

Progress in the Implementation of Sustainable Development Commitments in Africa



Forests, Biodiversity, Biotechnology, Mountains and Tourism A Compendium



United Nations
Economic Commission for Africa



Convention on
Biological Diversity

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E-mail: ecainfo@uneca.org
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Acronyms and Abbreviations

AATF	African Agricultural Technology Foundation
ABNE	African Biosafety Network of Expertise
AHI	African Highlands Initiative
AU	African Union
BIO-EARN	East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development
BIP	Biodiversity Indicators Partnership
Bt	Bacillus thuringiensis
CBFM	Community-Based Forest Management
COMESA	Common Market for Eastern and Southern Africa
CSD	Commission on Sustainable Development
DNA	Deoxyribonucleic acid
EAC	East African Community
ECA	United Nations Economic Commission for Africa
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
FLEGT	Forest Law Enforcement, Governance and Trade
GBO	Global Biodiversity Outlook
GDP	Gross domestic product
GEF	Global Environment Facility
GIZ	German Development Corporation
GHG	Greenhouse gas
GM	Genetically modified
GMO	Genetically modified organism
GTI	Global Taxonomy Initiative
HIV/AIDS	Human immunodeficiency virus/acquired immunodeficiency syndrome
IAS	Invasive alien species
ICT	Information and communications technology
IGAD	Intergovernmental Authority on Development

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IPRs	Intellectual property rights
ISAAA	International Service for the Acquisition of Agri-biotech Applications
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IYM	International Year of Mountains
JPOI	Johannesburg Plan of Implementation
LMO	Living modified organism
MDGs	Millennium Development Goals
MEA	Multilateral environmental agreement
NBF	National Biosafety Framework
NBSAP	National Biodiversity Strategy and Action Plan
NEPAD	New Partnership for Africa's Development
NFP	National Forestry Programme
NGO	Non-governmental organization
NLBI	Non-legally binding instrument
NWFP	Non-wood forest product
ODA	Official development assistance
PES	Payment for ecosystem services
PFIA21	Programme of Action for Further Implementation of Agenda 21
PRSPs	Poverty Reduction Strategy Papers
R&D	Research and development
REC	Regional Economic Community
REDD+	Reducing emissions from deforestation and forest degradation in developing countries
SADC	Southern African Development Community
SFM	Sustainable forest management
SMD	Sustainable mountain development
SMFE	Small and medium forest enterprises
TEEB	The Economics of Ecosystems and Biodiversity
TFCA	Transfrontier Conservation Area
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFF	United Nations Forum on Forests
UNWTO	United Nations World Tourism Organization
USAID	United States Agency for International Development
VPA	Voluntary Partnership Agreement
WABNet	West African Biosciences Network
WEHAB	Water and Sanitation, Energy, Health, Agriculture and Biodiversity
WEMA	Water Efficient Maize for Africa
WWF	World Wide Fund for Nature
WSSD	World Summit on Sustainable Development

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1. Introduction

1.1 Background

The United Nations Conference on Environment and Development (UNCED), which was held in Rio de Janeiro, Brazil, in 1992 and which is also known as the Earth Summit, was a landmark event for the sustainable development agenda. It highlighted international commitment to providing public and political support for addressing environment and development issues in a holistic and integrated manner.

UNCED adopted Agenda 21 (A21), an agenda for action for the United Nations, other multilateral organizations and individual Governments around the world, aimed at promoting the achievement of sustainable development through the integration of environment and development issues. A21 reflected global consensus and political commitment at the highest level on development and environment cooperation. A major theme of the Agenda was the need to eradicate poverty by giving poor people more access to the resources they need to live sustainably. It addressed fundamental issues for sustainable development in four main areas: social and economic dimension; conservation and management of resources for development; strengthening the role of major groups; and the means of implementation.

Moreover, UNCED recognized that regional and subregional cooperation was important for implementation of the Conference outcomes. In this regard, the Regional Commissions of the United Nations and other regional institutions were called upon to promote the integration of environmental concerns in regional and subregional development policies. Regional bodies were also requested to improve regional and subregional consultation to facilitate exchange of data, information and experience in the implementation of A21.

In 1997, the United Nations General Assembly held a special session to appraise the status of implementation of A21 (Rio +5). The five-year review found that little progress had been made in implementing the Agenda, noting that the desired momentum for accelerated implementation and a political declaration affirming renewed commitment were not generated. The General Assembly adopted a new resolution entitled Programme for the Further Implementation of Agenda 21 (PFIA21) that promised further action towards sustainable development and recommended areas of efforts needed for the enhanced implementation of A21.

The World Summit on Sustainable Development (WSSD) was convened in Johannesburg, South Africa, in 2002, with the goal of conducting a further 10-year review of the implementation of the outcomes of UNCED, in particular A21, and reinvigorating global commitment

to sustainable development. The **Johannesburg Plan of Implementation** (JPOI), agreed at WSSD, reaffirmed commitment to “full implementation” of A21, alongside achievement of the Millennium Development Goals (MDGs) and other international agreements. It contained targets and timetables to engender actions on a wide range of issues, most of which converged with and reinforced the MDGs. The partnership commitments on Water and Sanitation, Energy, Health, Agriculture and Biodiversity (WEHAB) and the Ecosystem Management initiative numbered over 200 at the time of the Summit, including major initiatives by development partners.

WSSD strengthened the UNCED mandate given to the United Nations regional commissions, calling on the commissions in collaboration with other regional actors to facilitate and promote balanced integration of the economic, social and environmental dimensions of sustainable development into their work, and into the work of regional, subregional and other bodies. Further, it was indicated that this could be done by facilitating and strengthening the exchange of experiences including national experiences, best practices, case studies and partnership experiences related to the implementation of A21.

In this regard, WSSD called on the United Nations regional commissions, in collaboration with other institutions and bodies, to organize regional and subregional reviews with a view to taking stock of the implementation of A21, PFIA21 and JPOI. Furthermore, the 2003 General Assembly Resolution 58/218 called upon the regional commissions, the specialized agencies and other organizations to take action to ensure the effective implementation of and follow-up to the commitments, programmes and time-bound targets adopted at the Summit.

In the light of the above, ECA, in collaboration with sister United Nations agencies, has since 2005 been preparing regional review reports on progress towards the implementation of the commitments contained in A21, PFIA21 and JPOI, focusing on specific thematic issues aligned with those contained in the Multi-Year Programme of Work of the United Nations Commission on Sustainable Development (CSD). The reports serve as background documents for the Africa Regional Implementation Meetings (Africa-RIMs), which are also organized by ECA in collaboration with United Nations agencies and regional organizations. The outcomes

of RIMs feed into the respective review and policy sessions of CSD.

At the United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20, held in Brazil from 20 to 22 June 2012, Heads of State and Government and high-level representatives reaffirmed their commitment to fully implement, among others the Rio Declaration on Environment and Development, A21, the PFIA21, the JPOI and the Johannesburg Declaration on Sustainable Development of the WSSD. In this connection, they agreed to raise the level of commitment to move the sustainable development agenda forward, emphasizing the need to step up efforts in implementing previous commitments.

This recent declaration by Heads of State and Government, and other stakeholders, underlined and reinforced the need to keep track of the progress made in implementing commitments on the different thematic areas. Such an assessment provides an opportunity to identify implementation challenges and constraints, and to propose effective policy and other measures necessary to accelerate implementation.

1.2 Purpose and outline of the report

The present Compendium is intended to raise awareness, generate commitment and catalyse action by the different stakeholders to accelerate the implementation of the various sustainable development commitments on forests, biodiversity, biotechnology, mountains and tourism in Africa. It provides an overview of the progress in the implementation of commitments related to those thematic issues. The Compendium derives from the Africa Review Reports on Forests, Biodiversity, Biotechnology, Mountains and Tourism prepared by ECA and its partners to assess progress in the implementation of A21, PFIA21 and WSSD, corresponding to the CSD-20 thematic cluster of issues. The lead agencies are: Food and Agriculture Organization of the United Nations (FAO) – forests; Convention on Biological Diversity Secretariat – biodiversity; UNEP – mountains and tourism; and ECA – biotechnology. The same thematic cluster of issues was addressed in the Fourth Issue of the Sustainable Development Report on Africa (SDRA-IV), which was prepared in collaboration with the same partners.

The reports were discussed at an Ad Hoc Expert Group Meeting held in Addis Ababa in November 2012. The meeting was organized by ECA in collaboration with UNEP, FAO and the Convention on Biological Diversity Secretariat. The overall objective was to enable participants to provide input and comments to validate and enrich the thematic regional review reports. The meeting was attended by 33 experts and practitioners from member States, the regional economic communities, United Nations bodies and other organizations in the fields of forestry, biodiversity, biotechnology, mountains and tourism. The experts provided input and comments that helped in finalizing the reports.

Each report summarizes the relevant international commitments, and concrete actions and progress made towards the implementation of the five themes. It identifies challenges and constraints, and proposes the way forward to accelerate progress in implementation. Taking account of the inherent and complex interlinkages that exist between the themes of the report, as well as across the economic, social and environmental dimensions, the concluding section identifies synergies and trade-offs, and presents options for strengthening an integrated approach to the sustainable management of forests, biodiversity, biotechnology, tourism and mountains for sustainable growth and poverty reduction.

2. Forests

Key messages

Forest and wood resources provide multiple goods and services that underpin the livelihood of millions of people and national economies in many countries in the region. Forest and wood resources provide up to 80 per cent of energy in some countries. They contribute an average of up to 6 per cent of gross domestic product (GDP) in sub-Saharan Africa and are central to effectively responding to climate change challenges.

A21 and the non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests, adopted by UNCED and reaffirmed by PFIA21 and JPOI, provided important frameworks and a strong foundation for sustainable forest management (SFM). Important areas of implementation success by African countries include: strengthening political commitment, developing and implementing National Forest Programmes (NFPs), gazetted forest protected areas for biodiversity conservation, and promoting community-based forest management (CBFM) towards SFM.

Enhanced policy-level appreciation of the contribution of forests to overall national development and the integration of forestry into national development frameworks are primary prerequisites and entry points for strengthening commitment and effective actions, including financing for the sustainable development and management of all types of forests in the region. Therefore, it is essential to carry out valuations, and document the forest sector's actual and potential contributions to poverty reduction and overall national economic development. NFPs should be effectively incorporated into national development plans. Moreover, supportive policies should be developed and incentives provided to catalyse the development of small and medium forest enterprises (SMFEs), which are already making a major contribution job creation within the forest sector.

Forest governance, law enforcement and multi-stakeholder participation in forest management should be strengthened in order to tackle deforestation and forest degradation, promote investment and access and share the benefits of SFM. To that end, African countries should, inter alia, support the implementation and enforcement of policy and legal reforms arising out of the national forest programme processes. CBFM should be strengthened through developing and enforcing policies and regulations relating to collaborative forests and securing community-access rights to productive land, forests and other resources. At the same time, Governments should promote policies that will foster increased and long-term private-sector investment in the sustainable development and management of all types of forests, including public, private and community forests.

Countries need to acquire and promote the application of scientific knowledge and appropriate technology for SFM. Enhanced funding allocation to support forestry education and training at both formal and non-formal levels is crucial. Forestry research should be prioritized in national development planning and therefore funding provided to the sector to generate and meet the needs for adequate and timely scientific information, up-to-date data and information and technologies to support SFM.

Climate change and climate change adaptation and mitigation have profound implications for achieving SFM in Africa. African countries therefore need to be fully engaged and contribute to shaping climate change-related forest mechanisms that are favourable to and will enable Africa to attain its sustainable development aspirations. Among such mechanisms are reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+). In this connection, support is needed to enhance technical competence and achieve conformity of national institutions, policies and legislation with the requirements under these mechanisms.

International cooperation and partnerships for SFM in the region should be strengthened. Countries should be supported to harmonize forest-related policies and plans and strengthen regional and subregional cooperation for SFM. Moreover implementation of international forest-related frameworks and agreements such as the Convention on Biological Diversity, United Nations Convention to Combat Desertification, United Nations Framework Convention on Climate Change and the non-legally binding instrument (NLBI) should promote the required coordination and cooperation in SFM.

2.1 International forest-related commitments

Africa has 674 million hectares of forests, which is about 17 per cent of the world's forest area, and supports nearly one billion people or 14 per cent of the world population. These forests are largely concentrated in the tropical zones of Western and Central Africa (49 per cent), and Eastern and Southern Africa (40 per cent). With more than 133 million hectares of forest, the Democratic Republic of the Congo alone has more than 25 per cent of the region's forest cover, while Northern Africa has little more than 9 per cent, principally along the coast of the western Mediterranean countries. In terms of population distribution, the most densely populated countries are the least forested and vice versa. Up to 98.8 per cent of Africa's forests are natural forests, with only eight million hectares of plantations, of which 42 per cent are industrial. Only 10 per cent of total wood removals in Africa in recent years were used as industrial roundwood, with the rest used for fuel.

Africa is well endowed with a variety and an abundance of biodiversity, and its forests play important roles socially, economically and ecologically. Most national forest policies recognize the vital role of all types of forests in protecting fragile ecosystems, watersheds and freshwater resources, and often set up mechanisms for protection of sensitive sites such as hill sanctuaries, riparian buffer zones and gallery forests and the establishment of barrier forests, shelterbelts and windbreaks to protect soil, water and ecological functions.

The region contributed 21 per cent of the global total of carbon in forest biomass, with Central Africa containing the largest amount; only 3 per cent of the region's forest area was designated primarily for protection of soil and water, compared with 8 per cent at the global level. On average, forest resources accounted for 6 per cent of GDP in Africa, by far the highest share in the world. These forests have also played an important role

in the livelihoods of many communities and in the economic development of many countries in the region.

However, the ability of forests to provide benefits, goods and ecological services for the survival of humankind depends to a great extent on the maintenance of the richness of their biodiversity. This in turn depends on the rate of depletion of primary forests and conservation efforts to maintain forest biodiversity. High rates of deforestation, increasing land degradation, wildfires and poor management practices pose a great threat to the ability of Africa's forests and rich biodiversity to contribute to the continent's sustainable development. Climate change and rapid population growth make the situation even worse, as they work against any efforts Africa makes towards poverty reduction and economic growth.

In order to promote and achieve SFM, a number of key forest-related commitments were adopted in A21, PFIA21 and JPOI of the World Summit on Sustainable Development. Box 1 contains a summary of some of these commitments.

2.2 Concrete actions taken, progress made and achievements

The major actions taken and progress made by African countries in implementation of the forest-related sustainable development commitments embedded in the A21, PFIA21, the JPOI and other international agreements, are highlighted below.

Box 1: main commitments on forests contained in A21, PFIA21 and JPOI

- a. Enhance political commitment to achieving SFM by endorsing it as a priority on the international political agenda, taking full account of the linkages between the forest sector and other sectors through integrated approaches.
- b. Implement the expanded action-oriented work programme of the Convention on Biological Diversity on all types of forest biological diversity.
- c. Maintain existing forests through conservation and management, and sustain and expand areas under forest and tree cover, in appropriate areas of both developed and developing countries, through the conservation of natural forests, protection, forest rehabilitation, regeneration, afforestation, reforestation and tree planting, with a view to maintaining or restoring the ecological balance and expanding the contribution of forests to human needs and welfare.
- d. Prepare and implement, as appropriate, national forestry action programmes or plans for the management, conservation and sustainable development of forests.
- e. Strengthen forest-related national institutions to enhance the scope and effectiveness of activities related to the management, conservation and sustainable development of forests, and to effectively ensure the sustainable utilization and production of forests' goods and services in both developed and developing countries. This should include promoting the participation of the private sector, labour unions, rural cooperatives, local communities, indigenous people, youth, women, user groups and non-governmental organizations (NGOs) in forest-related activities, and access to information and training programmes within the national context.
- f. Strengthen and improve human, technical and professional skills, as well as expertise and capabilities to effectively formulate and implement policies, plans, programmes, research and projects on management, conservation and sustainable development of all types of forests and forest-based resources, and forest lands inclusive, as well as other areas from which forest benefits can be derived.
- g. Maintain and increase the ecological, biological, climatic, socio-cultural and economic contributions of forest resources, including to: promote more efficient and sustainable use of forests and trees for fuel and energy supplies; and promote more comprehensive use and economic contributions of forest areas by incorporating ecotourism into forest management and planning.
- h. Support the United Nations Forum on Forests (UNFF) as the key intergovernmental mechanisms to facilitate and coordinate the implementation of SFM at the national, regional and global levels, thus contributing, inter alia, to the conservation and sustainable use of forest biodiversity.
- i. Enhance international cooperation to implement the Intergovernmental Panel's proposals for action directed towards the management, conservation and sustainable development of all types of forests, including provision for financial resources, capacity-building, research and the transfer of technology.
- j. Facilitate and support the effective implementation of the non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests, adopted by UNCED; and on the basis of the implementation of these principles, to consider the need for and the feasibility of all kinds of appropriate internationally agreed arrangements to promote international cooperation on forest management, conservation and sustainable development of all types of forests, including afforestation, reforestation and rehabilitation.
- k. Review, monitor and report on progress in the management, conservation and sustainable development of all types of forests.
- l. Strengthen or establish systems for the assessment and systematic observations of forests and forest lands with a view to assessing the impacts of programmes, projects and activities on the quality and extent of forest resources, land available for afforestation, and land tenure; and to integrate the systems in a continuing process of research and in-depth analysis, while ensuring necessary modifications and improvements for planning and decision-making.
- m. Provide economists, planners, decision makers and local communities with sound and adequate updated information on forests and forest land resources.

2.2.1 Enhancing political commitment to sustainable forest management

Political commitment is a demonstration of the highest level of interest and is crucial for the promotion of any development cause. With regard to SFM, the continent as a whole has demonstrated enhanced commitments through the following:

- a) Participation in important international dialogues on forests, such as the UNFF;
- b) Signing and ratifying forest-related multilateral agreements such as the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification;
- c) Creation of regional bodies and programmes that address environment and forest-related matters. These include: the African Ministerial Conference on the Environment, whose objective is to strengthen cooperation between African Governments on economic, technical and scientific activities in order to halt the degradation of the region's environment, and satisfy the food and energy needs of the region's people; and the New Partnership for Africa's Development (NEPAD), which has a substantive set of actions on forests and the environment. Furthermore, African countries have established the TerrAfrica Platform – supported by FAO and the World Bank – which aims to promote and boost sustainable land management through cross-sectoral approaches.

Political commitment has also been demonstrated at subregional level. This is particularly so in Central Africa which hosts the Congo basin, the second largest contiguous track of tropical rain forests in the world. This is the only subregion with a formal well-articulated and resourced forum of ministers in charge of forests. In West Africa, the Economic Community of West African States (ECOWAS) has shown commitment by undertaking the harmonization of the forest policies of its member States in collaboration with FAO. Other subregions have also taken thematic actions such as Southern Africa on tourism.

2.2.2 Developing criteria and indicators and promoting forest certification for sustainable development

Criteria and indicators constitute an important instrument for monitoring, evaluating and reporting on the implementation of SFM. By identifying the elements of SFM such as policy and institutional development, the instrument provides a means of assessing progress.

In 1992, the International Tropical Timber Organization (ITTO) developed the very first set of seven SFM criteria and indicators for tropical rain forests. Since then, many ITTO producer member countries, including those in Africa, have used the ITTO set of criteria and indicators to develop their own sets. They use them to monitor, assess and report on forest management at national level and to fulfil international reporting obligations.

