has a role to play in the development of agricultural biotechnology acknowledging the fact that most of the cutting edge biotechnology innovations are in the private sector domain. The presentation on Aventis Crop Science provided the participants with an opportunity to learn about the work of a leading private sector actor in agricultural biotechnology. The research and development strengths of Aventis include functional genomics, state of the art approach to new chemical entities' discovery biotechnology and plant breeding. Aventis' biotechnology capability involves the transfer of agronomic and quality traits through genes. The main areas of biotechnology application by Aventis are crop management, food and human health, animal health and industrial intermediaries. Some of Aventis' achievements are the development of OXY gene, HBN-resistant tobacco, BXN cotton and gene tolerance for isoxazoles. Some commercial products that Aventis has generated are LibertyLink (glufosinate) in maize and canola, BXN (bromoxynil) in cotton, StarLink (Bt) in maize and SeedLink in canola, maize and vegetables.



To improve on and consolidate their biotechnology capability, Aventis has developed strategic alliances with other actors such as the National Agricultural Centre for Soyabean Research in Brazil for the development of tropical varieties with stacked herbicide and insect resistance. Another example of a strategic alliance forged by Aventis is one with Australia's CSIRO for the development of innovative technologies. Aventis also uses strategic alliances for seed distribution.

Aventis perceives its role in Africa to include involvement in policy implementation discussions to assist capacity building projects for regulatory and risk assessment, the identification of general agricultural development needs and match them to existing products, collaboration with local expertise to develop and commercialise locally adapted varieties and through local alliances, develop solutions to identified problems unique to Africa.

From the discussions that ensued, it was clear that there is need for collaboration between the public institutions involved in biotechnology with private ones. An example of collaboration between Monsanto and the Kenya Agricultural Research Institute on sweet potato research was cited as an example of such linkages. Moreover, while the general perception seems to be that the private sector is primarily concerned with maximising profit returns from their investment Monsanto's focus on smallholder development in Ethiopia was cited as an example of private sector interest convergence with local interests.

There is arguably need for the use of incentives to spur biotechnology research and development in countries. These could be in the form of secure and well-articulated property rights' systems. From the presentations, it was clear that some countries in the region have been able to access important technological information through their intellectual property rights offices.

## **CROSS-CUTTING ISSUES**

### **Intellectual Property Rights**

Intellectual property rights (IPRs) were identified as an issue affecting the development of biotechnology in some of the countries reviewed. IPRs have assumed great prominence with the trend towards greater proprietorisation of technology fuelled by the emergence of new, highly reproducible technologies. Strong IPR systems have, for instance, been a major feature in agricultural biotechnology development. While the idea behind granting intellectual property rights is to encourage disclosure of information without the originator of such information fearing that they will lose that information, IPRs can be a barrier to the development of local agricultural biotechnology capacity. This is especially the case where IPRs limit the access of local researchers to new technology or where the cost and rigours of patenting act as a hindrance to successful commercialisation of locally-developed technology which builds on proprietary techniques.

The cost of patenting was perceived as prohibitive for most local inventors in Eastern and Southern African countries. Participants noted that accessing patent information is not easy due to the currently existing method of recording it which is relatively low-technology. Though there are private patent databases to which one can subscribe, or patent law firms and consultants who can be commissioned to carry out searches, the use of these latter methods would necessarily entail incurring further costs.

While advertent to the limitations that IPRs can pose to agricultural biotechnology development, participants noted that the existence of IPR regimes can potentially contribute to biotechnology development. Indeed the existence of a strong IPR regime is a necessary prerequisite for private



sector engagement in agricultural biotechnology. Given that the majority of agricultural biotechnology patents are held by the private sector, access to information contained in the patents is predicated on the existence of a strong IPR system which provides protection for the property rights of the patent holders.

## **The Biosafety Protocol**

The workshop participants noted that the presentations made on the Cartagena/Biosafety Protocol were very important. The provisions of the Protocol, they pointed out, needed to be borne in mind as state parties prepare for the Fifth Session of the Conference of Parties to the Convention on Biological Diversity (COP5) scheduled for May 2000. The participants also noted that the implication of Articles 4 and 5 of the Protocol is that it deals primarily with agricultural biotechnology.

In accordance with its Article 36, the Protocol will be open for signature at the United Nations Environment Program (UNEP) Nairobi Kenya attending COP 5 meeting from 15 – 26 May and at the United Nations Headquarters in New York in June 2000. One of the presenters informed the participants that under the Protocol, governments will signal whether or not they are willing to accept imports of agricultural commodities that include living modified organisms (LMOs) by communicating their decisions to the world community via an Internet-based Biosafety Clearing House. In addition, shipments of these commodities that may contain LMOs are to be clearly labelled.

Participants acknowledged that the negotiations leading to the Protocol's adoption had been very contentious and pointed out that more work still needed to be done to resolve possible conflicts between the Protocol and the agreements concluded under the World Trade Organisation. The Participants also noted that upon signing the Protocol, most of the states represented would need to put in place legislation to domesticate the provisions of the Protocol.

## **CONCLUSIONS AND RECOMMENDATIONS**

During the workshop, representatives from different countries learnt from experiences in other countries, ways of dealing with some constraints to biotechnology research and development. For instance, the approach in South Africa where the government has put in place mechanisms for institutions to apply for funding to carry out biotechnology research which is product-driven, based on a cost-benefit analysis and multi-institutional.

Most biotechnology research in the region is still in the public domain. The main private sector actors in biotechnology are multinational corporations. There is clearly need for institutional articulation and collaboration between diverse actors which would imply public-public and public-private institutional articulation to ensure that there are synergistic interactions between diverse biotechnology actors. In these articulations, especially in the public-private linkages, a balance has to be struck between national needs to ensure to meet food needs and private enterprises' interests in establishing a market and making profits.

It is clear that countries need to organise themselves and mobilise their institutions to get into biotechnology activities in an informed manner. Two issues are extremely crucial in this regard. First, there is need to enlarge the scientific information base since biotechnology is science-intensive. Countries need to build up a critical minimum level of biotechnological competence particularly in areas that are relevant for their national development. This can be achieved through investment in



training of persons in the relevant areas and the commitment of resources to the development of infrastructure for biotechnology research. Lessons from South Africa indicate that investment in capacity building is imperative to the development of local biotechnology inventive capacity.

Secondly, countries in the Eastern and Southern African region need, in varying degrees, to put in place policies and institutions necessary for developing and harnessing biotechnology relevant to their national development. A sound biotechnology policy has to aim at maximising the benefits from the technology while ensuring that the risks associated with the technology are minimal. The policy making process should be participatory and should include all stakeholders. Informed participation of all stakeholders in biotechnology policy formulation is predicated on better understanding of such stakeholders of the nature of the issues at stake. The public must be made aware of the benefits and potential risks of biotechnology. Currently, most awareness campaigns have focused on the risks associated with biotechnology with not enough emphasis laid on the benefits. The role of actors in biotechnology research and development in informing the public on key biotechnology issues cannot be overemphasised here. The example of the African Biotechnology Stakeholders' Forum (ABSF) from Kenya was seen as a very useful means of catalysing dialogue between diverse biotechnology actors which other countries could emulate.

Since countries are at different stages of biotechnology development, it is necessary to identify the conditions that have favoured successful developments in countries that are in advanced stages of biotechnology development and how they dealt with general constraints that are discernible in other countries. For those countries that have minimum biotechnology capacity, it is important to identify the structural and institutional constraints to biotechnology development.