Through criteria and indicator activities, changes towards good policies and field practices in forest management are taking place in the African producer member countries of ITTO. For example, ITTO states that overall “forest policies in the tropics are evolving in line with ITTO policy development work and that forest management is improving with the area of forest under SFM, increasing from almost zero in 1988 to 36 million hectares in 2005 and 53 million hectares in 2010” (Blaser, and others, 2011). The Organization also reports a considerable increase in both the number of its member countries submitting data and improvement of the quality of the data submitted.

Certification, which is gradually becoming an important market tool, is based on criteria and indicators. This has facilitated ITTO member countries (especially in Central and West Africa) to achieve certification of their timber products. Indeed criteria and indicator training and field-testing showed that a major motivator for the commitment of a number of countries to criteria and indicators was the desire to eventually seek certification of their timber products (Blaser, and others, 2011).

Changes in policy and institutional arrangements are also taking place in dry-zones of Africa as a result of identifying the criteria (essential elements of forest management) against which the sustainability of dryland zones could be assessed and measured; and monitoring the related indicators in order to review and adapt for-

est objectives and policies. In most of these dry-zones, participatory forest management options have been adopted as SFM for multiple objectives, which best reflect the traditional use of the forest resources, with emphasis on what matters most (fuelwood, fodder, grazing, agro-forestry, and non-timber forest products) to relevant non-state stakeholder groups.

Moreover, a number of guidelines have been prepared under the coordination of FAO to support countries on SFM, including “Guidelines for sustainable forest management in drylands of sub-Saharan Africa” (FAO, 2010) and “Guidelines for Institutionalizing and Implementing Community-Based Forest Management in sub-Saharan Africa” (FAO, 2012).

2.2.3 Developing national forest programmes

The term “national forest programme” (NFP) is a generic expression for a wide range of approaches towards forest policy formulation, planning and implementation at the subnational and national levels. It is an outcome of the international forest policy debate, and is a commonly agreed framework for SFM that is applicable to all types of forests.

All African countries have a national forest programme process, the results of which bear different names from one country to the other. In some countries, it is called the Forestry Master Plan while in others it is referred to as the Forestry Development Plan. This is a well developed activity in the continent, as witnessed by the great success of the NFP Facility partnerships in Africa since 2002. Out of the 70 NFP Facility partnerships worldwide, 35 are with African countries, with a catalytic support in mitigating constraints to the smooth development of the NFP processes in these countries. West Africa has the largest number, as all its 15 countries are NFP Facility partners.

2.2.4 Pursuing economic growth in a sustainable manner

African countries have been pursuing general economic growth in order to reduce poverty, improve the livelihoods of the populations, and ease pressure on the environment in general, particularly forest resources. Progress in this area has been unbalanced. Some subregions have made significant progress in socioeconomic indicators such as the GDP, and growth and labour pro-

ductivity, while others have been lagging behind. Poverty, deforestation and environmental degradation are strongly linked – therefore, efforts to reduce pressure on the environment in general and forests in particular must be encouraged by forest stakeholders as a way to help themselves.

2.2.5 Improving forest law compliance, governance and trade

The World Bank estimated that in 2006, Governments around the world lost over US\$10 billion in revenue due to illegal trade in timber and timber products, and that illegal logging represented up to 90 per cent of total production in some countries. For the same year, the World Wide Fund for Nature (WWF) estimated that approximately 19 per cent of timber entering the European Union market was from illegal sources. Africa was no exception to this general trend. For example, the World Bank estimated that in 2006 illegal logging represented up to 70 per cent of the total log production in Gabon and Ghana.

Increasingly, African countries have been forging partnerships with the European Union Forest Law Enforcement, Governance and Trade (FLEGT), an initiative which supports countries in the fight against illegal logging. This initiative has been very well received in Africa. Of the 31 countries supported by the Africa-Caribbean-Pacific Forest Law Enforcement, Governance and Trade (ACP-FLEGT) Support Programme, 22 are African; while 73 out of the 88 projects of the Programme (83 per cent) are implemented in Africa. These projects contribute to eliminating illegal forestry activities in the partner countries through Voluntary Partnership Agreements (VPAs).

2.2.6 Implementing the non-legally binding instrument for all types of forests

African countries have recently shown interest in implementing the NLBI for all types of forests in an attempt to improve forest governance and sustainable management of the forest sectors in Africa. The NLBI, also known as the “Forest Instrument”, is perhaps the newest of the major outcomes of the global debate on forests agreed during the seventh session of the UNFF in 2007. UNFF-7 adopted this instrument as a common framework to promote SFM. It seeks to promote po-

Box 2: Implementation of non-legally binding instruments in Ghana

The Ghana Forestry Commission sought and obtained assistance from FAO to adopt and implement the NLBI through a project entitled “Moving forward in the implementation of the Non-Legally Binding Instrument on All Types of Forests in Ghana”. Funding for the project was provided by the German Federal Ministry for Economic Corporation and Development. FAO and the German Development Corporation (GIZ) provided technical assistance.

Ghana has successfully demonstrated the usefulness of the NLBI as an effective tool for forest-sector assessment that can be used by other countries to assess their performance in the implementation of their national forestry policies and programmes. Following the successful implementation of the Instrument in Ghana and the presentation of the achievements at the eighth session of the UNFF in New York, Liberia had received funding to implement the Instrument as well. Nigeria also expressed willingness to implement it and is seeking assistance (both technical and financial) to do so.

litical commitment and actions at all levels to enhance SFM and contribute to the improvement of the economic, social, and environmental values of all types of forests for the benefit of both current and future generations.

2.2.7 Developing community-based forest management as a policy instrument for sustainable forest management

CBFM in Africa is recognized as an important tool for biodiversity conservation, poverty reduction, sustainable livelihoods development, and conflict prevention. With regard to participatory forest management in Africa, Wily (2002) reported that action to involve local communities in the management of forests was well underway in more than 30 African countries, largely through more than 100 projects involving around 5,000 communities and affecting more than 100 national forests, and over 1,000 new protected areas or community forests. “Most of these developments have – or quickly acquire – policy and legal support through National Forestry Policies, National Forest Management Plans and particularly new forestry legislations” (Wily, 2002).

According to Wily (2002), as the region’s socio-political climate is rapidly changing, with African states adopting more and more devolved and inclusive ways of managing society and its resources, trends towards decentralization of actions involving local communities in the management of forests have also emerged in Mozambique, South Africa and Zimbabwe, and are increasingly taking place in Cameroon, the Gambia, and elsewhere in the continent. This provides greater opportunities for landscape restoration, livelihoods improve-

ment, and biodiversity conservation through locally controlled management.

Indeed, over the last two decades, many African countries have been undertaking policy and legislative reforms to ensure the devolution of authority and responsibility to local communities. The African Forestry and Wildlife Commission (AFWC) in its recent sessions underscored the increasing desire at African level to see more community empowerment in forest resources management (FAO-AFWC, 2008 and 2010). Experience in most of the countries has demonstrated that for policy and legislative reforms to be successful, they need to be backed up by supportive extension services, changes in attitude among all stakeholders, and improved capacity of local community institutions to effectively implement CBFM practices (FAO, 2012).

2.2.8 Promoting non-wood forest products for sustainable forest management

In the search for sustainable development in the forest sector, African countries are increasingly engaged in promoting the production and extraction of non-wood forest products (NWFPs) as a point of convergence between conservation and rural development priorities. Clark (2001) defines NWFPs as materials derived from forests, excluding timber. They include bark, roots, tubers, corms, leaves, flowers, seeds, fruits, sap, resins, honey, fungi and animal products; and are collected from a wide range of ecotypes, including high forest, farm fallow, otherwise disturbed forest and farmland.

NWFPs are used for food and medicine and form the majority of forest-dwelling people’s use of the forest. They are often the only means for forest dwellers to enter the cash economy. Their production is usually less destructive than timber harvesting and offers good

opportunities for improving livelihoods as NWFPs are generally easily accessible to the rural poor, and relatively little capital investment is required for their collection, processing and marketing. From the drylands of East Africa to the humid tropical forests of Central and West Africa, efforts to promote NWFPs for sustainable development have been on the increase (although eco-region-specific) as each region focuses on the NWFP opportunities available in its ecological endowment.

Knowledge and use of the NWFP sector has been built in Central and humid West Africa. These include the use of *Irvingia gabonensis*, the fruit of which is similar to a mango and is used for food; *Gnetum africanum*, a leafy vine that grows across the Congo Basin in forest openings, secondary forests and fallow farmlands, and is well-appreciated as a food item; and *Pausinystalia johimbe* (yohimbe), native tree of the coastal forests of Central Africa, with a range extending from south-east Nigeria to Gabon and possibly to the Democratic Republic of the Congo. Its bark has long been used in traditional health care and cultural systems for its aphrodisiac properties, and is now traded internationally in North America and Europe. The total value of yohimbe bark exports from Cameroon was \$600,000 in 1998 and has been growing each year (Clark and Sunderland, 2004). Farmers in the Sudan and pastoralist communities in Kenya have also increased their income from sustainably producing gum Arabic.

2.2.9 Promoting biodiversity conservation through forest protected areas

FAO (2011) indicated that about 14 per cent of the total forest area in Africa was designated for conservation of biological diversity, and that most of the countries in Africa showed an increase or no change in forest areas devoted to conservation since 1990. Between 1990 and 2010, conservation efforts were more important in terms of volume in West Africa followed by North Africa and Southern Africa. However, in Central and East Africa, steady increase was dominant.

The progression is more pronounced in five countries, namely the Central Africa Republic, the Democratic Republic of the Congo, Gabon, Madagascar and the Sudan. Indeed Central Africa is extremely rich in natural resources which are of great importance at local, national and global levels. Locally, the rich biodiversity of plant and animal species in this subregion are an es-

sential source of food, materials and shelter for over 20 million people. The forests also have important cultural values as they play an important role in many forest societies' belief systems. Nationally, the subregion's extremely rich timber and non-timber forest products are important for their economic and safety net values.

2.2.10 Supporting the development of small- and medium-size forest enterprises

Information on the contribution of African SMFEs to the economies is limited at best. This is largely due to their close connection with the informal economy. Nevertheless, SMFEs have the potential not only to provide jobs and improve the livelihoods of the poor, but also to take advantage of the forward and backward linkages with the other sectors of the economy. Examples of successful SMFEs exist throughout Africa.

In the Gambia, a sample studied in 2005 was spread among 26 villages with 72 community-based enterprises which had 484 interest group members. These harvested 11 forest products including fuelwood, timber, honey, netto, palm oil, tree-nursery and kembo posts. They were also involved in handicrafts, rhun palm splits, and engaged in ecotourism and forest walks.

In Liberia, SMFEs created by informal pit-sawyers provided jobs for a growing number of ex-combatants and were a major contributor to the peace and security of the country. The pit-sawyers work with pre-existing sawyer unions, and pay fees and taxes to communities and the Government through agreed-upon formal and informal arrangements regulated by the forestry department.

In Cameroon, by the end of 2008, forest communities had 25-year legal leases under the community forest policy, which enabled them to lumber and commercialize wood products. One of these communities (the Gbopaba community) reported, over its first five years of operation, lumbering and commercializing about 1,280 m³ of commercially valuable hard wood for a total receipt of 34 million CFA francs¹ (\$80,189), 64 per cent of which were directly invested in local social infrastructure, roofing materials, house and church construction, water supply maintenance, training, health, and student school fees for the benefit of the local community.

1 French Communauté financière africaine (African Financial Community).

In Botswana, Kenya, Lesotho, Malawi, South Africa, Swaziland and Zimbabwe, small-scale forest products enterprises are numerous and are important contributors to employment. They provide the much needed incentives for the sustainable management and conservation of forests and forest resources.

2.3 Implementation challenges and constraints

African countries are faced with serious challenges and constraints in implementing the above actions towards the achievement of sustainable management of forests and thus increase the contribution of forests to the sustainable development of their economies. These constraints, which are discussed below, include climate change, limited and unpredictable resources for SFM, inadequate governance, collaboration and participation in forest management, inadequate data, scientific knowledge and technology transfer, and population pressure and rapid urbanization.

Climate change

Climate change has a major impact on forests, since the distribution of the different tree species and ecosystems depends greatly on prevailing climatic conditions. Mangroves, island and relic forests, Afromontane forests, dryland and high tropical forests are all at risk of degradation and death from either lack of water or too much water resulting from climatic extremes. Among the projected impacts of climate change on forests are reduced forest diversity (tree species richness; genetic diversity), and reduction in forest density and resilience which will alter the environment and livelihood services of forests, thereby undermining livelihood security (Fisher, and others, 2010).

While climate change can negatively impact SFM, deforestation and forest degradation make a significant contribution to greenhouse gas (GHG) emissions. On a global scale, deforestation contributes between 15 and 17 per cent of GHG emissions, which is more than the entire transport sector (FAO/ITTO, 2009). The REDD+ mechanism, developed under the United Nations Framework Convention on Climate Change, presents an opportunity for financing SFM to contribute to

the forest-based carbon sequestration and storage. The REDD+ in particular has the potential to lead to significant co-benefits through rehabilitation of degraded forest lands and soils, increasing productivity of agricultural landscapes, and expanding capacity of restoring natural habitats through afforestation and agroforestry (Blom, and others, 2010).

Beyond their key role in climate change mitigation of land-based emissions, forests can also play an important role in adaptation to climate change. Selection, improvement and development of species adapted to the different anticipated climatic scenarios will ensure the continuity of social, economic and ecosystem services, and thus the protection of livelihoods. Forests in Africa, especially in Central Africa, offer an opportunity to benefit from the current financing mechanisms in place or under development through the United Nations Framework Convention on Climate Change.

Limited and unpredictable resources for sustainable forest management

SFM is constrained by a lack of adequate, predictable and sustainable financing. Government budget allocations in Africa are not adequate to enable forest agencies to fulfil their mandates. Many countries currently take an ad hoc approach to financing, using a small number of mechanisms such as bilateral and multilateral loans, grants, and subsidies that often cover only a few activities. Compared with other productive sectors such as agriculture, benefits of SFM often take years to accrue. It requires long-term investment. Most of the SFM financing is provided by development partners. However, this remains unpredictable as well as inadequate. The challenge is therefore to mobilize and allocate adequate public resources for SFM. The other challenge is to put in place incentives that will attract long-term private-sector investments in the sector.

Inadequate governance, collaboration and participation in forest management

There are complex relationships between the different governance levels – global, regional, subregional, national and local as well as among the multi-sector agents – which affect forests and forestry. Therefore, one of the key challenges is to achieve effective coordination and strategic partnerships among the various levels. At the same time, given that forests have multiple functions, there are considerable overlaps among agri-

cultural, pastoral, energy, environment, and non-sector agencies such as ministries of local government, finance and planning in Africa. This requires integrated and multiple forest-use management. Ensuring appropriate governance while maintaining synergetic collaboration amongst the various levels and actors, however, remains a challenge for many Governments.

Over the last few decades, various forms of community forestry have increasingly gained popularity in the region. However, appropriate policy and legal frameworks for their successful implementation are lacking in many countries. Many local communities lack secure access or ownership of forest resources. Moreover, local people are not equipped with the skills to manage resources sustainably. These, among others, create disincentives to engage and invest in long-term SFM.

Improving forest governance and slowing down deforestation entails and requires tackling illegal wood harvesting for domestic sale. The significance of this is that in many African countries the domestic market is largely supplied by illegal logging activities. The challenge is therefore to bring the activities of the large informal wood sector into the VPA or a VPA type of system, which could provide the incentive for the different actors to adopt SFM practices.

Inadequate data, scientific knowledge and technology transfer

Reliable data and information on the extent, status and changes in forest size remain fragmented, unreliable and generally unavailable to those who need them most. While forest resources assessment may be an expensive undertaking for many African countries, it remains an absolute necessity if appropriate policies and management plans are to be developed and implemented. Research in many aspects of forestry remains limited in areas such as land-use (for instance agroforestry), landscape restoration, profitability of commercial plantations, and on the socio-economic and political aspects of consumption and management of forest resources. This information is of vital importance in the context of the growing demands of the large and growing populations.

SFM is also constrained by lack of adequate access to and deployment of appropriate and affordable technologies for forest development, including harvesting and processing. Access and use of state-of-the-art technolo-

gies for forest measurement and monitoring would also strengthen forest planning and management.

Population and rapid urbanization pressure on natural resources

Africa has now become the fastest-growing and fastest-urbanizing continent. Its population has grown from 110 million in 1850 to nearly one billion today. The implications of population growth on demands for forest-related goods and services, and on the integrity of natural resources are well known.

As the population grows, so does the demand for food (leading to agricultural expansion into forestlands) and firewood collection (as argued earlier, 90 per cent of wood removals in Africa are used as fuelwood, with only 10 per cent as industrial roundwood). The pressures on African forests and forest resources will inevitably continue rising to meet the needs of the fast-growing populations in the rapidly urbanizing and industrializing countries, especially if most of their people remain poor.

It is often argued that when forest and tree resources get too scarce, rural people make a greater effort to retain trees in the landscape and to plant more trees. However, increased pressure and poverty levels may curtail the ability of poor rural people to plant more trees and sustainably retain trees in the landscape.

Rapid urbanization, which is also fuelled by rapid population growth, is an emerging land-use pattern which could possibly have both negative and positive implications for SFM or development. On the negative side, rapid urbanization has the potential to work against SFM in Africa, as cities expand most of the time at the cost of forest and agricultural land. On the other side, urbanization could have a positive impact on SFM as people migrate into urban areas, releasing the population pressure on forestlands. However, unless the people migrating to the cities find meaningful off-farm employment, they will continue to depend on forest products (e.g. fuelwood, charcoal and bush meat) which need to be harvested in a sustainable manner. In either way, SFM could be sacrificed as urbanization proceeds.

2.4 Conclusions and recommendations

A21, as well as the non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests (adopted by UNCED and reaffirmed by the PFIA21 and JPOI), provide important frameworks and a strong foundation for SFM. These have since been reinforced by the adoption of the NLBI on all types of forests.

African countries have taken a number of concrete actions to implement forest-related commitments contained in these and other instruments. With a view to achieving SFM, appreciable progress has been made in a number of areas including: strengthening political commitment, developing and implementing NFPs, gazetting forest-protected areas for biodiversity conservation, and promoting community-based forest management for SFM. Although limited, some progress has also been made in improving forest law enforcement, promoting NWFPs for SFM and supporting the development of SMFEs.

Implementation progress, in these and other areas, is confronted by many challenges and constraints including: climate change; limited and unpredictable resources for SFM; inadequate governance, collaboration and participation in forest management; inadequate data, scientific knowledge and technology transfer; and rapid urbanization and population pressure. While some of these factors hamper, there are others that present real opportunities for further progress towards SFM. Important lessons which have been learned in implementation of the various commitments form a backbone for the following recommendations that will contribute to accelerating progress towards SFM in the region.

Recommendations

Improving the forestry contribution to and integration with poverty reduction and overall national development

- Forest sector-lead agencies should undertake activities to document and demonstrate the actual and potential contribution of the forest sector to poverty reduction and overall national economies. Among such activities are: quantifying the crucial role of forests in sustaining the

livelihoods of millions in rural areas, including the role of environmental services in agricultural productivity and watershed protection.