Participants at the workshop felt that it was necessary to identify ways of linking modern biotechnology with existing indigenous knowledge to ensure that countries are not reinventing the wheel at each point. Further, they felt that account should be taken of the diversity of potential end-users of biotechnology and the variety of their needs to ensure that overall biotechnology development impacts on the national development of the countries concerned. In developing biotechnology in developing countries and Africa in particular, it is imperative, for instance to consider the needs of small farmers. The example of multinational companies' interest in smallholder agriculture was given as illustrative of the fact biotechnology development in Africa must have this crucial sector in mind. In addition to consideration of end users, it is also important to consider suitable transfer and delivery methods of the biotechnology (products and processes) for the diversity of end users. The perception that biotechnology is far removed from small-scale resource poor farmers because they cannot afford to buy products of biotechnology such as seeds was decried. The experiences in countries such as Kenya and Zimbabwe indicate that most farmers plant hybrid seeds.

Finally, participants felt that there was need to rally the support of parliamentarians in lobbying for changes in policy for biotechnology development. The success of such an initiative in the United States of America was cited.

A follow-up programme was agreed by workshop, namely the assessment of national biotechnology innovation systems in the Eastern and Southern African. To initiate the national assessments' process, case studies will be commissioned in the six countries represented in the workshop.



## AGENDA

### **MONDAY FEBRUARY 21**

#### Session I: Overview of Relevant Issues (Chair: Prof. Jennifer Thomson)

- 1100-1130 *Introductory Remarks* Dr Patricia Kameri-Mbote, ACTS  
1130-1215 *Capabilities for Biotechnology Management in Africa: Policy and Institutional Considerations* Dr John Mugabe, ACTS  
1215-1245 Discussion  
1400-1600 Breakout discussion on emerging issues

### **TUESDAY FEBRUARY 22**

#### Session II: National Experiences and Needs for Agricultural Biotechnology Development in Southern Africa (Chair: Dr. Patricia Kameri-Mbote)

- 0830-0915 *Agricultural Biotechnology in South Africa: Status of R&D Activities and Policies* Prof. Jennifer Thomson and Ms Rosemary Wolson, University of Cape Town  
0915-0945 Discussion  
0945-1030 *Agricultural Biotechnology in Zimbabwe: Status of R&D Activities and Policies* Dr. Idah Sithole-Niang, University of Zimbabwe and Mr. Julius Mugwagwa, Biotechnology Trust of Zimbabwe  
1100-1130 Discussion

#### Session III: National Experiences and Needs for Agricultural Biotechnology Development in Eastern Africa (Chair: Dr Idah Sithole-Niang)

- 1130-1215 *Agricultural Biotechnology in Uganda: Status of R&D Activities and Policies* Keizire Boaz Blackie and Paul Asimwe, ACTS  
1215-1245 Discussion  
1400-1445 *Agricultural Biotechnology in Ethiopia: Status of R&D Activities and Policies* Dr. Tilahun Zeweldu, Ethiopia Agricultural Research Organisation  
1445-1515 Discussion  
1515-1600 *Agricultural Biotechnology in Tanzania: Status of R&D Activities and Policies* Dr John Kasonta, Commission on Science and Technology  
1630-1700 Discussion

### **WEDNESDAY FEBRUARY 23**

- 0830-0915 *Agricultural Biotechnology in Kenya: Status of R&D Activities and Policies* Prof. James Ochanda, University of Nairobi, and Dr Grace Thitai, National Council for Science and Technology  
0915-0945 Discussion

#### Session IV: The Role of Private Actors in Agricultural Biotechnology Development (Chair: Prof. James Ochanda)

- 0945-1030 *The Role of Aventis Crop Science in Agricultural Biotechnology Development for Africa* Mike Strano, Aventis  
1100-1130 Discussion

#### Session V: Overview of Emerging Issues (Chair: Dr John Mugabe and Dr Patricia Kameri-Mbote)

- 1130-1230 Breakout discussion and framing questions for national biotechnology innovation systems' assessment

# WORKSHOP 4:

## NATIONAL EXPERIENCES AND NEEDS IN DEVELOPING BIODIVERSITY STRATEGIES AND ACTION PLANS

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ORGANISERS	Africa Centre for Technology Studies United Nations Environment Programme
SUPPORTED BY	UNEP-GEF Biodiversity Planning Support Programme
OBJECTIVES	To provide an opportunity for governments to openly review progress made in implementing the Convention on Biological Diversity

### INTRODUCTION TO THE WORKSHOP: ISSUES AND AIMS

Most countries in Eastern Africa have ratified the Convention on Biological Diversity. Thus they have incurred obligations under Article 6(a) of the Convention to develop or adapt existing national strategies, plans or programmes to promote the conservation of biological diversity and sustainable use of its components. They are also expected under Article 6(b) of the Convention to integrate as far as possible and as appropriate measures pertaining to the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectional plans, programmes and policies.

In response to the requirements of Article 6 of the Convention, countries of the Eastern Africa sub-region are engaged in the formulation of national biodiversity strategies and action plans. Some have already generated draft strategies and action plan documents while others have just started the process.

The preparation of the national biodiversity strategies and plans and programmes has proved a daunting and challenging task for these countries. The task involves multifaceted issues, including financial, technological, organisational, and information needs, as well as political will and support, not all of which have been readily available. Further challenges are presented by transboundary natural resources, such as lakes, coastal waters and migrating species of wild animals, which require special mechanisms for management.

It is against this background that an Eastern Africa sub-regional workshop on national experiences and needs in developing biodiversity strategies and action plans in six countries from Eastern Africa (Ethiopia, Kenya, Mauritius, Sudan, Tanzania and Uganda) was organised to:

- ✍ Promote intra-regional exchange of experiences, knowledge, information and expertise in developing national biodiversity strategies and action plans;
- ✍ Assist countries to review the content and identify gaps in draft national biodiversity strategies and action plans;
- ✍ Assist countries to identify innovative ways and means of implementing National Biodiversity Strategies and Action Plans;
- ✍ Contribute to generation and promotion of guidelines on how to implement Article 6(b) of the Convention; and
- ✍ Expose national planning teams to computer-based tools for acquiring and managing information necessary to develop and implement strategies and action plans on biodiversity.



The effective, rich and fruitful discussions during the workshop were facilitated by a background paper prepared by ACTS, as well as by additional material submitted at the workshop, along with presentations made by many other experts. Presentations by policy makers and experts from national focal points for biodiversity planning served to augment the papers and give greater insight into NBSAP processes. Views were exchanged freely on problems encountered and solutions developed, as well as on the best way to handle future challenges.

The workshop generated recommendations on how to improve national biodiversity planning in the sub-region. Further it identified ideas on issues relating to Article 6(b) of the Convention. This report sums up the proceedings of the workshop. It does not necessarily represent the views of ACTS or UNEP, the organisers of the workshop.

## OVERVIEW ISSUES

This session, in addition to introducing participants to the purpose of the workshop, reviewed some of the major concerns in the preparation of national biodiversity strategies and action plans. It put the requirements of Article 6 of the CBD in context and reviewed sub-regional NBSAP preparation processes. Also, it explored information needs and management systems for biodiversity planning.

From the outset, the difficulties of the task confronting the participants in the workshop were recognised; controversial and diverse multifaceted issues to be discussed within a very limited time. The need to focus on the theme and identify manageable problems was thus stressed if the apparent commitment to the goals of the workshop were to be translated into realistic proposals. It was clear right from the start that there were many common needs as well as country-specific ones. Meeting these needs, it was agreed, should form the basis for the discussion and proposals.

The scope of obligations conferred on parties by Article 6 of the CBD was thoroughly discussed. The aim was to establish some benchmarks against which country initiatives and experiences could be assessed. Principally, the article enjoins states to develop or adapt national strategies, plans or programmes for the conservation and sustainable use of biodiversity. The obligation created, then, is one of national planning--to prepare a blueprint on how the CBD will be implemented. But nothing in the CBD stops a state from preparing a series of sub-national and sectoral (e.g., one on plants, animals etc.) strategies and subsequently adopting these at national level so that together they cover the whole of the national territory.