- Efforts should be made to link overall economic growth as measured by GDP with the forestry production, both in the formal and informal sectors of the economy (this will do justice to forests and forest resources, which at the moment are not properly accounted for in the national GDP accounting system; large portions of production of forestry by smallholder farmers and large estates are completely ignored).
- Research should be strengthened on the link between economic growth and forest development.
- NFPs should be effectively incorporated into national development plans, including national Poverty Reduction Strategy Papers (PRSPs), as well as to key sectoral plans such as those for agriculture, energy, wildlife and water sectors.
- Strengthen institutional mechanisms for multi-stakeholder engagement in and coordination of programmes and initiatives with a bearing on SFM.
- Develop supportive policies and provide incentives to catalyse the development of SMFEs.

Sustainable energy development

- African countries, especially those with large fuelwood consumption, should promote clean and renewable energy, and improve energy efficiency and access to advanced energy technologies, including cleaner fossil fuel technologies.
- In order to change patterns of fuelwood energy development, production and consumption in many countries, national capacities of forestry services, and energy agencies for wood-energy planning and policy development should be enhanced.
- The pursuit of biofuel development should be carefully and judiciously undertaken, taking into account technical and scientific information for the efficient and sustainable produc-

tion, processing and utilization of such energy source today, without compromising SFM.

Harnessing opportunities provided by the emerging responses to climate change

- Climate change and climate change adaptation and mitigation have profound implications for achieving SFM. African countries therefore need to be fully engaged and contribute to shaping climate change-related forest mechanisms that are favourable for Africa to attain its sustainable development aspirations. Among these mechanisms are the Clean Development Mechanism (CDM) and REDD+. In this connection, support is needed to enhance technical competence and achieve conformity of national institutions, policies and legislation with the requirements under these mechanisms.

Enhancing financing and investment in the forest sector

- African Governments should raise the priority ranking and public budget allocations towards SFM programmes and activities. At the same time, Governments should promote policies that will foster increased and long-term private-sector investment in the sustainable development and management of all types of forests, including public, private and community forests.

Strengthening forest governance and law enforcement, and multi-stakeholder participation in forest management

- African countries should support the implementation and enforcement of policy and legal reforms arising out of NFP processes. Partnership should also be strengthened with initiatives such as FLEGT and European Union VPA. In this connection, countries should consider extending the VPA coverage to domestic markets for forest products; in this regard, the VPA process needs to include provisions for and mechanisms to strengthen local communities' participation.
- CBFM should be strengthened through developing and enforcing policies and regulations relating to collaborative forests as well as to secure community access rights to land, forest and associated resources.

Strengthen and promote acquisition and application of scientific knowledge and appropriate technology for sustainable forest management

- Enhance funding allocation to support forestry education and training at both formal and non-formal levels.
- Forestry research should be prioritized in national development planning and adequate funding provided for the sector to meet the needs for scientific information, up-to-date data, and information and technologies to support SFM.
- Mechanisms to document and share knowledge and good practices in SFM should be strengthened and promoted.

Strengthen international cooperation and partnerships for sustainable forest management

- Countries should be given support to harmonize forest-related policies and plans, and strengthen regional and subregional cooperation for SFM. On-going cooperation initiatives such as the Great Green Wall for the Sahara and Sahel Initiative (GGWSSI), the Congo Basin Forest Initiative, the new Congo Basin Partnership on REDD+ and the Fouta Djallon project all provide building blocks for the required cooperation.
- Implementation of international forest-related frameworks and agreements such as the Convention on Biological Diversity, United Nations Convention to Combat Desertification, United Nations Framework Convention on Climate Change and the non-legally binding instrument should promote coordination and cooperation in SFM at regional and subregional levels.

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3. Biodiversity

Key messages

Biodiversity includes people and the environments they help to shape. No matter how far removed people may seem from the “natural” environment, they remain intimately connected with ecosystems and their processes through their diets, use of materials, energy, water, recreational activities and much more.

The region’s rich biodiversity is central to sustaining life, livelihoods, cultural practices, poverty reduction and sustainable development in Africa. African societies, including in urban areas, depend on natural environments for delivering food, medicine and resources that sustain production systems, whether for small-scale or commercial production, and they attach cultural importance to biodiversity.

Effective wide-scale implementation of the commitments on biodiversity is essential to pave the way towards improving the conservation and sustainable use of biological resources, and placing African countries – individually and collectively – well on the path to sustainable development. To date, African countries have achieved mixed results in meeting these commitments. There has been overwhelming success in the ratification of the Convention on Biological Diversity and other biodiversity-related multilateral environmental agreements (MEAs); and successful formulation of strategies, plans, and other frameworks for implementation of the MEAs. However, slow and little progress has been made in many other crucial areas including: implementation of these plans and strategies; mainstreaming biodiversity into national development plans; and sustainable use of biodiversity.

African countries should domesticate and implement the Strategic Plan for Biodiversity (2011-2020). The Strategic Plan provides a framework and impetus for the implementation of the Convention on Biological Diversity, addressing the drivers and underlying causes of biodiversity loss, maintenance of biodiversity, enhancement of benefits to all, and for the appropriate national, regional and international mechanisms. Development partners should prioritize and provide sufficient and predictable technical and financial support to African countries to assist them to fully implement the Strategic Plan.

Policy and decision-making for sustainable use and management of biodiversity should be strengthened. African countries should develop well-targeted policies focusing on critical areas, species and ecosystem services in order to avoid the most dangerous impacts of biodiversity loss on people and societies. In addition, investments should be made to increase availability and access to information on biodiversity to enhance decision-making.

Biodiversity should be effectively mainstreamed into sectoral, national, subregional and regional development frameworks. To this end, African Governments should carry out valuation of ecosystems and biodiversity in order to understand and take into account the true value of their countries’ biological endowments. Moreover, countries need to make use of environmental economics and its concepts such as the green economy/growth and The Economics of Ecosystems and Biodiversity (TEEB). This will enable the conversion of trade-offs between conservation and development into win-win situations.

The word biodiversity, a contraction of ‘biological diversity’, can be broadly defined as being the combination, variety and abundance of all life on Earth and the ecosystems upon which life depends. While biodiversity is frequently understood to refer simply to the variety of species on the planet, it is a much wider concept. It is, in its fullest form, the complete variety of life on Earth, from the smallest to the largest scale. Biodiversity refers to the ecosystems of which species form part, and within which they interact with one another and with the physical or non-living environment. It also encompasses the genetic variation within species. Each of these three levels – genes, species and ecosystems – interacts with the other. It is these interactions which constitute the so-called “web of life” to which we all belong.

Furthermore, biodiversity and ecosystems are important providers of ecosystem services such as climate regulation, carbon sequestration, watershed protection, and habitat for species that provide bush meat, as well as opportunities for tourism (ECA and UNEP, 2011). Losing these ecosystem services would undermine the resources on which many African livelihoods and economies are based. In addition to these often intangible benefits, biodiversity does and can continue to contribute directly and indirectly to formal African economies, to the livelihoods of many rural Africans, and to development if utilized sustainably.

In spite of its fundamental importance, biodiversity continues to be lost at an unprecedented rate. The third edition of the Global Biodiversity Outlook reported that globally, despite some progress, the world community has been unable to significantly reduce the rate of biodiversity loss. The situation is similar in Africa where the actions taken have not translated into a significant improvement in the overall state of biodiversity in the region. African Governments therefore need to encourage sustainability in their economies in order to protect their “green infrastructure” and underlying biodiversity in order to ensure the sustained provision of valuable ecosystem services as a critical condition for achieving sustainable livelihoods and general wellbeing of their citizens, for current and future generations. This includes ensuring that sustainability is introduced into key sectors such as agriculture, mining and minerals, forestry, fisheries, manufacturing and infrastructure development.

3.1 International biodiversity-related commitments

Action to conserve and sustainably use biodiversity at the international level has been ongoing for several decades. A21, PFIA21 and JPOI contain a wide range of biodiversity-related commitments including the 2010 Biodiversity Target.² The main commitments are summarized in Box 3.

² The target is “to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth.”

Box 3: Implementation of non-legally binding instruments in Ghana

- a. Reduce biodiversity loss, achieving by 2010 a significant reduction in the rate of loss;
- b. Ratify and promote effective implementation at national, regional and international levels of the Convention on Biological Diversity, the Cartagena Protocol on Biosafety and other biodiversity-related agreements;
- c. Integrate the objectives of the Convention on Biological Diversity and biodiversity-related strategies and action plans into global, regional and national policies, strategies and programmes including those on sustainable development and poverty eradication, into programmes of financial institutions;
- d. Promote the ongoing work under the Convention on Biological Diversity on the sustainable use of biological diversity, including on sustainable tourism, as a cross-cutting issue relevant to different ecosystems, sectors and thematic areas;
- e. Encourage effective synergies between the Convention on Biological Diversity and other multilateral environmental agreements (MEAs), inter alia, through the development of joint plans and programmes;
- f. Promote the wide implementation and further development of the ecosystem approach, as being elaborated in the ongoing work of the Convention;
- g. Promote concrete international support and partnership for the conservation and sustainable use of biodiversity. This includes:
 - i. Providing financial and technical support to developing countries, including capacity-building, in order to enhance indigenous and community-based biodiversity conservation efforts;
 - ii. Facilitating the transfer of technologies, including biotechnology, to developing countries, consistent with the provisions of the Convention on Biological Diversity;
 - iii. Providing the necessary support to integrate the conservation of biological diversity and the sustainable use of biological resources into national development plans and promote international cooperation to develop and strengthen national capacity-building;
 - iv. Promoting effective implementation at national, regional and international levels of the Convention on Biological Diversity, the Cartagena Protocol on Biosafety and other biodiversity-related agreements;
 - v. Supporting the conservation of Africa's biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, in accordance with commitments that countries have under biodiversity-related agreements to which they are parties; and
 - vi. Providing incentive measures at the national, regional and international levels to promote the conservation and sustainable use of biological diversity.
- h. Effectively conserve and sustainably use biodiversity, promote and support initiatives for hotspot areas and other areas essential for biodiversity, and promote the development of national and regional ecological networks and corridors;
- i. Strengthen national, regional and international efforts to control invasive alien species (IAS);
- j. Recognize the role of women in the conservation of biological diversity and the sustainable use of biological resources;
- k. Recognize the rights of local and indigenous communities, who are holders of traditional knowledge, innovations and practices, and with their approval and involvement, develop and implement benefit-sharing mechanisms on mutually agreed terms for the use of such knowledge, innovations and practices; encourage and enable all stakeholders to contribute to the implementation of the objectives of the Convention and in particular recognize the specific role of youth, women and indigenous and local communities in conserving and using biodiversity in a sustainable way;
- l. Promote the effective participation of indigenous and local communities in decision and policy-making concerning the use of their traditional knowledge;
- m. Promote the implementation of the Global Taxonomy Initiative (GTI) programme of work;
- n. Maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction;
- o. Develop national, regional and international programmes for halting the loss of marine biodiversity, including in coral reefs and wetlands; and

- p. Promote collaborative research programmes, especially in developing countries, to support activities on biodiversity, with particular reference to cooperation with local and indigenous people and their communities in the conservation of biological diversity and sustainable use of biological resources, as well as the fostering of traditional methods and knowledge of such groups in connection with these activities.

3.2 Concrete actions taken, progress made and achievements

3.2.1 Reduce biodiversity loss and achieve a significant reduction in the rate of loss by 2010

The global community failed to achieve the 2010 target of significantly reducing the rate of biodiversity loss. The third edition of the Global Biodiversity Outlook (GBO 3), however, found that even though the target was not met, the existence of the target was a spur for action at global, regional and national measures and that it stimulated measures to safeguard biodiversity (Secretariat of the Convention on Biological Diversity [SCBD], 2010). This has also been true in Africa.

In recent years, one of the most striking positive trends in nature conservation has been the continued increase in the coverage of protected areas in Africa. In 1990, protected areas covered 14.4 per cent of terrestrial areas and 2.3 per cent of marine areas. By 2010, the size of the protected area estate had increased to 15.7 per cent for terrestrial and 4.9 per cent for marine areas (IUCN, UNEP-WC-MC, 2010). Further, the amount of forest area designed specifically for the conservation of biodiversity has been increasing. In 1990, the amount of forest designated for biodiversity conservation was slightly less than 500,000 square kilometres. By 2010, this had increased to more than 540,000 square kilometres, or slightly less than 14 per cent of the region's total forest area (FAO, 2010).

While the size and number of protected areas in Africa is increasing, management effectiveness remains an issue. An analysis of 439 protected areas found that the effectiveness of protected- areas management in the region was amongst the lowest. On a scale from 0 to 1 (where 0 refers to no management in place and 1 refers to management reaches highest standards), Africa had an overall mean score of 0.44. This suggested that protected-areas management fulfilled basic management requirements but had significant deficiencies, and as a result compromised the effectiveness of protected areas. Of the protect-

ed-areas assessments considered, about 27 per cent had management effectiveness that was considered unacceptable while 9 per cent indicated sound management (Leverington, and others, 2008).

The issue of representativity is also important as many significant biodiversity areas, such as Alliance for Zero Extinction sites and biodiversity hotspots, are not currently under official protection. Many of southern African woodland eco-regions have more than 10 per cent of their area protected. However, northern African eco-regions are less protected (Jenkins and Joppa, 2009). These considerations are addressed in the programme of work on protected areas under the Convention on Biological Diversity as well as in the programmes and work plans of other partners, such as the World Network of Biosphere Reserves under the United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere Programme.

It should also be borne in mind that Africa is rich in Indigenous and Community Conserved Areas (ICCAs). These are natural sites, resources and species' habitats conserved in a voluntary and self-directed way through community values, practices, rules and institutions, and they make an important contribution to the conservation of biodiversity outside designated protected areas.

3.2.2 Ratification and promotion of effective implementation of the Convention on Biological Diversity and other biodiversity-related agreements

African countries have a good track record with the ratification of the Convention on Biological Diversity and other biodiversity-related agreements. For example, the Convention has 193 parties including 53 African States – this is near universal African membership. The Ramsar Convention has 46 African parties, which equates to 85 per cent of all African countries. This pattern holds true of all biodiversity-related agreements. Table 1 summarizes the membership of African countries in biodiversity-related agreements.

Table 1: Membership of African countries in global biodiversity-related multilateral environmental agreements

Convention or treaty	Entry into force	Number of parties	Number of African parties	Proportion of African membership (in percentage)
Convention on Biological Diversity	29 December 1993	193	53	98
Ramsar Convention	21 December 1975	160	46	85
World Heritage Convention	17 December 1975	189	45	83
CITES1	31 December 1974	175	52	96
Convention on Migratory Species	1 November 1983	117	40	74
ITPGR2	29 June 2004	127	42	77

In addition to ratifying biodiversity-related agreements, African countries have taken concrete actions to implement these agreements, particularly the Convention on Biological Diversity. All African State parties, with the exception of Libya and Somalia, have established National Biodiversity Strategies and Action Plans (NBSAPs). NBSAPs codify the approach for country plans to take in order to protect the biodiversity within their own territory.

In many countries, the preparation of strategies has stimulated the development of additional laws and programmes, and has spurred action on a broad range of issues. As such, NBSAPs serve as a framework for implementing the Convention on Biological Diversity at national level. Fifty-three African countries have completed their NBSAPs (République tunisienne, 2009). Of these countries, eight have revised NBSAPs and five are currently in the process of revising them. Revising an NBSAP is important as it allows for parties to identify and meet new challenges and to respond to recent guidance from the Conference of the Parties to the Convention on Biological Diversity, in particular the incorporation of national targets based on the Strategic Plan for Biodiversity 2011–2020.

According to the national reports provided to the Convention on Biological Diversity, many policies in support of biodiversity were introduced over the last five years throughout Africa. Most parties (upwards of 85 per cent) reported that they had developed new legislation related to biodiversity since their third National Reports were submitted in 2005. Legislation relating to Environmental Impact Assessments (EIAs) can also be attributed to some NBSAPs, which highlighted these as necessary for reducing the impacts of development on biodiversity.

Examples of those include a law adopted in 2009 on marine protected areas in Tunisia (République tunisienne, 2009), as

well as a decision by Algeria in 2009 to expand its list of species whose conservation is of national interest (République algérienne, 2009). Nearly all parties reported that they were also undertaking actions related to education and public awareness about biodiversity and the environment. While some of those actions are part of strategic communication, education and public awareness campaigns, others are more general.

3.2.3 Integration of the objectives of the Convention on Biological Diversity and biodiversity-related strategies and action plans into global, regional and national policies, strategies and programmes

Integration or mainstreaming of biodiversity into the plans and programmes of other sectors is important for the conservation and sustainable use of biodiversity beyond protected areas. A comprehensive assessment of the preparation, content, adequacy and effectiveness of existing NBSAPs, including the effectiveness of integration and mainstreaming efforts, was produced by the United Nations University Institute for Advanced Studies in 2010 (Pripp, and others, 2010).

Their assessment found that only a small majority of NBSAPs had placed biodiversity within the development policy context; the rest considered biodiversity to fall only within the conservation domain (Pripp, and others, 2010). Those that had considered biodiversity within the development sphere did so to varying degrees, from weak statements about the importance of mainstreaming biodiversity to thorough analyses of the interlinkages and actions to be taken (ibid). A major weakness amongst NBSAPs, and this

holds true for many African countries' NBSAPs, is that they were developed more than 10 years ago and because they have not been revised recently, they have lost their ability to influence national policy (ibid).

It is important for mainstreaming that biodiversity is taken into consideration in development, poverty reduction and sectoral plans and programmes, and not just that NBSAPs identify biodiversity as part of development (Pripp, and others, 2010). The most important policies for mainstreaming are National Development Strategies (NDSs), Poverty Reduction Strategy Papers (PRSPs) and Millennium Development Goals Reports (MDGRs). In their assessment, Pripp, and others (2009) found the following:

Poverty reduction strategy papers:

- Mainstreaming of environment in PRSPs has been gradually improving in more recent PRSPs compared to earlier ones;
- Other environmental issues such as water and sanitation are often given higher priority than biodiversity in PRSPs;
- Biodiversity coverage is slightly better in newer PRSPs; and

- There is little connection between countries' NBSAPs and PRSPs on mainstreaming biodiversity, with usually a strong emphasis in one or the other but never in correlation with each other. This suggests the documents have been prepared in isolation of each other.

Millennium Development Goals Reports:

- Biodiversity is not well reflected in MDGRs when compared to other environmental issues;
- Integration of biodiversity into MDGRs is extremely limited; and
- There is weak alignment between MDGRs and NBSAPs, and by association a weak role for NBSAPs in national policy development.

There are many opportunities to address the biodiversity crisis while contributing to other social objectives and thus integrate biodiversity into other sectors (see Box 4).

The mainstreaming of biodiversity across the whole government system and across economic sectors can be increased (see Box 5) in order to enhance the conservation of biodiversity in protected areas.

Box 4: South Africa – Working for Water Programme

Western Cape Province, South Africa, is home to the smallest of the world's 15 floristic kingdoms, the Cape floristic region, which boasts very high levels of biodiversity. The province's environmental agency, Cape Nature, has developed a strategic approach to conservation by integrating biodiversity priorities into the work of the provincial government departments and local authority plans and frameworks, developing guidelines for environmental assessments, mainstreaming biodiversity priorities into agriculture production at both the sector and farm levels, working with the private sector to develop new sustainable markets, and building programmes that link conservation, social services, and poverty alleviation. For example, the Working for Water and Working for Wetlands programmes generate employment opportunities that support natural resource management and conservation programmes such as habitat restoration and management of invasive alien plants.

(SCBD, 2008)

Box 5: Madagascar – National Strategy for Sustainable Management of Biodiversity

The National Strategy for Sustainable Management of Biodiversity in Madagascar, first adopted in 2002, was revised to align it with the "Madagascar Action Plan" which sets the incoming Government's larger vision for the development of the country. The Government of Madagascar has taken several steps to mainstream biodiversity. Each ministry of the Government has an environment unit and environmental issues are integrated into the planning process for each sector of the economy. Locally specific objectives and action plans for the management of each of the country's 22 regions have been developed to ensure the wide implementation of actions for biodiversity conservation and sustainable use. Indicators developed in the country to monitor biodiversity status and trends have been modified to bring them in line with the 2010 Biodiversity Target.

(Republic of Madagascar, 2010)

3.2.4 Promotion of the ongoing work under the Convention on Biological Diversity on the sustainable use of biological diversity

Important actions have also been taken to address the unsustainable use of biodiversity. Currently, almost 17 per cent of the region's total forest area has management plans and the percentage has been increasing since 1990 (FAO, 2010). Further, more than 76,000 square kilometres of forest in Africa have been given Forest Stewardship Council (FSC) certification (FSC, 2011). This represents more than one per cent of all of the region's forest estate. However, certified forests are concentrated in only a few countries. There have also been a variety of novel approaches to reduce or avoid adverse impacts of economic activities on biodiversity.

Thirty African Parties reported that they had developed, or were in the process of developing, mechanisms to assess, monitor and measure the impact of tourism on biodiversity. They (over 50 per cent) reported that programmes were in place, or were being considered, for increasing the tourism sector's awareness of the impact of tourism on biodiversity, and the mitigation of those impacts. Moreover, almost 50 per cent of parties had programmes in place to support indigenous and local communities to participate in tourism policy development.

For example, Ethiopia has put in place the institutional framework to monitor the impact of tourism on biodiversity and sustainable tourism has been integrated into the NBSAP. In addition, the Institute of Biodiversity Conservation has been given the responsibility of following up and identifying processes that have adverse effects on biodiversity and initiating policy measures to

regulate such processes, and upon approval, of following up the implementation of such policies (Federal Democratic Republic of Ethiopia, 2009).

3.2.5 Encouraging effective synergies between the Convention on Biological Diversity and other multilateral environmental agreements

At international level, the three Rio Conventions, namely the United Nations Framework Convention on Climate Change, the United Nations Convention to Combat Desertification and the Convention on Biological Diversity have been working together for over ten years to enhance synergies. In August 2001, a Joint Liaison Group was formed "as an informal forum for exchanging information, exploring opportunities for synergistic activities and increasing coordination" (SCBD, 2012). The Secretariats of the three conventions have undertaken some work to encourage synergies at secretariat level and between the conventions. These include: establishment of a cross-cutting initiative on climate change and biodiversity by the Convention on Biological Diversity; the development of a joint work programme on biodiversity and drylands by the Convention on Biological Diversity and the United Nations Convention to Combat Desertification; development of a pilot programme for joint implementation activities at national level by the Convention on Biological Diversity and the Global Environment Facility (GEF) Secretariats; and cooperation on gender integration into thematic areas (SCBD, 2012).

In addition to these on-going activities, the Joint Liaison Group has been encouraged to facilitate cooperation and coordination at international and national level and is in the process of developing a list of cooperative

Box 6: South Africa – Biodiversity and Wine Initiative

South Africa is the world's eighth largest wine producer, with some 90 per cent of the production taking place in the Cape Floristic Region, which is part of the highly threatened fynbos biome. The expansion of grape vines, which increased as export markets grew, raised concerns that the areas important to biodiversity could be lost. As a result, in 2004 the wine industry and biodiversity sector formed a partnership and created the Biodiversity and Wine Initiative (BWI), which develops biodiversity guidelines for the wine industry.

The BWI aims to prevent further loss of habitat in critical sites and increase the area of natural habitat in protected areas. Farmers are assisted with assessing the biodiversity value of their land, implementing biodiversity guidelines and identifying unique marketing elements. Farming practices that enhance the suitability of vineyards and surrounding areas to biodiversity are also promoted. Currently more than 110,000 hectares of natural areas have been conserved through the Initiative. This is an area larger than the amount of area devoted to wine production. As part of the programme, a logo was developed to allow consumers to identify BWI wines.

(Republic of South Africa, 2009)

activities (ibid). Some suggested activities include: the promotion of complementarity amongst NBSAPs, National Action Programmes (NAPs) and National Adaptation Programmes of Action (NAPAs); collaboration amongst national focal points; collaboration amongst the scientific subsidiary bodies to the conventions;³ and the development of joint work programmes or plans, joint workshops and joint capacity-building activities.

While these efforts at international level are important, synergies can only be concretely realized at national level. In their assessment of NBSAPs, Pripp, and others (2010), found that only a few NBSAPs “address climate change and, where they do, this is mostly in the form of simply reflecting on the impact of climate change on biodiversity and not in the form of specific objectives and actions”. However, they found that a higher proportion of NAPAs integrate biodiversity to varying extents (ibid).

With regard to drylands, degradation and desertification, the NBSAPs or countries with large proportions of drylands have integrated biodiversity and drylands very well. In general, the NBSAPs and NAPs seem to be well aligned (ibid). The biodiversity-related MEAs discussed in Chapter 1 have developed a number of complementary approaches (site, species, genetic resources or ecosystem-based) and operational tools (e.g. programmes of work, trade permits and certificates, multilateral system for access and benefit sharing, regional agreements, site listings, funds) (SCBD, 2012). These interlinkages amongst the different conventions and the issues they address provide a basis for cooperation (ibid).

3.2.6 Promotion of the wide implementation and further development of the ecosystem approach

Almost 70 per cent of African parties reported that they were applying or considering applying the ecosystem approach according to the principles provided by the Convention on Biological Diversity Conference of Parties in Decision V/6. Over 70 per cent reported that they had adapted or were considering adapting the eco-

system approach at national level. Also, almost 65 per cent reported that they were creating an enabling environment for the ecosystem approach, including through relevant institutional frameworks. For example, Cabo Verde was switching its intervention in rural areas from a project-based approach to a programme/ecosystem-based approach. This approach was used to draft the watershed management plans of Picos and Engenhos, Ribeireta, Flamengos (Santiago Island) and Fajã (South Nicolau Island) (Republic of Cabo Verde, 2010).

3.2.7 Promotion of concrete international support and partnership for the conservation and sustainable use of biodiversity

Adequate financial resources are required for the effective conservation and sustainable use of biodiversity. Developed countries have committed to providing funding for biodiversity management in developing countries. This aid can be tracked using various means, including the “Rio Markers”, which measure the level of funding to each of the Rio Conventions from each of the 24 donor countries (Biodiversity Indicators Partnership [BIP], 2012).

Figure 1 is based on Rio Markers data and show that global Official development assistance (ODA) for biodiversity was on a gradual increase until 2008 when it dipped as a result of the global economic and financial turmoil. Total funding for biodiversity was approximately \$3 billion, about 3 per cent of total ODA (BIP, 2012).

Figure 2 depicts the total amount of biodiversity-related ODA flowing to Africa, which in 2005 was in the region of \$400 million.

Figure 3 is a graphical representation of recipients of biodiversity-related ODA. The strength of the green shading reflects the level of funding. As can be seen from the graph, funds to individual African countries were on the lower end of the scale. However, this is not to say that total funding to Africa was low.

The Global Environment Facility (GEF) is the designated financial mechanism for the Convention on Biological Diversity. Since its inception it has disbursed a total of \$805 million to African countries for activities

³ The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to the Convention on Biological Diversity, the Committee on Science and Technology (CST) to the United Nations Convention to Combat Desertification, and the Subsidiary Body for Scientific and Technological Advice (SBSTA) to the United Nations Framework Convention on Climate Change.

that assist countries to conserve and sustainably utilize biodiversity, as well as activities to promote access and benefit sharing (GEF, 2010).

In addition to receiving external funding, African countries have been involved in cooperation activities on an international, regional and subregional level. Approximately 90 per cent of the African parties reporting to the Convention on Biological Diversity indicated in their fourth national reports that they were participating in transboundary management or cooperation initiatives. Forty-three per cent reported that they were involved in bilateral cooperation; another 43 per cent reported that they were involved in multi-lateral cooperation, and 58 per cent involved in regional and subregional cooperation.

For example, several African countries were party to the African-Eurasian Waterbird Agreement, and seven West African parties were cooperating in the Regional Marine and Coastal Conservation Programme for West Africa (PRCM) aimed at conserving marine and coastal biodiversity. African parties also reported that they were working with other parties or considering working with other parties to develop regional, subregional or bioregional mechanisms and networks. These included the International Long-Term Ecological Research Network (ILTER), and Southern African Botanical Diversity Network (SABONET).

Figure 1: Biodiversity-related ODA 2005–2008 (BIP, 2012)

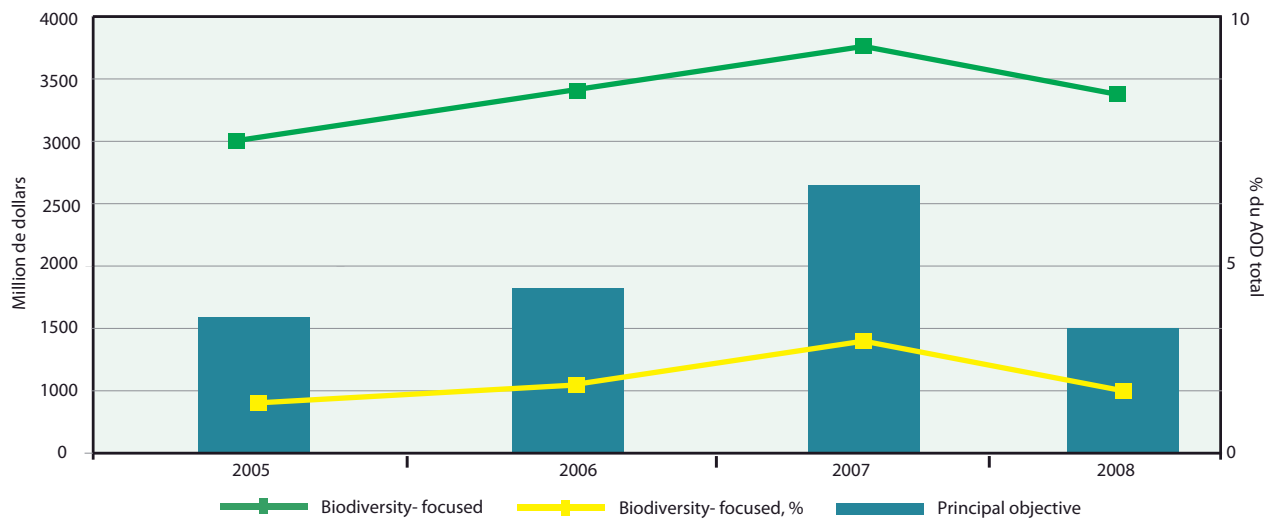
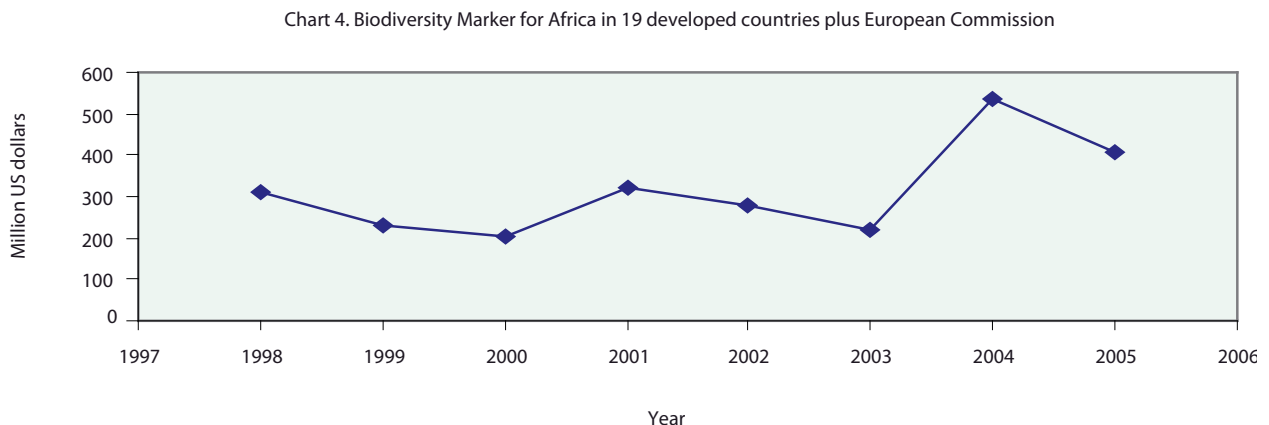


Figure 2: Biodiversity-related ODA to Africa, 1997–2005 (BIP, 2012)



3.2.8 Effective conservation and sustainable use biodiversity, promotion and supporting initiatives for hotspot areas

Africa contains eight of the world's 34 biodiversity hotspots (Conservation International, 2007), 140 Alliance for Zero Extinction sites (AZE, 2010), and more than 1,200 Important Bird Areas (BirdLife International, 2011). In addition, Africa has 326 Ramsar sites, which cover a surface area of 85,523,029 hectares and represent 44 per cent of all globally designated wetlands. These wetlands are reservoirs of genetic, species and ecosystem diversity and they provide for the protection of migratory waterfowl through the creation of networks of critical sites for refuge, stop over and breeding. Africa also hosts 45 designated cultural heritage sites, 35 natural heritage sites and four mixed sites under the World Heritage Convention.

3.2.9 Strengthening national, regional and international efforts to control invasive alien species

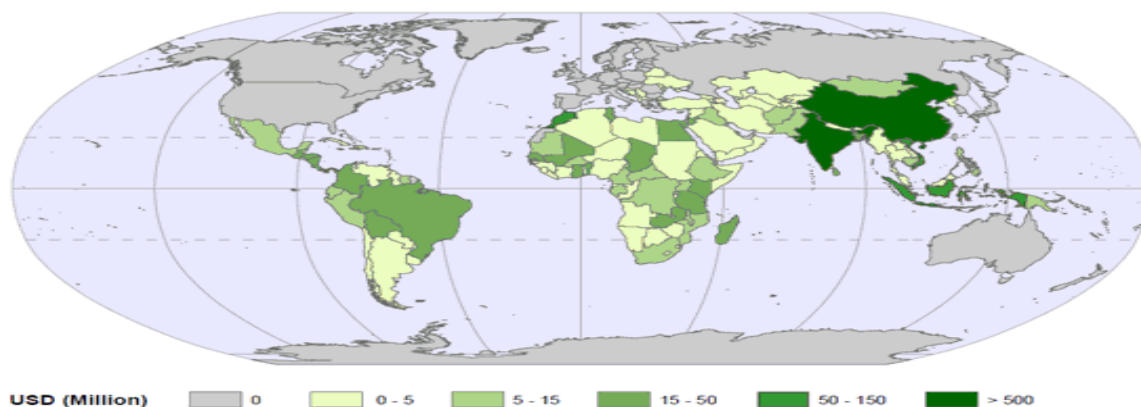
African countries have realized the great threat that invasive alien species (IAS) pose, not only to biodiversity and ecosystems, but also to human health, tourism and livelihoods. A continent-wide approach to solving the problem has been the adoption of the NEPAD Environmental Action Plan (EAP) in 2003, which has as one of its programme areas the prevention, control and management of invasive alien species (UNEP, 2006;

NEPAD, 2012). The goal of the programme was to “minimize the impact of invasive alien species on Africa’s people, economies and ecological systems” (NEPAD, 2012). The programme was to be implemented through existing mechanisms such as the East African Community (EAC), Southern African Development Community (SADC), and the Common Market for Eastern and Southern Africa (COMESA) (ibid).

There have also been successful subregional and national approaches to IAS. For example, the Southern Africa Biodiversity Support Programme was a seven-year collaborative programme between the Southern African Development Community (SADC), United Nations Development Programme (UNDP), International Union for Conservation of Nature (IUCN) and the Global Environment Facility. It was implemented in seven SADC countries with the goal of ensuring that biodiversity was conserved and utilized in a sustainable manner. The programme had a special focus on access and benefit sharing and invasive alien species, and one of its objectives was to strengthen the capacity of Southern African countries to manage such species.

In their reports to the Convention on Biological Diversity, the majority of countries reported that they had identified the main alien species introduced into their territories, and the risk they posed (SCBD, 2010). In addition, the majority of African countries reported that measures were in place to prevent the introduction or to control IAS (ibid). For example, a well cited example of IAS control is the Working for Water Programme in

Figure 3: Recipients of biodiversity-related ODA (BIP, 2012)



South Africa, which has provided jobs to local communities for the eradication of IAS. Nigeria also reported that it had achieved some success in the control of invasive species (Federal Republic of Nigeria, 2010).

Many of the countries have been involved in bilateral, subregional, regional and international cooperation programmes for dealing with IAS (SCBD, 2010). Despite these successes, there have still been challenges with regard to the management of IAS. For example, in its fourth national report to the Convention on Biological Diversity, Seychelles noted that IAS posed the biggest threat to biodiversity and that they were difficult to address owing to the limitations of current management techniques (Republic of Seychelles, 2011). In Zambia, *Lantana camara*, *Salvinia molesta* and *Eichhornia crassipes* have continued to pose a threat to indigenous biodiversity (Republic of Zambia, 2009). International organizations such as the International Union for Conservation of Nature, the Global Invasive Species Programme and CABI (a not-for-profit scientific research, publishing and international development organization) have also been running programmes that aim to strengthen the capacity of African countries to address invasive alien species.

3.2.10 Recognition of the role of women in the conservation of biological diversity and the sustainable use of biological resources

The gender roles of women and men include different labour responsibilities, decision-making processes, and knowledge; according to their needs, men and women often use and manage resources in different ways (SCBD, 2012). Therefore, we need to incorporate gender dimensions into our understanding of biodiversity and its conservation, sustainable use and the sharing of benefits. Gender mainstreaming is a strategy aimed at achieving greater gender equality by integrating a gender perspective into existing mainstream institutions and all programmatic areas or sectors, including the environment (ibid).

In the light of the above, the Convention on Biological Diversity in collaboration with the IUCN Gender Programme developed a Gender Plan of Action in 2008. The Plan defined the Secretariat's role in stimulating and facilitating efforts on national, regional and global levels to promote gender equality and mainstream

a gender perspective (SCBD, 2012). An analysis of NBSAPs from a gender perspective found that a low proportion of countries linked gender with biodiversity in the articulation of the strategy as well as in the development of the action plan (SCBD, 2010).

Gender is most identified with the participation of women in conservation activities, in the stocktaking phase of the NBSAP, in awareness and education activities, and in access and benefit sharing activities (ibid). NBSAPs that identify gender as being important most often articulate their gender strategies in relation to agrobiodiversity, agroforestry, fisheries and poverty reduction (ibid).