An important point about the preparation of the strategies emphasised at workshop was participation; the preparation should be as participatory a process as possible. It is a complex and multi-faceted task, involving many sectors of government, as well as actions of the private sector and individuals. Community leaders, representatives of industry and trade unions all have much to contribute both to the process and to the quality of the result. This is aimed at building the political and social consensus needed to bring greater legitimacy to the process as well as its product(s).

It was pointed out that since biodiversity is both pervasive and dynamic by nature, there is no absolute point when a state could consider that it has fully satisfied the requirements of Article 6. The process is non-linear and cumulative, and does not necessarily have to be predetermined, as this would destroy the basis for flexibility that may be needed to respond to new challenges and demands. In other words, preparation of strategies is a cyclical and adaptive process, which enables countries to continually judge their biota and capacity, have an evolving set of priorities and set out



actions to respond to new opportunities, and prepare evolving reports to the CBD and governments of their findings.

The need for creating specific collaborative mechanisms was emphasised during the discussion. In particular, participants sought to know the exact nature, progress and fate of the Clearing House Mechanism. Many of the countries represented at the workshop had neither access nor experience with this mechanism. It was clear that this matter could not be discussed fully as many of the issues surrounding the mechanism were not yet resolved. Participants thought COP 5 would help clarify these issues.

The need for governments to set the context for the preparation of strategies was highlighted. Governments need to provide the appropriate legal and institutional framework as well as financial and political support, for example, by providing for funding in the national budget and making the adoption of the strategies a national/cabinet issue. But the donors need to continue to play their role in funding, paying particular attention to each government's needs.

The issue of financial resources attracted the attention of several participants and was considered a key aspect in the preparation of national strategies and action plans. Current funding was found to be too rigid for the demands of the task.

Finally, the need to have a more participatory mode for managing the preparation of NBSAPs was emphasised. At the moment there is inadequate collaboration between the implementing agencies and the national focal points. Many of the proposals on the way ahead are packaged by the implementing agencies, with very little if any government participation. Sometimes discontent with decisions of the implementing agencies is very apparent, but the agencies do not give due consideration to national appeals. Thus there is need for flexibility and realistic compromises at all levels.

## **NATIONAL EXPERIENCES AND NEEDS**

*This session focused on case-by case scenarios in Eastern African countries. Countries shared their experiences freely. Many problems were of a common nature, but there were many country-specific ones too. Participants showed a great desire to find solutions to these problems.*

Based on country presentations, the workshop identified four major categories of countries in the preparation of NBSAPs: those that have just begun the process (e.g., Ethiopia); those that are well into the process (e.g., Uganda); those that are on the verge of completing the process (e.g., Tanzania and Kenya); and those that have completed their first NBSAPs (e.g., Seychelles). Countries that are just beginning the process and those that are still in the process were encouraged to use the available guidelines for NBSAPs preparation and to learn from those that have completed the process. Noting that NBSAPs do not end with the preparation of a document, the workshop emphasised that even countries that have completed the process and those that are at advanced stages have as much opportunity to use the guidelines.

It was noted that most NBSAPs in the region over-emphasise conservation and downplay sustainable use of components of biodiversity. This, it was agreed, is a big limitation in approach. Since the CBD treats conservation and sustainable use as two sides of the same coin, both of them should be given due emphasis.



Article 6(b) was considered at length. The requirement for integration still presents formidable challenges to many countries of the region, partly due to rigid traditional policy and institutional frameworks, and partly due to technological handicaps. Policy formulation in the region is still predominantly sectoral and management institutions still see themselves as only responsible for the mandate with which they are charged. Also most agencies lack the requisite blend of interdisciplinary personnel to deal with the complex socio-economic issues that integration demands. Thus there is need for capacity building, flexibility and greater institutional collaboration (inter-agency) in the preparation of NBSAPs.

Entwined with the question of integration is the need to consider NBSAPs in the broader context of a country's sustainable development. So far the process has been seen predominantly as an independent requirement that has little to contribute to the socio-economic development of the states concerned. It is considered a duty rather than a necessity. This is to miss the point, for it is only until countries appreciate that NBSAPs is a parallel process to sustainable development that the process will be given the attention it deserves.

The workshop also considered the issue of participation. Being a new approach to policy-making and implementation, involving all stakeholders in the NBSAPs initiative is great challenge. Although communities and NGOs enthusiastically participate politicians and the private sector have not played a sufficiently active part in the process, it was said. The challenge is to find ways and means of changing this trend.

Much deliberation focused on funding. Participants expressed concern that donors especially the implementing agencies have so far been very rigid and mean with funds and unrealistic in their time frames. In some cases (Tanzania, for example, rejected funding from the World Bank when the Bank offered to give funds far less than the budget; the Norwegian Government came to Tanzania's aid with a more reasonable grant) this has compromised the quality of products and led to frustration. The workshop called on donors to be more flexible and realistic in their demands. Countries were encouraged to seek alternative funding from other sources and to stop over-banking on implementing agencies.

Still with regard to funding, strong sentiments were expressed that the management of NBSAPs preparation was still in search of a more coherent framework, particularly in relation to the role of the implementing agencies. The undue influence of the agencies in the process constrains national initiatives and innovations in the process. Moreover, it fails to recognise the uniqueness of each country in respect of its preparation of NBSAPs.

## **INFORMATION NEEDS, TOOLS AND TECHNICAL SUPPORT**

*This session considered in detail the requirements for the preparation of NBSAPs, including a diverse array of mechanisms, some already established and in need of improvement, others of a more innovative nature. It was characterised by considerable enthusiasm and a desire to pursue practical possibilities. However, despite consensus on many of the issues discussed, genuine differences of emphasis remained on several issues, as well as on the most appropriate means to tackle the problems. It was felt that the novelty and complexity of many of the emerging issues preclude simple solutions, and required openness towards all possible options as well as an implied willingness to reappraise continuously the effectiveness of existing practices and initiatives. It was further recognised that the governments of the sub-region faced daunting challenges in all areas of information, tools and capacity.*

Article 6(b) of the CBD requires countries to integrate the conservation of biodiversity into sectoral and cross-sectoral plans, policies and programmes. Although it was agreed that "integration" is not



an absolute term, the workshop was clear on the requirement of this provision: that strategies on sectors such as forestry, fishing, and so on should be integrated with other national policies such as economic development, mining transportation, and energy, among others. Effective integration, it was pointed out, requires comprehensive institutional framework and effective communication between the different socio-economic sectors, as well as effective policy tools that would lead economic actors to incorporate environmental factors into determinants of their economic decision-making.

Despite apparent desire by countries to ensure substantive involvement in NBSAP preparation, integration was found to present a major challenge to the countries of the region. Little, if any, success has been achieved so far. This is due to many major constraints such as: lack of biodiversity knowledge and awareness outside the biodiversity constituency; institutional arrangements which do not encourage biodiversity or other environmental concerns to be taken into consideration by decision-makers; lack of methodologies or guidelines for incorporating biodiversity into sectors in ways that are meaningful to planners; and unwillingness to grapple with the politically-sensitive undertones of biodiversity conservation.

Accordingly, the integral place of information in biodiversity management was reiterated several times. The workshop pointed out that with appropriate review, modification and application, the experiences of individual states in a particular situation could be invaluable to finding particular solutions to similar problems in other countries. Knowledge and experiences about environmental problems and their solutions are unequally and poorly distributed around the region. It was agreed that management and exchange of biodiversity information among the countries of the region was poor. The need for the countries to engage actively in new initiatives such as the Clearing House Mechanism and greater use of media information exchange such as newsletters, publications, conferences and on-line electronic data communications at the national level was emphasised.