3.2.11 Recognition of the rights of local and indigenous communities and promotion of their effective participation

African parties have recognized the importance of including local and indigenous communities in the decisions regarding biodiversity management at national level. Although African parties reporting to the Convention on Biological Diversity had not yet established indigenous and local community advisory committees, approximately 50 per cent reported that they had supported, financially and otherwise, indigenous and local communities in formulating their own biodiversity conservation plans. For example, in Lesotho, through the Lesotho Highlands Water and Maloti Drakensberg Transfrontier Projects, communities had been trained to manage biodiversity within areas under their jurisdiction (Kingdom of Lesotho, 2009). In Malawi, rural communities were encouraged to produce village development plans, which included aspects related to biodiversity (Republic of Malawi, 2010).

Furthermore, over 50 per cent of African parties reported that they had taken measures to strengthen the capacity of indigenous and local communities to be effectively involved in decision-making regarding the use of their traditional knowledge, innovations and practices. Also, over 50 per cent reported that they had developed appropriate mechanisms to promote effective participation of indigenous and local communities in decision-making at international, regional, national and local levels. There has also been a growing recognition of the need to involve local and indigenous communities

Box 7: Togo – a pragmatic approach to protected areas management

From 1960 to 1980, protected areas, classified forests, national parks and animal reserves in Togo were managed with little consideration of local socioeconomic conditions, and with limited participation from local communities. Population growth, expanding agriculture and socio-political problems in the 1990s led the local population to question the value of the protected areas, and as a result many became degraded as they were no longer being respected by the communities surrounding them.

A programme was begun in 1999 to rehabilitate the country's protected areas, recognizing the complexity of establishing and managing them, and the need for local participation. A key element was the greater involvement of local communities in protected areas management. Through negotiation with communities, it was agreed that the size of some protected areas would be reduced, and that the released land would be available for the use of local people. In return, the communities agreed to respect the remaining protected areas.

As part of the consultation process, 60 village associations (Associations Villageoises de Gestion Participative des Aires Protégées) located around priority protected areas were formed, which have been in turn grouped under eight participatory management unions (Unions d'Associations Villageoises de Gestion Participative des Aires Protégées). The purpose of the associations is to facilitate communication between local communities and the Government and to encourage the implementation of joint activities.

(Togolese Republic, 2009)

Box 8: Gorongosa National Park, Mozambique

Gorongosa National Park is located in central Mozambique and includes the southern part of the Rift Valley. It was declared a conservation area in 1960, and currently covers an area of approximately 3,770 km². In the 1960s and 1970s, Gorongosa was one of the most famous game parks in Africa.

The park is home to a number of endemic plant species and is rich in migrant and endemic bird species. However, the outbreak of civil war in the mid 1970s resulted in many animals being killed for food, sport and trophies, as well as forcing the people working in the park to flee. Since the end of the civil war, a number of initiatives have been established by the Government and private organizations to restore the park, including infrastructure development, the recruitment of specialized staff and the reintroduction of certain species.

(Republic of Mozambique, 2009)

in decisions regarding the location and management of protected areas (see Box 7).

In Mozambique, there is a further exciting example of the involvement of local communities in biodiversity management.

3.2.12 Promoting the implementation of the programme of work of the Global Taxonomy Initiative

Twenty-eight per cent of African parties reported that they had considered or were considering putting in place plans to implement the Global Taxonomy Initiative (GTI), almost 50 per cent reported that they were making long-term investments in their national taxonomic collections, and 38 per cent reported that they were providing training to increase taxonomic capacity. Furthermore, over 50 per cent reported that they were

collaborating with subregional, regional and global initiatives and partnerships in implementing the GTI.

3.2.13 Halting the loss and maintaining the productivity of marine biodiversity

The sustainable management of coastal areas is considered critical in providing food and sustenance for people living in coastal areas, as well as for trade and tourism. Integrated coastal zone management is increasingly being practised in a cooperative manner at the subregional level, including through the Abidjan Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, and the Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the East African Region.

3.2.14 Promoting collaborative research programmes to support activities on biodiversity

African parties reported that they had put in place programmes to identify components of biodiversity at the ecosystem, species and genes level (73 per cent). They also had ongoing programmes to monitor threats to biodiversity such as invasive alien species (37 per cent), climate change (54 per cent), pollution (43 per cent), land use change (43 per cent) and over-exploitation (26 per cent). African parties (66 per cent) also reported that they had established programmes to encourage research that contributed to conservation and the sustainability of biodiversity, and that they had cooperated in the use of scientific advances in biodiversity (58 per cent).

The parties to the Convention on Biological Diversity have contributed through their national reports and other means to the production of the three editions of the Global Biodiversity Outlook (GBO). GBO is the flagship publication of the Convention on Biological Diversity and it summarizes the latest data on the status and trends of biodiversity, and draws conclusions for the future strategy of the Convention. GBO 1 was published in November 2001, GBO 2 in March 2006 and GBO 3 in May 2010. The fourth edition of the GBO will be published in 2014.

Other efforts to produce global assessments of biodiversity include the Millennium Ecosystem Assessment, published in 2006. The Biodiversity Indicators Partnership is another global programme that was developed to assist in the development of indicators for the 2010 Biodiversity Target; it has now been reorganized to feed into the Strategic Plan for Biodiversity 2011–2020.

3.2.15 Regional and subregional initiatives

In addition to actions at national level, there are several regional and subregional initiatives to conserve and sustainably utilize biodiversity, and ensure access to genetic resources and benefit sharing. These include intergovernmental initiatives, initiatives implemented by the regional economic communities and regional environmental organizations, and initiatives implemented by international NGOs with a presence in the region. Selected examples of these are highlighted below.

Regional biodiversity strategies and action plans

The regional economic communities and intergovernmental organizations have to date not developed biodiversity-related strategies, with the exception of the Southern African Development Community (SADC). SADC adopted the Regional Biodiversity Strategy in 2006, while the Regional Action Plan was adopted in 2011. The SADC Regional Biodiversity Strategy was designed to contribute to the SADC Regional Indicative Strategic Development Plan, as well as NEPAD and the MDGs (SADC, 2006).

Further to the regional strategy, SADC developed the Regional Biodiversity Action Plan in 2011. The SADC Regional Biodiversity Action Plan sets out a shared agenda for conservation and sustainable use in SADC (SADC, 2011). Its goal is to “promote equitable and regulated access to, sharing and enhancement of the benefits from, and responsibilities for protecting biodiversity in order to facilitate economic growth and poverty reduction in the SADC region” (SADC, 2011).

Initiatives by regional and subregional environmental organizations

Central African Governments have developed a model mechanism for coordination of environment and biodiversity actions across a subregion. On 17 March 1999, six Central African Heads of State signed the Yaoundé Declaration, which placed the protection of the Congo Basin at the centre of development, and committed them to collaborating to promote the sustainable use of the Congo Basin (Central African Forest Commission [COMIFAC], 2009). On 30 September 2004, the Central African Council of Ministers responsible for forests adopted the “Treaty on the Conservation and Sustainable Management of Forest Ecosystems in Central Africa and to Establish the Central African Forests Commission (COMIFAC)”, which was signed by Heads of State in February 2005.

In 2005, Central African Heads of State adopted the Convergence Plan (implemented through COMIFAC), which defined common intervention strategies for States and partners for the sustainable management of the forests and savannahs of Central Africa (COMIFAC, 2009). In addition to COMIFAC, member States of the Economic Community of Central African States (ECCAS) adopted the Programme d’Appui à la Conservation des Écosystèmes du Bassin du Congo

(PACEBCo), which was implemented by COMIFAC. The programme has four key components: institutional support for the implementation of the COMIFAC Convergence Plan; rural development; conservation and management of biodiversity and climate change adaptation; and programme management.

Transfrontier conservation areas

Transfrontier conservation areas (TFCAs), otherwise known as transboundary protected areas, transboundary protected areas complexes, adjoining protected areas and peace parks, have been recognized as an important tool for promoting the conservation of biodiversity (UNEP-World Conservation Monitoring Centre [WCMC], 2012). TFCAs are usually established by an agreement or treaty between neighbouring countries and so are considered intergovernmental entities.

Conservation is not the only goal of TFCAs: their establishment can contribute to sustainable livelihoods through the development of tourism in rural areas (UNEP-WCMC, 2012; IUCN, 2011; SADC, 2012). For example, the Southern African Development Community has acknowledged that TFCAs complement its principles on poverty alleviation and regional economic integration (SADC, 2012). In fact, the SADC Protocol on Wildlife Conservation and Law Enforcement commits member States to “promote the conservation of the shared wildlife resources through the establishment of transfrontier conservation areas” (ibid). At present there are approximately 20 existing or potential TFCAs in the SADC region.

Other subregions have also developed TFCAs. The most notable include Mount Nimba between Côte d’Ivoire, Guinea, and Liberia in West Africa; Tri-National de la Sangha between Cameroon, the Central Africa Republic, and the Congo in Central Africa; Virunga Volcanoes Transboundary Conservation Area covering the Democratic Republic of the Congo, Rwanda and Uganda in Central and East Africa; and Serengeti-Masai between Kenya and Tanzania in East Africa.

3.3 Implementation challenges and constraints

Below is a discussion of some of the most pressing of challenges and obstacles facing African countries.

Weak institutional and legal frameworks

There are several challenges facing the institutions tasked with managing biodiversity in Africa. The challenges and their severity vary across countries and no two countries have the same set of challenges and constraints. Similarities can, however, be identified. From a policy and legal perspective, most African countries suffer from the following problems:

- *Inadequate policies and legislation:* the main problem facing most African countries is that biodiversity-related policies and legislation are not adequate in terms of scope, content and sanctions. Most countries lack a coherent policy framework to guide actions in biodiversity management. The policies and legislation in many African countries are also out-dated and cannot deal with contemporary issues.
- *Fragmented legislation:* African countries also have to deal with a fragmented legal landscape. This is mainly because until fairly recently, the different aspects of biodiversity (and environmental) management were the responsibility of different sectors. This has in general led to multiple pieces of legislation that deal with specific aspects of biodiversity, without much coordination; and in the most extreme cases, contradictions between different pieces of legislation.
- *Overlaps in legislation:* a problem related to fragmentation is one of overlaps in biodiversity legislation. Many African countries face a situation where different pieces of legislation overlap and create duplication of efforts and therefore inefficiencies in biodiversity management.
- *Gaps in legislation:* given that most environment and biodiversity legislation is produced to deal with specific issues, and there are few over-arching biodiversity frameworks, the situ-

ation in many countries is that there tends to be significant gaps in legislation.

- *Poor enforcement of legislation:* a significant constraint for African countries is the enforcement of legislation. Oversight of the implementation of environmental and biodiversity-related legislation is a problem which many countries face. This problem is partially related to institutional and financial capacity (Pripp, and others, 2010; SADC, 2006; Madzwamuse, 2010).

From an institutional perspective, African countries face the following challenges:

- *Poor technical and human capacity:* many institutions tasked with the management of biodiversity in Africa face a major challenge in attracting and retaining skilled professionals to implement biodiversity management programmes and projects.
- *Weak coordination:* in many countries, biodiversity responsibilities have not been focused on one institution but scattered across many different departments, ministries and agencies (Madzwamuse, 2010). This is slowly changing though, with the establishment of environmental ministries and agencies. However, there is still a need for coordination across departments, ministries and sectors because environmental ministries and agencies have little authority in the sectors where impacts to biodiversity occur. Coordination remains a major problem in most African countries, particularly coordination across different ministries and agencies (horizontal coordination). In countries with two or more levels of government, vertical coordination (coordination between the different levels) is also a significant problem.

Funding constraints

One of the biggest challenges that African countries face in adequately managing their biodiversity is funding. Two main problems are seen with regard to funding of biodiversity:

- *Low levels of funding:* lack of sufficient funding poses barriers to the effective conservation and sustainable use of biodiversity, and for setting

up adequate mechanisms for access and benefit sharing. In most African governments, the allocations for biodiversity out of the national budget are quite low, relative to the allocations for other sectors of government. Governments often perceive biodiversity conservation to be a cost that does not bring any returns on investment, and do not make the connection between conservation of biodiversity, development (e.g. through sustainable forestry, fisheries and tourism, etc.) and improved livelihoods. Official development assistance (ODA) flows to environment and biodiversity are also generally low when compared to flows to other sectors. Global ODA funds targeting biodiversity are estimated to make up only 4 per cent of all ODA.

- *Sustainable funding:* lower income countries often rely on ODA to fund the majority of their biodiversity management programme. Given that a good proportion of ODA is project-related, these countries face the challenge of funding sustainability (Pripp, and others, 2010; UNECA, 2012; SADC, 2006).

Inadequate biodiversity research, inventory and monitoring systems

- Many developing countries face severe constraints in the identification and monitoring of the components of their biodiversity. Challenges also exist in the development and maintenance of systematic research programmes (Pripp, and others, 2010). Most research happens on an ad-hoc basis and is rarely guided by a national research framework that targets the areas of biggest needs and seeks to close gaps in knowledge as well as build on existing strengths. The interests of the research, academic and other institutions usually dictated the research agenda, leading to research being concentrated in some areas, while others are under-researched.
- Another problem lies in the fact that much of the research occurring in African countries is undertaken by external institutions (from other African countries or even other continents) and the results of such research are not shared with the institutions responsible for biodiversity management. Inventory and monitoring of the status of the components of biodiversity

and threats to biodiversity is important in order for countries to prioritize policies and actions to protect it. However, most African countries do not have the institutional and financial capacity to implement and maintain inventory and monitoring programmes (Pripp, and others, 2010).

3.4 Conclusions and recommendations

The overall goal of the commitments on biodiversity is to improve the conservation and sustainable use of biological resources and sustainable development. The effective implementation of these commitments would place African countries well on the path to sustainable development.

There have been mixed results in the progress and achievements in meeting these commitments. African countries have achieved overwhelming success in the ratification of the Convention on Biological Diversity, the Cartagena Protocol and other biodiversity-related multilateral environmental agreements. They have also successfully put in place plans for national implementation of such multilateral agreements through National Biodiversity Strategies and Action Plans and other environmental plans, programmes, policies and legislation.

There has been some progress, although slow in some cases, in promoting sustainable use of biodiversity, promoting international and regional cooperation and support, and in the conservation of biodiversity hotspots. Modest progress has also been achieved in controlling invasive alien species, recognizing the role and participation of indigenous and local communities and women in conservation and sustainable use, promoting the Global Taxonomy Initiative and conserving marine and coastal areas.

Little or no progress has been made in mainstreaming biodiversity into national development and poverty eradication policies and strategies, and into the plans and activities of other sectors. In addition, limited progress has been seen in encouraging synergies between and amongst other MEAs particularly at national level, in the wide implementation of the ecosystem approach and in collaboration in research.

Challenges and constraints to effective implementation of the biodiversity commitments have been at the policy and legal level where fragmentation, out-dated policies and legislation, gaps in policy and legislation, and poor enforcement of legislation have been some of the challenges seen. Obstacles also exist at institutional level, where limited technical capacity, financial capacity and lack of coordination are the biggest issues. Funding for biodiversity programmes has also been a huge constraint to biodiversity conservation and sustainable use on the African continent.

Recommendations

The following are recommendations for halting and reversing the loss of biodiversity and achieving the biodiversity-related commitments.

Implement the strategic plan for biodiversity 2011–2020

The Strategic Plan for Biodiversity 2011–2020 provides a framework for the implementation of the Convention on Biological Diversity, and for addressing the drivers and underlying causes of biodiversity loss, for the maintenance of biodiversity, for the enhancement of benefits to all and for the appropriate national, regional and international mechanisms.

- a) African Governments should therefore, among others:
 - Develop national biodiversity targets using the Aichi Biodiversity Targets as a flexible framework;
 - Revise and update their NBSAPs, incorporating the national biodiversity targets that have been developed;
 - Involve stakeholders in the revision and updating of NBSAPs as this leads to better implementation;
 - Use the revised and updated NBSAPs as tools for effective mainstreaming of biodiversity into national development and poverty reduction policies and strategies as well as into other sectors, and to that effect, align their NBSAPs, PRSPs and MDGRs;

- Implement their NBSAPs in synergy with the obligations of other biodiversity-related MEAs;
 - Ensure that NBSAPs are updated periodically to ensure that they respond to contemporary issues;
 - Set aside adequate funding for implementing NBSAPs because they contribute to maintaining ecosystems and biodiversity, which are important for livelihoods and economies; and
 - Identify strategic priorities for external funding within their NBSAPs, which will help to ensure that bilateral aid is utilized where it is most needed.
- b) Developed countries, international financial institutions, regional development banks, and other multilateral financial institutions should provide African countries with financial support to assist them to fully implement the Strategic Plan for Biodiversity 2011-2020.
- c) RECs, regional organizations, United Nations agencies, international and national NGOs should provide technical support and strengthen the capacity of African Governments to implement the Strategic Plan, including the revision and updating of NBSAPs.
- d) RECs, regional organizations, United Nations agencies, international and national NGOs should also mainstream biodiversity considerations into their regional strategies and action plans, across different sectors.
- Develop well-targeted policies focusing on critical areas, species and ecosystem services in order to avoid the most dangerous impacts of biodiversity loss on people and societies;
 - Invest in increasing the availability of information on biodiversity to enhance decision-making; and
 - Make use of the best available data and information to strengthen decision-making.
- b) Developed countries, international financial institutions, regional development banks, and other multilateral financial institutions should increase support to taxonomic research, including through funding and training of taxonomists. Moreover, they should increase support for gene banks in Africa in order to strengthen research and conservation

Mainstream biodiversity into sectoral, national subregional and regional development frameworks

While the activities of environmental departments and agencies in tackling specific threats to species and expanding protected areas, has been and continues to be extremely important, they are easily undermined by decisions from other ministries that fail to apply strategic thinking on policies and actions that impact on ecosystems and other components of biodiversity. Trade-offs between conservation and development are inevitable, and it is important that decisions are informed by the best available information and that the trade-offs are clearly recognized up-front, evaluated against their medium-and long-term impact, and that win-win alternatives are explored.

Strengthen policy and decision-making

African countries have managed to develop NBSAPs but these have not been updated and have not impacted on national development and sectoral policies and strategies. The revised and updated NBSAPs should ideally lead to the development of robust biodiversity policies on conservation, sustainable use and equitable benefit sharing.

- a) African Governments should carry out the following:
- Undertake valuation of ecosystems and biodiversity in order to understand the true value of their countries' biological endowments;
 - Continue to mainstream biodiversity across the whole of government and across economic sectors in order to appropriately address the underlying causes of biodiversity loss;
 - Include biodiversity considerations in land-use planning and decision-making so as to ensure

that no further loss of natural habitats takes place in priority biodiversity areas;

- Make use of environmental economics and its concepts such as the green economy and TEEB, to convert trade-off situations to win-win situations between conservation and development; and
 - Address the direct pressures on biodiversity where multiple drivers are combining to weaken ecosystems. Aggressive action to reduce those that are more amenable to rapid intervention should be prioritized, while longer-term efforts must continue to moderate more intractable drivers, such as climate change.
- b) Developed countries, RECs, regional organizations, United Nations agencies, international and national NGOs should provide technical support to African countries to assist them to effectively mainstream biodiversity; and facilitate access by African countries to the latest research on mainstreaming biodiversity.

Encourage sustainable use of biodiversity for improved livelihoods

- a) African Governments should:
- Implement the Nagoya Protocol at national level and use it to create sustainable income options for the rural and urban populations;

- Develop legislation that enables access and benefit sharing and the commercialization of beneficial genetic resources;
- Facilitate access and benefit sharing agreements between developers and providers, to guarantee sustainable use long-term business relationships;
- Govern access and benefit sharing value chains in a way that serves the objectives of conservation and benefit generations at the same time;
- Invest in different approaches to encourage and maintain community-based approaches to conservation, for improved livelihoods and enhanced conservation outcomes.
- Work with international and regional partners to develop a “biodiversity for poverty alleviation” initiative that will highlight the contribution that biodiversity makes to livelihoods, and to implement actions to strengthen that contribution.

RECs, regional organizations, United Nations agencies, international and national NGOs should provide technical support and strengthen the capacity of African Governments to implement the Nagoya Protocol and to strengthen community-based approaches to conservation.

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4. Biotechnology

Key messages

Biotechnology can make a significant contribution in the area of better health care and enhanced food security in Africa, through sustainable agricultural practices, more efficient and clean industrial and environmental processes, and support of sustainable approaches for managing and conserving biodiversity. This can be achieved if the decisions and actions on the introduction, development and deployment of biotechnology are demand-driven and based on scientific evidence and safety of the technology to human and animal health, and the environment.

African countries have demonstrated interest and have actively invested in research and development (R&D) as well as commercialization of biotechnology products at various levels and in different fora. Steady progress has been made in the development of policies, laws, regulations and institutional arrangements to govern biotechnology. However, the approach towards the development of regulatory frameworks has largely been cautious and sometimes contradictory.

Political commitment and priority setting are critical for the successful development and deployment of biotechnology in Africa. Governments should formulate policies to attract and encourage private-sector participation in biotech R&D, support the creation of incubation hubs in public universities, and help foster linkages with the private sector for commercialization.

National investment plans in research, including in biotechnologies, need to be increased. Biotechnology R&D requires significant funding, adequate infrastructure and human resources. Government policies to stimulate venture capital, contract research, partnerships with the corporate sector and other forms of financing are greatly needed. The promotion of partnerships and regional integration, and harmonization of biotechnology and biosafety policies offer opportunities for countries to cooperate in capacity strengthening, and pool scarce financial, human and infrastructural resources.

Effective and functional biosafety systems are needed to maximize the benefits of biotechnology and minimize potential risks. It is important to support the establishment of science-based regulatory systems at both national and institutional levels.

African countries should support and strengthen existing and new technology transfer mechanisms. It is crucial to ensure that technologies transferred are sustainable, demand-driven and responsive to local needs and realities.

The Convention on Biological Diversity defines biotechnology as: “any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use”. Traditional biotechnology refers to early forms of using living organisms to produce new commodities or modify existing ones. It includes such techniques as selective breeding, fermentation and hybridization. Traditional biotechnology has been used since ancient times to make new products or modify existing ones such as bread baking, beer brewing and turning milk into cheese. Historically, farmers have relied on selective breeding and cross fertilization to modify plants and animals to improve food production and satisfy other human needs (Convention on Biological Diversity and UNEP, 2003).

Modern biotechnology refers to applications that use genes, cells and living tissues in a predictable and controlled manner. The discovery of deoxyribonucleic acid (DNA), which contains the biochemical instructions of how an organism functions, has laid the groundwork for the transition from traditional to modern biotechnology. It made it possible to produce desired changes in an organism through the direct use of its genes in a precise, controlled and less time-consuming fashion in comparison to traditional biotechnology techniques (Convention on Biological Diversity and UNEP, 2003).

4.1 International biotechnology-related commitments

The sound application of biotechnology in the region's quest for sustainable development has been shaped and influenced by international regimes, regional processes and country-specific policy, institutional and legal arrangements. Progress made by various African countries in integrating biotechnology into the sustainable development agenda is closely linked with the policy/political landscape, and the nature of legislation put in place or applied to govern the technology. Noticeable achievements and major capacity-building initiatives associated with these developments at the international, regional and national levels are analysed in various sections of this report.

There are many international agreements that govern the responsible and sustainable use of modern biotechnology to which African countries are signatories and

hence contracting Parties. They include agreements addressing plant and animal health, environmental and food safety, as well as those governing trade. This section describes international agreed commitments related to biotechnology and international frameworks that contain significant elements governing the sound application of biotechnology.

Chapter 16 of Agenda 21 (A21) deals with the environmentally sound management of biotechnology. The chapter identifies two fundamental aspects: the potential role of biotechnology in addressing many environmental and developmental challenges; and the need to ensure that efforts to maximize benefits from modern biotechnology are done within the context of adequate safety measures (biosafety) and considerations. The Programme for the Further Implementation of Agenda 21 (PFIA21) underscores the urgent need for the conservation and sustainable use of biological diversity and the fair and equitable sharing of benefits arising from the utilization of components of genetic resources. It focuses on facilitating transfer and handling of biotechnology and its benefits, and the need for biosafety capacity-building.

The Johannesburg Plan of Implementation (JPOI) provides a framework for action to implement the original UNCED commitments, with a special focus on Water and Sanitation, Energy, Health, Agriculture and Biodiversity (WEHAB). It underscores the need to promote access to biotechnology and its benefits, and enhanced scientific and technical cooperation on biotechnology and biosafety. It also promotes the exchange of experts, training human resources and developing research-oriented institutional capacities (see box 9).

Box 9: Indicative list of main commitments and goals contained in JPOI, PFIA21 and A21 on biotechnology

- a. Promote practicable measures for access to the results and benefits arising from biotechnologies based upon genetic resources, in accordance with articles 15 and 19 of the Convention on Biological Biodiversity, including through enhanced scientific and technical cooperation on biotechnology and biosafety;
- b. Increase the availability of food, feed and renewable raw materials using biotechnology as a means;
- c. Establish enabling mechanisms for the development and the environmentally sound application of biotechnology;
- d. Respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles, and encourage the equitable sharing of the benefits arising from traditional knowledge;
- e. Enhance developing countries' capabilities to compete in the emerging market for biological resources, while improving the functioning of that market;
- f. Improve productivity, nutritional quality and shelf-life of food and animal feed products with efforts including work on pre- and post-harvest losses;

- g. Improve both plant and animal breeding and microorganisms through the use of traditional and modern biotechnologies, to enhance sustainable agricultural output to achieve food security, particularly in developing countries through:
 - i. Further developing resistance to diseases and pests;
 - ii. Developing plant cultivars tolerant and/or resistant to stress from factors such as pests and diseases and from abiotic causes;
 - iii. Promoting sustainable agricultural output by strengthening and broadening the capacity and scope of existing research centres to achieve the necessary critical mass, through encouragement and monitoring of research into the development of biological products, and processes of productive and environmental value that are economically and socially feasible, while taking safety considerations into account;
 - iv. Promoting the integration of appropriate and traditional biotechnologies for the purposes of cultivating genetically modified (GM) plants, rearing healthy animals and protecting forest genetic resources; and
 - v. Developing processes to increase the availability of materials derived from biotechnology for use in food, feed and renewable raw materials production.
- h. Maintain and develop data banks of information on the environmental and health impacts of organisms to facilitate risk assessment;
- i. Cooperate on issues related to conservation of, access to, and exchange of germ plasm; rights associated with intellectual property and informal innovations, including farmers' and breeders' rights; access to the benefits of biotechnology; and biosafety;
- j. Accelerate technology acquisition, transfer and adaptation by developing countries to support national activities that promote food security, through the development of systems for substantial and sustainable productivity increases that do not damage or endanger local ecosystems;
- k. Contribute, through the environmentally sound application of biotechnology, to an overall health programme;
- l. Prevent, halt and reverse environmental degradation through the appropriate use of biotechnology in conjunction with other technologies, while supporting safety procedures as an integral component of the programme;
- m. Ensure safety in biotechnology development, application, exchange and transfer through international agreement on principles to be applied on risk assessment and management, with particular reference to health and environmental considerations, including the widest possible public participation and taking account of ethical considerations; and
- n. Establish enabling mechanisms for the development and the environmentally sound application of biotechnology.

In addition to the commitments contained in A21, PFIA21 and JPOI, biotechnology-related commitments are contained in several international agreement and conventions. For instance, the Convention on Biological Diversity recognizes that technology includes biotechnology (Article 16) and foresees the need to exploit the potential benefits of modern biotechnology

while safeguarding against potential risks to biological diversity, taking also into account risks to human health. Indeed, Article 8(g) of the Convention obligates contracting parties to develop national biosafety systems, while Article 19 deals with 'Handling of Biotechnology and Distribution of its Benefits'.

Box 10: Biotechnology in the Convention on Biological Diversity and its Protocols

The Cartagena Protocol on Biosafety was adopted in 2000 and applies to the transboundary movement, transit, handling and use of all living modified organisms (LMOs) that may have adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health. The Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress was adopted on 15 October 2010 as a supplementary instrument to the Cartagena Protocol on Biosafety. Liability and redress refers to the obligation under the applicable law to provide for compensation for damage resulting from an action for which that person is deemed to be responsible. Adoption of the Supplementary Protocol is a major milestone in the quest for an environmentally sound application of biotechnology.

The objective of the Protocol is to contribute to the conservation and sustainable use of biological diversity, taking also into account risks to human health by providing international rules and procedures in the field of liability and redress relating to LMOs. The Supplementary Protocol gives flexibility to countries to use existing laws or develop new legal, administrative or judicial rules or procedures relevant to liability and redress.

The Codex Alimentarius Commission, created in 1963 and administered jointly by the World Health Organization (WHO) and FAO Food Standards Programme, sets sanitary and technical standards for food safety. The main purpose of Codex is to ensure that consumers receive products that are of minimum acceptable quality, are safe and do not present a health hazard. In July 2003, the Ad Hoc Intergovernmental Task Force on Food Derived from Biotechnology of the Codex Alimentarius Commission reached a landmark agreement to adopt principles for the evaluation of food derived from modern biotechnology (FAO and WHO, 2003a) and on guidelines for the conduct of food safety assessment of food derived from recombinant-DNA plants (FAO and WHO, 2003b), and foods produced using recombinant-DNA microorganisms (FAO and WHO, 2003c).

Agreements negotiated under the World Trade Organization (WTO) often have implications for biotechnology. In particular, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) applies where a biotechnology product may pose a risk to human, plant or animal health. The Agreement on Technical Barriers to Trade covers all technical regulations, standards and conformity assessment procedures that do not fall directly under the SPS Agreement. Member States of WTO are obligated to ensure that the Agreement on Technical Barriers to Trade prevents deceptive trade practices without imposing unnecessary obstacles to international trade (Wafula, and others, 2012).

The Agreement on Trade-Related Aspects of Intellectual Property Rights is an international agreement administered by WTO. Biotechnology is often proprietary due to heavy investments associated with the entire

process of product development, regulatory compliance and deployment. Protection of intellectual property therefore provides encouragement for innovations involving biotechnology. In addition, intellectual property rights (IPRs) accord incentives for investments, which may lead to new products and processes. Some concerns have been raised about the impact of IPRs on food security. For instance, farmers may be required to enter into contracts with multinational companies for seeds. These Technology Use Agreements would typically prevent farmers from sharing seeds or even saving seeds for the next planting season.

Finally, biosecurity is emerging as a key area in the development and implementation of regulatory frameworks for food, agriculture, fisheries and forestry. It has direct relevance to food safety, conservation of the environment (including biodiversity), and the sustainability of agriculture. In broader terms, biosecurity encompasses all policy and regulatory frameworks (including instruments and activities) to manage risks associated with food and agriculture (including relevant environmental risks), as well as fisheries and forestry.

Biosecurity is composed of three sectors, namely, food safety, plant life and health, and animal life and health. These sectors include food production in relation to food safety, the introduction of plant pests, animal pests and diseases, zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and safe management of invasive alien species and genotypes.

4.2 Concrete actions taken, progress made and achievements

Biotechnology is steadily being adopted in many African countries to spur development and poverty alleviation as recommended in the African Union NEPAD Science and Technology Consolidated Plan of Action (CPA). The application of biotechnology R&D in Africa cuts across agriculture, environment, health and the industry. African countries are embracing biotechnology R&D at various levels to cope with the increasing demands for food, feed, fibre and fuel.

In the area of human and animal health, biotechnology is being exploited in disease diagnosis, treatment, drugs and vaccine development. Biotechnology is also being harnessed in the sustainable use and conservation of forest resources. Some of the industrial applications include generation of energy (biogas) from industrial wastes and conservation of renewable raw materials as a substitute for fossil fuels, for instance, commercialization of biofuels as a potential substitute for petrol and diesel.

4.2.1 Biosafety law and legislation

Biosafety issues transcend national boundaries and, if not well managed at the regional level, they can disrupt trade or make borders susceptible to transboundary movements of GMOs. Key areas with transboundary implications include planting of GM crops, intraregional trade in products containing GMOs, and delivery of emergency food aid with GM content. Article 14 of the Biosafety Protocol states that countries may enter into bilateral, regional and multilateral agreements and arrangements to manage transboundary movements of GMOs.

RECs, including COMESA, SADC, ECOWAS and EAC have launched initiatives dedicated to regional harmonization of biosafety policies. Subregional approaches to biosafety are expected to bolster subregional integration goals and foster intercountry cooperation through the sharing of knowledge, expertise, experiences and resources.

African countries have made remarkable progress in the development of mechanisms for the development and environmentally sound application of biotechnology. These include the development and implementation of National Biosafety Frameworks (NBFs), which is a combination of policy, legal, administrative and technical instruments to ensure an adequate level of protection and safety in the transfer, handling and use of living modified organisms. The current status is characterized by two main types of NBFs: explicit, as stand-alone policies that have been specifically formulated to address biotechnology; or implicit, whereby sectoral policies and laws pay reference to aspects of biosafety.

Generally, the regulatory framework addresses important issues related to handling of GMOs for research purposes (contained and confined use), risk assessment and management provisions before and after environmental release of GMOs, and issues related to marketing and trade (import, export and transit).

Table 2 summarizes the status of biosafety policies and legislation in Africa. More than 90 per cent of countries have developed NBFs with assistance from UNEP-GEF. However, implementation of NBFs is at different stages of progress.

Box 11: Africa's Science and Technology Consolidated Plan of Action of the African Union

Africa's Science and Technology CPA focuses on the safe development and application of biotechnology (Programme 1.2) and building a common African Strategy for biotechnology (Programme 5.4). Following the adoption of the Plan in August 2005 by the African Ministerial Council on Science and Technology and the AU, a High-Level African Panel on Modern Biotechnology was constituted to give independent advice and guidance on the role of biotechnology in the region's economic recovery and transformation (ISSD, 2007; AU, 2006). The main message delivered by the Panel was that regional economic integration in Africa should embody the building and accumulation of capacities to harness and govern modern biotechnology. The Forum for Agricultural Research in Africa has also expanded its portfolio to include continental priorities in biosafety and biotechnology (Morton, 2010).

Table 2: Summary of status of biosafety policies and legislation in Africa

	Eastern	Central	West	Southern Africa	North
Enacted biosafety laws	Ethiopia, Kenya, Tanzania		Burkina Faso, Ghana, Mali, Nigeria, Senegal, Togo, Cameroon	Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe	Libya, the Sudan
Draft biosafety bills	Burundi, Eritrea, Madagascar, Rwanda, Seychelles, Uganda	Democratic Republic of the Congo	Côte d'Ivoire, Guinea- Bissau		Egypt, Tunisia, Morocco
Approved biotech/biosafety policy	Kenya, Madagascar, Seychelles, Uganda	Cameroon		Malawi, Namibia, Swaziland, Zambia, Zimbabwe	The Sudan
Draft biotech/biosafety policy	Comoros, Eritrea, Rwanda	Democratic Republic of the Congo			Libya
Sectoral legislation with reference to biosafety					Egypt, Libya
Sectoral biotech/biosafety policies with reference to biotech and biosafety	Djibouti			Mauritius	

Source: Wafula, and others, 2012.

4.2.2 Applications of biotechnology

Enhance availability of food, feed, fibre and renewable raw materials

A number of African countries are engaged in crop biotechnology with the aim of increasing food security and alleviating poverty. Significant impacts and positive outcomes have been achieved in Kenya from adoption of tissue-culture banana by small-scale farmers. The technology made it possible for more than 10,000 farmers to access large quantities of superior clean planting with early maturity traits (12-16 months compared to the conventional banana of 2-3 years), bigger bunch weights (30-45 kg compared to the 10-15kg from conventional material), and higher annual yield per unit of land (40-60 tons per hectare against 15-20 tons previously realized with conventional material) (Karembu, and others, 2009).

South Africa is an outstanding example of a country that has embraced and benefited tremendously from advances in modern biotechnology. Approximately 12 million hectares of GM maize (white and yellow) were planted in the ten-year period from 2001 to 2010 for food, feed and processing. The total area planted with GM soybeans increased from 290,000 hectares in 2010 to an estimated 450,000 hectares in 2011 owing to high

demand. Cumulative farm income gains from adoption of biotech crops for the period 1998-2010 amounted to US\$809 million (James, 2011).

Another major achievement and successful case in the application of biotechnology is the development of the New Rice for Africa (NERICA), which has contributed towards self-sufficiency in rice production and improved food security. NERICA varieties have now been introduced in more than 30 countries in sub-Saharan Africa (Diagne, 2009).

In Ghana, microorganisms are used in fermented foods to enhance flavour and retain quality under conditions of little or no refrigeration. By increasing product shelf life microorganisms contribute to food safety and food security. The Council for Scientific and Industrial Research Food Research Institute has developed purified bacterial culture medium to enhance the quality of a fermented corn-dough product, known traditionally as Ga kenkey. This technology has been out scaled for traditional factory-type batch production of large volumes of Ga kenkey, not hitherto possible. An increased demand for high-quality kenkey has resulted in production upscaling at the traditional food processing point (Amoa-Awua, and others, 2004).

Special attention has been paid to development of technologies that can contribute towards nutritionally enhanced foods using tools of modern biotechnology to mitigate malnutrition. The African Biofortified Sorghum project⁴ seeks to develop a more nutritious and easily digestible sorghum variety that contains increased levels of essential amino acids (especially lysine), increased levels of Vitamin A, and more available iron and zinc.

The development of cassava with increased pro-vitamin A, iron and protein is another major project in Africa. This work is being undertaken under the aegis of the BioCassava Plus (BC Plus) project.⁵ Cassava is a staple crop consumed by more than 250 million people in sub-Saharan Africa. Increasing the nutritional content of the crop will tremendously reinforce the campaign to reduce malnutrition.

Adoption of *bacillus thuringiensis* (Bt) cotton has contributed to increasing availability of fibre in Burkina Faso and South Africa. With regard to Burkina Faso, cotton remains the principal cash crop generating over \$300 million in annual revenues. This represents over 60 per cent of the country's export earnings (International Cotton Advisory Committee). Some 2.2 million people depend directly or indirectly on cotton, often referred to locally as "white gold" (Vognan, and others, 2002).