Acknowledging that sound information management is a complex and technology-dependent exercise, the workshop underscored the need for a central co-ordinating body at the national level, in addition to individual institutions that are the sources of the biodiversity information. Such a body should have access to, and knowledge about, information held throughout the national network, but will generally leave control of information to the individual custodian institutions. While the network model of a national management information strategy relies on a diversity of specialised institutions, the effectiveness of the network as a whole depends on the quality of its components. Careful and honest consideration of institutional capacity is therefore a key to any successful national information management effort. There is a clear need for a regional biodiversity information network which will facilitate access to all levels of information and will combine information in each discipline, furthering the understanding of the biodiversity of all living systems. Such a system will identify and seek to fill gaps, leading to new research and more informed policy decisions throughout the region.

The workshop further underscored the role of traditional and indigenous knowledge in the management of biodiversity. The management of this knowledge may require particularly careful thought because of the nature of the information and the sensitivities involved in its collection. But on the whole, local people have as much to learn from modern science as scientists have as much to learn from modern societies. So far the lines of communication have not been opened in either direction. The integration of local skills and knowledge with specialised technical and scientific inputs represents a most challenging and potentially rewarding aspects of a locally based biodiversity conservation and development strategy.



Finally, the workshop emphasised the need for institutional and human resources capacity building as priority actions for effective NBSAP preparation. Training is required in all areas that impinge on the process, including EIA, information management, reporting, monitoring and evaluation, etc.

## CONCLUSIONS AND RECOMMENDATIONS

The workshop recognised that development of the BSAP is a cyclical and adaptive process that should be based on provisions of the Convention on Biological Diversity. It will require:

- /// More flexible, adequate and creative financing
- /// Continued collaboration and co-ordination between institutions (including government, NGOs, the private sector etc.) at local, national, regional and global levels
- /// Clearer definition of roles and responsibilities between the lead institution and other stakeholders
- /// Continued efforts to decentralise BSAP preparation and implementation
- /// The sharing of knowledge, information and experiences between/among institutions and countries
- /// Adequate time be given to achieve major activities in the planning and implementation process
- /// Capacity building of institutions that are engaged in the BSAP process
- /// Capacity building to address emerging issues
- /// Greater use of economic tools for the conservation, sustainable use and equitable sharing of benefits of biodiversity
- /// Further investment in collection, analysis, synthesis and dissemination of relevant information – by electronic and non-electronic means
- /// Regional processes and cross border ecosystem issues of relevance to biodiversity be included in NBSAPs
- /// Integrating biodiversity planning principles, products and processes into broader sectoral and cross- sectoral planning activities at national and where appropriate sub national levels
- /// Require greater political commitment at both national and sub national levels

In addition to the above considerations there is a need to apply these principles to the process of implementing the strategies and action plans. However, implementation of NBSAPs will also need to be guided by principles governing monitoring, evaluation and reporting.

To enable countries to implement Article 6(b) of the Convention on Biological Diversity, there is a need for the Conference of Parties to adopt a decision that will require the Global Environment Facility and other financial mechanisms to address and support the integration of biodiversity considerations into sectoral and cross-sectoral processes, plans, programmes and policies as part of its portfolio of enabling activities.



## AGENDA

### TUESDAY FEBRUARY 22

#### Session I: Official Opening and Overview Issues

- 0930-0940 *Welcome remarks* John Mugabe, Executive Director, ACTS  
0940-1005 *Official Statement from UNEP-GEF* David Duthie, UNEP-GEF Division  
1005-1025 *Official Statement from Representative of the Government of Kenya* Mr B. K'Omudho, NES  
1100-1130 *A Review of National Biodiversity Strategies and Action Plans* John Mugabe and Mita Manek, ACTS  
1130-1200 Discussion  
1200-1230 *Clearing House Mechanism (CHM) and its Role in National Biodiversity Planning* Demonstration of Computer-Based Tools by ELCI