Benefits from Bt cotton include an average yield increase of almost 20 per cent, plus labour and insecticide savings (two rather than six sprays), resulting in a net gain of about \$66 per hectare compared with conventional cotton. Egypt was successful in deploying Bt maize (Ajeeb YB) to combat poverty. Increase in yield per hectare resulted in a gain of \$267 plus insecticide savings equivalent to \$89 per hectare for a total gain of approximately \$355 per hectare, minus the additional cost of seed per hectare at \$75 for a net benefit per hectare of around \$280 (Karembu, and others, 2009). Morocco and Tunisia have been doing biological research and preliminary trials on palms, potatoes, tomatoes, maize and forest trees (Morris, 2011).

Biological nitrogen fixation has been adopted by many African countries to address the challenges of low usage and high costs of fertilizer. The technology induces the multiplication of microbes in plant roots – known as

biofertilizers – which help the plant to fix nitrogen from the atmosphere. Use of biofertilizers has been reported in many countries, including Kenya, Senegal, Tanzania, Tunisia, Zambia and Zimbabwe (Juma and Serageldin, 2007). Use of biofertilizers contributes to reduced use of chemical fertilizers, which may pollute soil and water basins, and interfere with crucial life forms that maintain the overall ecological balance.

Developments in industrial biotechnology have offered new opportunities for fossil fuel substitution and carbon sequestration, resulting in a positive impact on climate change dynamics. For example, the Government of Ghana supports development, and investment in and commercialization of biofuels as a potential substitute for petrol and diesel. This is being encouraged through favourable tax regimes to attract companies to develop alternatives to fossil fuels (Antwi, and others, 2010). The use of biofuels is a major intervention in dealing with high oil prices and supporting global reduction of greenhouse gases.

Improving human and animal health

Cutting-edge developments in genomics and bioinformatics have made the diagnosis and early treatment of many diseases and disorders possible. An outstanding example is diabetes, which was once considered a rare disease in sub-Saharan Africa. Human insulin for the treatment of diabetes was one of the first genetically engineered products to become commercially available, in 1982 (Motala and Ramaiya, 2010).

Through research into the development of recombinant DNA (GM), better, cheaper and safer vaccines are being sought. Through the use of monoclonal antibodies and recombinant DNA technologies, it is now possible to genetically modify vaccines more rapidly. For instance, clinical trials and efforts to develop HIV/AIDS vaccines using recombinant DNA techniques in Africa and other regions of the world are at various stages of progress. The Kenya Medical Research Institute has also developed an affordable and diagnostic testing kit for hepatitis B.

Professionals in the field of animal sciences are using biotechnology discoveries to improve animal health and production. In Uganda, recombinant vaccines for East Coast fever and new cattle diseases have been developed. East Coast fever alone kills a million cattle every year in East, Central and Southern Africa, and

⁴ For details about the project visit <http://biosorghum.org/>.

⁵ For details about the project visit http://www.danforthcenter.org/science/programs/international_programs/bcp/.

Box 12: The Pan African Veterinary Vaccine Centre

The Pan African Veterinary Vaccine Centre (PANVAC) was launched in March 2004 as a specialized agency within the Department of Rural Economy and Agriculture of the African Union Commission. The Centre is located in Debre Zeit, Ethiopia. It seeks to contribute to AU member States' efforts in the control and eradication of animal diseases.³

One of the broader objectives of PANVAC is improvement of the efficacy of the current contagious bovine pleuropneumonia (CBPP) vaccines used in Africa, by applying new technologies and transferring the same to AU member States. CBPP is considered the most threatening infectious disease by most African veterinary services.

is responsible for up to 50 per cent of all calf deaths in pastoral and agro-pastoral communities, impacting negatively on livelihoods (Agfax, 2010). In 1996, the International Livestock Research Institute released a recombinant vaccine against East Coast fever (theileriosis) for field trials.

Enhancing protection of the environment

Forestry biotechnology has contributed to sustainable use and conservation of forest resources in Africa. A typical example is clonal forestry, a technology that was developed in South Africa, and has been adopted by Tree Biotechnology Project Trust in Kenya (Wakhusama and Kanyi, 2002). The Trust has the largest single forest tree clonal nursery in East and Central Africa, capable of producing high-quality tree hybrid clones and pure selected seedlings. Clonal forestry has helped to supply plant material that is pest and disease resistant, contributed to wealth creation through the fast maturing and high-quality trees with good wood characteristics, and immensely increased the forest cover.

Adoption of pest and disease resistant biotech crops such as Bt cotton and Bt maize have had positive impacts on the protection of biodiversity and reduction of the amount of agrochemicals released to the environment. Farmers growing conventional cotton in Burkina Faso have to spray six times per season to control bollworm whereas those growing Bt cotton only have to spray two times (James, 2010 and 2011).

The agro-processing industry in Africa produces large amounts of waste, which contributes to environmental pollution. Projects supported by the former Swedish-funded East African Regional Programme and Re-

search Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN), now called BioInnovate, have demonstrated that waste is a resource that could be used to generate bioenergy and value-added chemical products. Using biotechnology, processes for biogas production and recovery of valuable products from Nile perch waste have been developed. Similarly, production of biogas from sisal processing waste has been successfully explored (Forsman, and others, 2010).

Industrial effluents containing high contents of organic matter, nitrogen and heavy metals end-up discharged into the environment and fresh water sources with little or no pre-treatment. This has necessitated the search for technologies for environmentally friendly treatment of industrial wastes such as tannery wastewaters. Biological processes are not only cost effective but also environmentally sound alternatives to the chemical treatment of tannery wastewaters.

4.2.3 Biotechnology research and development and technology transfer facilitation

One of the key commitments set out in JPOI is the fostering of scientific and technical cooperation on biotechnology and biosafety, including exchange of experts, training, human resources, and developing research-oriented institutional capacities. The AU-NEPAD Agency African Biosciences Initiative launched in 2005 is a typical example of concrete actions taken to enhance scientific and technical cooperation in the region.

The African Biosciences Initiative of the AU-NEPAD Planning and Coordinating Agency (NEPAD Agency/

Box 13: Biotechnology and wastewater treatment in Ethiopia

In Ethiopia, the department of biology at Addis Ababa University commissioned a pilot plant for six months to evaluate the effectiveness of biological nitrogen and organic matter removal from tannery wastewater. The pilot wastewater treatment plant was fed with raw tannery wastewater obtained from the Modjo Tannery located 70 km south of Addis Ababa. The plant was found to be operationally efficient for the removal of nitrogen, organic matter and other pollutants from the tannery.

ABI) is intended to address African problems in agriculture, health and environment through the application of biosciences innovations; use new developments in biosciences to protect the environment, conserve biodiversity and improve livelihoods and well-being of the people of Africa; build and strengthen human capacity in biosciences in Africa; promote access to affordable, state-of-the-art research facilities within Africa; and harness indigenous knowledge and technology of the African people for sustainable utilization of natural resources and wealth creation.

In Eastern Africa, most of the agricultural biotechnology R&D activities focus on mitigating production constraints (biotic and abiotic) and enhancing productivity of major crops. The level of progress in Kenya and Uganda is advanced compared to other countries, and they are engaged in both intermediate and advanced biotechnology applications including research trials of transgenic maize, cotton, sweet potato, cassava and sorghum.

Apart from agriculture, Kenya and Uganda also have a growing number of biotechnology applications in health, environment and industry diagnostic tools, medicines, vaccines and hormones. Biotechnology is used in bioremediation, biofuels and production of enzymes (Olembo and others, 2010). Biotechnology in

Tanzania mainly involves tissue culture and micropropagation, marker-assisted breeding, disease diagnostics and livestock vaccines (Mnoney, and others, 2001; Rutabanzibwa, 2004).

Most R&D activities in Ethiopia have been in the area of agricultural biotechnology, with coffee, teff, banana, wheat and sorghum as priority crops. In recent years, projects in the areas of industrial, health and environmental biotechnology have been gaining ground (Kassa, 2011). In Rwanda, there has been a limited, but steadily growing range of biotechnology applications in areas such as crop husbandry, medicine (HIV/AIDS diagnostics, vaccine trials using recombinant DNA technology), production of bioenergy, and waste treatment. Rwanda has also made modest progress in industrial biotechnology applications in the brewing of beer, production of juice and yoghurt.

Biotechnology in Burundi is at its embryonic stage. The types of research which has been done there include in vitro plant tissue culture and animal biotechnology addressing bovine genetic improvement, embryo rescue and animal disease diagnostics.

In Zambia, the University of Zambia is the only public institution undertaking biotechnology R&D work in the country. The university has been involved in tissue

Box 14 African Biosciences Initiative Network

The AU-NEPAD Agency/ABI adopted the regional networking approach whereby institutions make their resources available to address common challenges. In this regard, four regional networks were established on the continent, namely, the Southern African Network for Biosciences (SANBio) covering southern African countries, the Biosciences Eastern and Central Africa Network (BecANet) covering countries in Eastern and Central Africa, the West African Biosciences Network (WABNet) covering ECOWAS countries, and the North African Biosciences Network (NABNet) covering six countries in North Africa.

Box 15 : BIO-EARN

In response to the challenge of mobilizing science and technology for the region's development, the BIO-EARN Programme was initiated in 1998. The first and second phases of the BIO-EARN Programme (1999-2005) were focused on building human and infrastructural capacity in using advanced agricultural, environmental, industrial biotechnology and developing biopolicy and biosafety regulatory skills. In the third phase (2006-2009), the capacity of African scientists and policymakers was used as the basis to develop nine large regional research consortia, involving science and market actors, engaged in research for development (R4D) with a focus on crop productivity, agroprocessing, environmental and industrial development.

Over a period of ten years (1999-2009), the BIO-EARN Programme engaged 35 institutions from Ethiopia, Kenya, Tanzania, Uganda and Sweden, more than 100 scientists and an even larger number of policymakers and practitioners from the region. The programme also developed new products such as improved varieties of sorghum, cassava and sweet potatoes, new bioprocess technologies for wastewater treatment and energy production, and has served as a platform for regional collaboration and information sharing on biotechnology and biosafety policy issues. BIO-EARN has been transformed into a new programme, namely "Bioresource Innovations Network for Eastern Africa Development (Bio-Innovate).

Box 16 : South Africa – East Africa

Partnerships and intraregional collaboration has resulted in successful technology transfer from South Africa to East Africa. A case in point is the successful negotiation, testing and transfer of tissue-culture technology to mitigate disease pathogen load in bananas in order to reverse the declining trends in farm productivity, and enhance farmers' access to clean planting materials in East Africa.

The other outstanding example is the transfer of clonal forestry technology to East Africa, where farmers have been able to access hybrid fast growing multipurpose tree seedlings to meet basic fuel wood needs as well as for commercial application. These efforts were facilitated by the International Service for the Acquisition of Agri-biotech Applications (ISAAA AfriCenter). ISAAA is a not-for-profit international organization that shares the benefits of crop biotechnology with various stakeholders, particularly resource-poor farmers in developing countries, through knowledge-sharing initiatives and the transfer of proprietary biotechnology applications.

culture plant biotechnology for more than 10 years, focusing on induced mutation techniques on cassava improvement.

Despite enormous potential, Zimbabwe has had limited biotechnology R&D activities. The Zimbabwe Biosafety Board approved the very first set of confined field trials for both Bt maize and Bt cotton in 2001. Both trials were conducted over three seasons during which data were collected. The technology performed very well but the next level of commercialization was not realized.

In Malawi, there are moderately equipped laboratories in agricultural institutions and universities capable of conducting R&D, but research work has been limited to tissue culture of crops such as banana and beans, with no ongoing research on transgenic crops. In the past few years, biotech research capacity has been strengthened, but they lack the necessary equipment and facilities to carry out their research. In 2011, the National Biosafety Regulatory Committee approved the application by Bunda College to conduct confined field trials of Bt cotton in Malawi.

In Mozambique, there is limited agricultural biotechnology research capacity. Activities have been limited to research on virus-free cassava, Irish potato, banana and sweet potato planting materials. The transgenic drought-tolerant maize being developed under the Water Efficient Maize for Africa (WEMA) project is the

only product currently under development that is targeted to Mozambique.

The majority of biotechnology research conducted in West and Central Africa has been on tissue culture for mass propagation of clean plantlets. Nwalozie, and others (2007) observed that few laboratories in the sub-region characterized germ plasm and fewer still had the capacity to conduct molecular marker-assisted breeding. Burkina Faso, Ghana and Nigeria, are the only West African countries that have granted approvals for testing of GMOs. A combination of inadequate capacity, lack of implementing regulations and supportive political environment has impeded progress in the rest of the countries.

In Nigeria, GM crops undergoing field trials include Bt cowpea, biofortified sorghum, and the biocassava Plus. Bt cowpea and the Africa biofortified sorghum are undergoing trials at the Institute for Agricultural Research, ABU, Zaria, while biocassava Plus is undergoing a trial at the National Root Crop Research Institute, Umudike. In addition, there is growing interest in the testing and prompt release of insect-resistant, herbicide-tolerant cotton (GAIN, 2012).

In November 2012, the Ghana National Biosafety Committee approved three applications for the confined field trial of living modified organisms. In addition to commercialization of Bt cotton, Burkina Faso

Box 17 : West African Biosciences Network

The West African Biosciences Network (WABNet), consisting of ECOWAS countries, has been initiated as part of the NEPAD/African Biosciences Initiative. It is a cluster of three science and technology flagship programmes, namely biodiversity, biotechnology and indigenous knowledge systems, and it is being implemented through regional networks involved in carrying out R&D and in transferring biosciences technologies. WABNet is involved in cutting-edge biotechnology-related research and has a critical mass of expertise that is actively involved in R&D.

Box 18 : Central African Council for Agricultural Research and Development and West and Central African Council for Agricultural Research and Development

One of the subregional organizations committed to supporting biotechnology is the Central African Council for Agricultural Research and Development and West and Central African Council for Agricultural Research and Development (CORAF/WECARD). Biotechnology and biosafety programmes are implemented under the CORAF/WECARD 2008-2013 Operational Plan. The Biotechnology and Biosafety Programme has contributed to the establishment of a cassava cleaning and multiplication methodology that combines in vitro and in vivo greenhouse techniques within the framework of a commissioned project of the food security response initiative. In the area of capacity strengthening, capacities of researchers and technical experts have been enhanced in the areas of risk assessment and management for GMOs, construction of greenhouses, acquisition of laboratory materials and chemical products for conducting experiments related to biotechnology projects (CORAF/WECARD, 2011).

granted approvals for greenhouse experimentations of GM sorghum with an improved level of vitamin A and improved zinc and iron content, and trials of GM cowpea “Bt cowpea” resistant to *Maruca vitrata* Fab.

Technology transfer was considered as a critical and indeed an integral process in the quest to realize sustainable development during the 1992 UNCED meeting in Rio de Janeiro, Brazil. In this section of the report,

initiatives in Africa aimed at facilitating transfer of environmentally sound technologies during the past two decades are reviewed. Traditionally, Africa has benefited from North–South technology transfer arrangements. The emerging trend is now one of South-South collaboration with countries in Asia and Latin America. Some of the technology transfer initiatives that are documented include the one in Box 19

Box 19 : Africa–Brazil

The idea of a stronger Africa–Brazil linkage is a typical example of a south-south collaboration model. The collaboration was formalized in 2008 with the inauguration of a Regional Office of the famous Agricultural Research Corporation (EMBRAPA of Brazil) in Accra, Ghana. The Accra Office, among other things, would facilitate technical cooperation activities for agricultural development, technology transfer, ensure availability of research findings to industry, and enhance human resource capacity-building. It is designed to help to deepen South-South cooperation through collaboration of Ghanaian and Brazilian scientists to the mutual benefit of Ghana and other African countries (Galerani and Bragantini, 2007). chemical products for conducting experiments related to biotechnology projects (CORAF/WECARD, 2011).

Box 20 : African Agricultural Technology Foundation

In 2002, the African Agricultural Technology Foundation (AATF) was established to serve as a platform for brokering access to and transfer of proprietary technologies to improve the region’s food security prospects. AATF handles intellectual property management, regulatory compliance, liability protection, licensing and sublicensing arrangements, and freedom-to-operate assessments. Under multi-partnership arrangements, AATF has spearheaded the transfer of agro-based technologies. These include Striga weed control technologies that are currently being deployed for use by smallholders in Eastern and Southern Africa.

In addition, AATF negotiated and entered into a contractual agreement with Monsanto Company to allow for access to and use of the insect-protection gene in genetic improvement of cowpea against pests in sub-Saharan Africa. The Foundation also entered into a tri-partite agreement with Monsanto and the International Maize and Wheat Improvement Center (CIMMYT) to access and deliver drought-tolerant maize varieties as a way of mitigating the effects of climate change.

Box 21 : Public-private partnerships for biotechnology

The emergence of public-private partnership project models – where private-sector owned technologies are negotiated and made available royalty-free to African institutions to develop food crops for African farmers – are expected to contribute to food security. An outstanding example is the WEMA project where the Monsanto Company licensed its technologies royalty-free to AATF and the CIMMYT for use in developing WEMA, which is a drought-tolerant variety of maize. The royalty-free seeds will be available to African farmers at a cost comparable to conventional varieties, and farmers can replant or exchange seeds if they wish without facing any legal sanctions (Wekesa and Sihanya, 2005).

4.2.3.1 Education and capacity-building initiatives for implementation of biotechnology and biosafety-related commitments

The region's public research institutions and institutions of higher learning have established programmes dedicated to building human resource capacity. They have also invested in facilities and infrastructure for conducting biotechnology R&D. In Kenya, public universities including Kenyatta, Nairobi, Jomo Kenyatta University of Agriculture and Technology, Egerton and Moi offer biotechnology courses at BSc, MSc and PhD levels.

Kenyatta University has facilities for conducting advanced genetic engineering work. The School of Pure and Applied Sciences conducts research in the development of transgenic maize for drought tolerance and iRNA technology for Striga resistance in sorghum. The Centre for Biotechnology and Bioinformatics at the University of Nairobi is engaged in research and post-graduate training at MSc and PhD levels in biotechnology and bioinformatics to increase capacity and develop manpower for health, agriculture, industry, environmental management and related fields.

In Uganda, the Faculty of Agriculture at Makerere University offers a MSc in crop science, with a biotechnology option focusing on genetic engineering in crop production. The faculty also conducts research in areas such as diagnostics, DNA mapping and marker assisted breeding. The Faculty of Veterinary medicine at the same university applies molecular techniques on research in diagnostics, veterinary microbiology and pathology. In conjunction with the department of Biochemistry, it offers a MSc in molecular biology and biotechnology.

In Ethiopia, the College of Natural Sciences (the former Faculty of Science) at Addis Ababa University initiated joint research and training programmes in biotechnology with Swedish universities. Through these

programmes, staff members were trained in the area of agricultural biotechnology and industrial biotechnology. The Ethiopian Government has also supported establishment of a state-of-the-art biotechnology laboratory at Holeta with focus on agricultural biotechnology. It is one of the centres managed by the Ethiopian Institute of Agricultural Research (Forsman, and others, 2010).

A number of international and regional agencies and institutions and donor organizations have initiated programmes dedicated to the capacity-building of African countries in biotechnology and biosafety. The International Centre for Genetic Engineering and Biotechnology has a sub-Saharan Africa-wide capacity-strengthening project on biosafety.

The Program for Biosafety Systems, managed by the International Food Policy Research Institute, supports partner countries in Africa and Asia in the responsible development and use of biotechnology. The Program works with stakeholders to develop and implement science-based, functional biosafety systems that ultimately expand producer choice, inspire consumer confidence, facilitate trade, and promote agricultural R&D.