#### Session II: National Experiences and Needs

- 1400-1500 *National Experiences and Needs in Biodiversity Planning* Ethiopia, Mauritius and Sudan  
1530-1600 Discussion  
1615-1715 *National Experiences and Needs in Biodiversity Planning* Kenya, Tanzania and Uganda  
1715-1745 Discussion

### WEDNESDAY FEBRUARY 23

#### Session III: Information Needs, Tools and Technical Support

- 0830-0900 *Integrating Biodiversity into Sectoral Policies, Programmes and Processes* Manab Chakraborty, UNEP  
0900-0930 *Information Needs and Management Systems for Biodiversity Planning* Barbara Gemmill, ELCI  
0930-0950 *IUCN's Technical Support to National Biodiversity Planning in Eastern Africa* Abdulrahman Issa, IUCN  
0950-1030 Discussion  
1030-1050 *Transboundary Considerations in National Biodiversity Planning in East Africa* Alan Rodgers, UNDP  
1050-1110 Discussion  
1130-1300 *Country Experiences and Needs in Integrating Biodiversity Considerations into Sectoral Policies, Plans and Programmes* Ethiopia, Mauritius, Sudan

## **SPECIAL SESSIONS**

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### **BIODIVERSITY CONSERVATION IN PRODUCTION FORESTS**

The GEF embarked early last year on the sustainable use policy initiative, with a focus initially on forest ecosystems. The objective of this initiative is to expand GEF's portfolio in the context of sustainable use of biological resources in ways that do not undermine biodiversity. In the light of the major challenges posed by the multiplicity of users, stakeholders and options for harvest of products and related technologies, coupled with scientific uncertainty about the impact of these users and uses on forest ecosystem integrity, the special session addressed the extent to which there is scope for biodiversity conservation under these conditions, and what the potential role of GEF is.

During the session, led by Kanta Kumari of the GEF Secretariat, particular reference was made to an issues paper on biodiversity conservation in production forests, produced by CIFOR for the GEF. This paper concluded that there is definite scope for biodiversity in production forests, and that it is not technical obstacles, but rather institutional capacity and enabling environment constraints that inhibit this. Discussion focused on the scope for biodiversity conservation in managed forests in Eastern and Southern Africa, identifying key elements that are critical to enhancing prospects for biodiversity conservation in managed forests and making suggestions on alternative approaches that should be considered by the GEF.

### **GEF-NGO PARTNERSHIPS FOR BIODIVERSITY CONSERVATION**

This special session, organised by GEF, discussed experiences to date and ways forward for the future for GEF-NGO partnerships in biodiversity conservation in Eastern and Southern Africa. Hemanta Mishra of the GEF Secretariat and Sheila Aggarwal-Khan of UNEP-GEF presented an overview of the GEF, its mandate and operational structure. The session proceeded to look at key elements of the GEF-NGO alliance, including participation and consultation, involvement in policy dialogues and outreach activities.

Discussion on ways forward for GEF-NGO partnerships in the region was chaired by Edward Alitsi of ELCI. Using practical examples of existing GEF-NGO alliances in Eastern and Southern Africa, discussion focused on the procedures, mechanisms and activities under which GEF and NGOs can work together to better conserve biodiversity.

### **THE CYBERKIOSK**

During the Forum, a Cyberkiosk was organised and run by ELCI and the East Africa Internet Association (EAIA). Its aim was to introduce participants to the use of internet technologies in their professional activities, and to provide guidance on mobilising and using electronic information on biodiversity.

Led by Suzanne Drouilh of the EAIA and assisted by AfricaOnline, a major internet service provider in Africa, a wide variety of interactive training sessions were held during the course of the Forum, including those dealing with accessing and using the internet, new technologies, electronic networks and individual electronic information management. Open internet access was also provided to Forum participants through the Cyberkiosk.

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