Several institutions with an Africa-wide mandate have also been established. For instance, the AU-NEPAD African Biosafety Network of Expertise (ABNE) was established by the AU/NEPAD office of Science and Technology as a continent-wide biosafety service provider. ABNE seeks to build and strengthen the capacity of African countries in making informed science and evidence-based decisions on the application of biotechnology.

Responding to Article 23 (Public Awareness and Participation) of the Biosafety Protocol, several institutions are engaged in communication and outreach activities on biotechnology and biosafety. They include the International Service for the Acquisition of Agri-biotech Applications AfriCenter, African Biotechnology Stakeholders Forum and Africa Harvest. These organizations

Box 22 :Capacity-building for an Africa-wide biosafety system

A project on capacity-building for an Africa-wide biosafety system was commissioned in 2003 between the AU and the German Federal Ministry for Economic Cooperation and Development (BMZ). Its purpose was to equip the AU with the necessary capacity and effective instruments to support its member States in implementing the Cartagena Protocol and applying the African Model Law on Biosafety. The AU Model Law influenced the legal drafting of Ethiopia, Ghana, Mali and Tanzania biosafety legislation.

The substantive activities of the project started in January 2006 and were concluded in April 2011 with a total budget of 2 million Euros. Among the first activities was the establishment of a biosafety office at the seat of the African Union Commission (AUC) in Addis Ababa. The project also established a Technical Advisory Committee with representation from the five African regions, AUC, GIZ, NEPAD and ECA.

provide information to scientists, journalists, policy-makers, regulators, farmers and consumers, on developments in modern biotechnology and biosafety to facilitate science-based decision-making.

4.2.4 Liability and redress measures

The Supplementary Protocol defines “damage” as an adverse effect on the conservation and sustainable use of biological diversity that is measurable and significant. It also provides for an indicative list of factors that should be used to determine the significance of an adverse effect. Once the threshold of significant damage has been met, the need for response measures arises. Traditional damage, which is common in third-party civil liability instruments, and which includes personal injury, loss or damage to property or economic interests, is not covered by the Supplementary Protocol.

The Protocol has adopted an administrative approach for addressing damage. The elements of the administrative approach deal with how, when and who should take response measures in the event of damage or sufficient likelihood of damage resulting from living modified organisms that find their origin in a transboundary movement (Convention on Biological Diversity, 2010). Realistic liability and redress provisions are necessary for responsible development, deployment and use of biotechnology in a sustainable manner.

However, countries should be careful about imposition of strict liability provisions that undermine or impede efforts to implement and achieve biotechnology-related sustainable development commitments. The belief that countries need to be protected from multinationals has led to the establishment of very stringent regulations and liability and redress regimes in some African countries. This has not only discouraged foreign technology developers and development partners but also

stifled home-grown biotechnology R&D efforts (Cullet, 2006).

To date, 49 African countries have ratified or acceded to the Cartagena Protocol on Biosafety. Such countries agreed on taking necessary and appropriate legal, administrative and other measures to implement the Protocol. The state or level of development and application of these instruments varies across the continent. Tanzania and Zambia are examples of countries that have demonstrated commitment to domesticate the Cartagena Protocol on Biosafety by enhancing biosafety legislation and instituting key components of National Biosafety Frameworks (NBFs). However, progress in the implementation of sustainable development commitments related to biotechnology has been slow due to stringent liability provisions.

4.3 Implementation challenges and constraints

Despite the progress in developing legal frameworks, translating policy into practice in Africa has been slow. A variety of reasons are attributed to this. The precautionary approach to GMOs, as laid out in the Cartagena Protocol on Biosafety and encapsulated in most national legislation, has overriding focus on risks associated with GM technology. The exclusive focus on risks, rather than on both risks and benefits, has limited the introduction of the technology in many countries.

Capacity-building activities to help countries put in place NBFs have not been balanced, as they are predominantly focused on managing risks (Morris, 2011). Other challenges include lack of strong political will

and commitment, and lack of mechanisms to access scientific evidence to inform timely and efficient decision-making on biotechnology. The African biotechnology R&D sector is also hampered by low levels of funding, absence of biosafety regulatory frameworks in most countries, and inadequate human resource and infrastructural capacity that is required to engage in cutting-edge biotechnology work.

Challenges and constraints associated with the implementation of sustainable development commitments related to biotechnology in Africa are highlighted below.

Political commitment and priority setting

- The extent to which biotechnology has contributed to sustainable development in various countries is closely linked with and has been dictated by the policy and political landscape and the nature of legislation enacted to govern the technology. The majority of African countries have not integrated the biotechnology agenda into national development policies. In the absence of identified priorities, it is difficult for these countries to make informed and long-term policies.
- Moreover, lack of information on biotechnology R&D, deployment and development in some subregions, in particular North Africa and Central Africa, is further hampering informed decision-making and priority setting.

Funding and capacity-building

- Modern biotechnology R&D is knowledge and capital intensive with hefty financial implications. Short-term erratic and low-level financing of biotechnology R&D is a major constraint across the continent. Most of the current biotechnology R&D programmes are donor funded although coordinated and managed by public research institutions. The low level of private-sector participation in biotechnology R&D is another challenge. Scientific and technological infrastructure to conduct modern biotechnology R&D work is only available in a few countries.

Biosafety regulation

- Biosafety regulations play a key role in the judicious and sound use of biotechnology. However, laws and regulations that could stifle biotechnology scientific and technological innovations may hamper the implementation of biotechnology-related sustainable development commitments. For instance, strict liability and redress provisions that exceed basic scientific principles, and the guidance provided by the biosafety protocol and other international instruments, may prevent African countries from implementing sustainable development commitments related to biotechnology.

Technology transfer and intellectual property rights

- Many African countries still grapple with the lack of coherent and realistic policies, often exacerbated by a lack of elaborate mechanisms for promoting public-private partnerships in technology transfer, despite this being a critical component for achieving sustainable development. The number of initiatives and programmes with appropriate funding and institutional structures dedicated to facilitating technology transfer in Africa is limited.
- The role of intellectual property protection and its impact on the acquisition, development and diffusion of biotechnology is not well entrenched. In most African countries, institutions for administering industrial property rights (particularly patents) are still in their infancy. While a good number of the countries have established patent offices, the usefulness of these as sources of scientific and technological information has not been adequately exploited.

Communication, awareness and public participation

- Polarized debates and negative public perceptions impede biotechnology uptake. Misinformation remains one of the key factors that has hindered the adoption of biotechnology in Africa.

Perceived risks associated with genetically modified organisms

- The development and deployment of modern biotechnology has been surrounded by a wide range of concerns, mostly directed at GMOs and their products. The main concerns are linked to human health, animal health and impacts on biodiversity. Under human health, there are concerns that GM foods may contain novel protein toxins arising from introduction of foreign genes; and may also contain some proteins that might cause allergies. In addition, it is feared that antibiotic-resistant genes used as markers in genetic engineering may induce large-scale evolution of drug-resistant bacteria (Hosea, and others, 2004).
- Under animal health, concerns are raised when GMOs and their products are used as feed for poultry, pigs and ruminants. There are also concerns about chemical compositions, nutritional parameters and digestibility of GM feed; and safety of milk from livestock raised on GM feed, as well as risks posed by animals fed on herbicide-tolerant or insect-protected crop silage.
- Ecological concerns dwell mainly on possible negative impacts that may be caused by GMOs such as impact on non-target organisms, loss of biodiversity due to the dominance of GM strains, emergence of super weeds, gene escape and trans-genes effect. Socio-economic controversies include the possibility of GMOs interfering with traditional agriculture, commercial export risks, product labelling to facilitate consumer choice, intellectual property rights related to ownership of the technology, ethical and cultural considerations, and the morality of modifying natural organisms (Hosea, and others, 2004).

4.4 Conclusions and recommendations

The application of biotechnology R&D in Africa cuts across agriculture, environment, health and industry.

African countries are embracing biotechnology R&D at various levels to cope with the increasing demands for food, feed, fibre and fuel. In the area of human and animal health, biotechnology is being exploited in disease diagnosis, treatment, drugs and vaccine development. It is also being harnessed in the sustainable use and conservation of forest resources. Industrial application of biotechnology in the area of energy generation (biogas) from industrial wastes, and conversion of renewable raw materials as a substitute for fossil fuels, is an emerging opportunity.

However, a comparison of Africa and other regions of the world shows an emerging technological divide. This could be due to several reasons, including: the precautionary approach to GMOs as laid out in the Cartagena Protocol on Biosafety and encapsulated in most national legislation; the high degree of scepticism surrounding GM applications in agriculture, while GM technology is used widely in drug development, diagnosis and treatment of diseases; a lack of strong political will, commitment, and clear policy directions; lack of mechanisms to access scientific evidence for informed decision-making; low levels of funding; absence of biosafety regulatory frameworks in most countries; and inadequate human resources and infrastructural capacity.

African countries are thus encouraged to spell out clear priorities and adopt proactive strategies to harness the economic, health, environmental, and industrial benefits of biotechnology, while managing the associated potential challenges, risks and tradeoffs. Regional cooperation and integration efforts in biotechnology and biosafety should be promoted as a mechanism of harnessing and leveraging national and regional expertise, financial resources and facilities for biotechnology R&D. The following recommendations in particular are put forward as means to address the challenges and constraints identified.

Recommendations

Political commitment and priority setting

- As demonstrated by the good progress made in countries such as Burkina Faso, Egypt, Kenya, South Africa and Uganda, sustained political will and commitment is indispensable. Governments should formulate policies to attract and encourage private-sector participation in

biotech R&D, support formation of incubation hubs in public universities, and help foster linkages with the private sector for commercialization.

- Priorities need to be established to enable agricultural biotechnologies to meet national needs regarding food security and poverty alleviation.
- For agriculture to contribute to meeting national development needs, holistic and integrated approaches that consider the entire agricultural innovation system should be pursued.

Funding and capacity-building

- National investment plans in research, including in biotechnologies, need to be increased. Instituting specific policies that ensure adequate and consistent funding of biotechnology R&D should be considered. Government policies to stimulate venture capital, contract research, partnerships with the corporate sector, and other forms of financing are much needed. Research is also needed to identify specific policies on alternative or innovative financial mechanisms for biotechnology R&D.
- Continuous and demand-driven capacity-building is crucial to enable African countries to engage in cutting-edge biotechnology applications and also cope with the speed at which technologies are evolving.
- Promotion of partnerships and regional integration and harmonization of biotechnology and biosafety policies offers opportunities for countries to cooperate in capacity strengthening and pool together scarce financial, human and infrastructural resources.

Biosafety regulation

- Failure to put in place effective and functional biosafety systems may hinder the capacity of African countries to maximize the benefits of biotechnology and minimize potential risks. It is important to support the establishment of science-based regulatory systems at both the national and institutional levels.

- Capacity-building in biosafety regulation should take into consideration the rapidly evolving nature of genetic engineering applications, such as progression from developing crops with single genes to those with multiple (stacked) genes.
- Realistic liability and redress provisions are necessary for responsible development and deployment of GM products. It is recommended that the development of liability and redress regimes be guided and informed by the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress. The Protocol gives the parameters of what constitutes damage and the basis for seeking redress.

Technology transfer and intellectual property rights

- African countries should support and strengthen existing and new technology transfer mechanisms. It is crucial to ensure that technologies transferred are sustainable, demand driven and responsive to local needs and realities.
- African countries should also support and strengthen intellectual property systems that reconcile the need to reward inventors, and should promote freedom to innovate through capacity-building, appropriate policies and institutional arrangements.

Communication, awareness and public participation

African Governments should take lead responsibility in promoting and improving the understanding of biotechnology based on scientific evidence for informed decision-making and public participation. Well-coordinated, credible communication strategies and programmes to enhance public awareness and engagement are crucial in building public confidence, trust and acceptance of the technology.

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5. Mountains

Key messages

Mountains form a significant part of the land mass in Africa and play a critical role in the region's sustainable development. Mountains harbour rich natural resources such as forests, minerals and tourist attractions which, if efficiently harnessed, can propel Africa to sustainable development. They serve as water towers for water supply and clean energy production – key drivers of the region's socio-economic development. They provide habitat for biological diversity, and changes in mountain ecosystems act as early indicators of climate change, thus providing insights into adaptation strategies.

There are many threats, challenges and opportunities in mountain areas of Africa that should be considered in their sustainable management. These include population dynamics that drive many changes in mountain regions. All over Africa, mountain water resources are under pressure from unsustainable use, climate change, and other human-induced and natural forces. Unless the African highland water resources are fairly and sustainably managed, there is a high risk of intolerable strain on relations between highland and lowland communities.

There is a need to establish or strengthen regional, subregional, national and mountain community level institutional mechanisms and arrangements. This would enhance the promotion and coordination of sustainable development initiatives in mountain regions and communities.

There is an urgent need to develop policies, strategies, programmes and actions (both national and transboundary) for integrated and sustainable mountain resource development that take into account the specificities of mountain areas, while recognizing their fragility, as well as their significant contribution to sustainable development. Such strategies, programmes and actions must be developed in a participatory manner, involving mountain communities. Good management practices and technologies should also be replicated and up-scaled.

It is important to provide enabling conditions and incentives for investment by the private sector in sustainable development in African mountain areas and include appropriate funding in national budgets in order to enhance wellbeing and reduce disparities. Innovative resource mobilization should be increasingly adopted to mobilize additional resources for sustainable mountain development (SMD). These include, for instance, the payment for ecosystem services (PES) approach, which would enable mountain communities to benefit from the services provided by the ecosystem thus promoting its conservation and sustainable use.

The development and implementation of a convention or protocol to ensure sustainable development in mountain regions globally should be considered. It is increasingly acknowledged that the absence of such a legally binding management instrument is hampering the sustainable development of mountain ecosystems and communities.

Mountains account for about a fifth of the world's terrestrial land area, and provide the direct support base for about a tenth of its population. Mountain ecosystems have a number of vital values and functions which bear great contributions to sustainable development in Africa, both within the mountain regions and beyond. Mountains are the continent's water towers, acting as an important source of freshwater for human consumption, expansion of agricultural land use, industry and hydroelectricity to meet rising energy needs.

Mountain ecosystems are repositories of rich biological diversity; they are popular destinations for tourism, physical and spiritual recreation, as well as privileged places of important cultural diversity, knowledge and heritage. Some mountains contain very fertile agricultural land and carry some of the highest rural population densities on the continent, engaged in agricultural production of a range of crops, primarily for their subsistence, but also largely on demand in the lowlands for food security and economic activities. They contain mineral wealth whose exploitation holds a key position in the continent's development potential.

Mountains also contain a variety of other products ranging from high-quality timber to non-timber products, which occupy an important position in the mountain people's livelihoods and development of the continent as a whole. Most of the numerous streams and rivers that flow from the mountains have great potential for generation of clean hydroelectric power, which can be harnessed to meet the high energy needs and drive forward the continent's industrial development aspirations. Last but not least, the unique, spectacular and magnificent landscapes and values of mountains hold invaluable potentials for the world's most important non-consumptive wealth – tourism and recreation attractions – which can be wisely harnessed to drive the mountain regions and the continent in general, out of the poverty and underdevelopment traps.

Yet, mountains continue to be marginalized, thus jeopardizing their sustainable development and management. For instance, the mismanagement of land in mountain areas has the potential for overwhelming degradation on the lowlands. These include disruption of the hydrological cycle, flood, siltation and landslides. From a social perspective, degradation of the mountain ecosystem can lead to mass migration of impoverished peoples who will further add to the pressures of the lowlands, leading to social conflicts. Political-military and social conflicts have also characterized the mountain

societies and, these together with natural disasters, often augment the spread of malnutrition and infectious diseases.

5.1 International mountain-related commitments

UNCED provided a first major opportunity to bring the long-standing mountain problems to the highest level of attention. Chapter 13 of A21 (or the Mountain Agenda), entitled "Managing Fragile Ecosystems: Sustainable Mountain Development", focuses specifically on sustainable development in mountain regions. It entails two thrusts: first, to increase knowledge about the ecology and sustainable development of mountain ecosystems; and second, to promote integrated watershed development and alternative livelihood opportunities.

Following UNCED, the United Nations Commission on Sustainable Development (CSD) was formed and charged with coordinating the implementation of the A21. The Commission designated FAO as Task Manager for the implementation of Chapter 13 of A21. The PFIA21 highlighted areas of the Agenda that required urgent action. It did not, however, deal with the conservation and sustainable development in mountain ecosystems, apart from the issue of integrated watershed management and biodiversity conservation.

JPOI, on the other hand, recognized the uniqueness and fragility of mountain ecosystems, their vulnerability to the adverse effects of climate change and hence, the need for specific protection; it also addressed the issues of SMD, as outlined in six key different areas of implementation. JPOI injected further impetus in implementation of the Mountain Agenda, including further harmonization of policies, laws and protocols at country, bilateral and subregional levels to integrate SMD needs.

In November 1998, the General Assembly in its resolution 53/24 proclaimed 2002 as the International Year of Mountains (IYM), and FAO was invited to act as a lead Agency for IYM. In the same resolution, Governments, UNESCO, UNEP, UNDP and other organizations were requested to collaborate with FAO in the IYM initiative. The United Nations decision offered a good opportunity for the countries of Africa and the world at large to reinvigorate implementation of Chapter 13 of A21, the Mountain Agenda, through promotion of

Box 23: Main commitments and goals contained in JPOI, PFIA21 and A21 on mountains

- a. Develop and promote programmes, policies and approaches that integrate environmental, economic and social components of SMD;
- b. Implement programmes to address, where appropriate, deforestation, erosion, land degradation, loss of biodiversity, disruption of water flows and retreat of glaciers;
- c. Implement programmes to promote diversification and traditional mountain economies, sustainable economies, sustainable livelihoods and small-scale production systems;
- d. Promote full participation and involvement of mountain communities in decisions that affect them and integrate indigenous knowledge, heritage and values in all development initiatives;
- e. Mobilize national and international support for applied research and capacity-building, provide financial and technical assistance for the effective implementation of the sustainable development of mountain ecosystems in developing countries and countries with economies in transition;
- f. Address the poverty among people living in mountains through concrete plans, projects and programmes, with sufficient support from all stakeholders, taking into account the spirit of the International Year of Mountains; and
- g. Generate and strengthen knowledge about the ecology and sustainable development of mountain ecosystems.

initiatives and activities geared to achieving sustainable development in mountains. In general terms, implementation of the Agenda has been on course, save that there is still a need for enhanced and accelerated implementation efforts.

5.2 Concrete actions taken, progress made and achievements

In the last two decades, the implementation of the Mountain Agenda in Africa has been challenging, mainly due to the persistent problem of poverty and lack of capacity and resources for investment in SMD. The first five-year period of implementation (1992–1997) was dominated by preparatory initiatives, including reorganization of policies and programmes to integrate issues of sustainable development in mountain regions, as well as mobilization and sensitization on SMD. Generally not much was achieved regarding implementation of actions on the ground specific to the Mountain Agenda.

During the next five years, following the adoption of PFIA21 (1997–2002), efforts were made to address the need for conservation and sustainable management of land and natural resources for poverty eradication, disaster reduction and improvement of people's livelihoods. Interventions in these areas were deemed critical for the SMD agenda. Following the adoption of JPOI

in 2002, there has been an increase in implementation on the ground. This includes development, replication and up-scaling of best practices in SMD, especially land management technologies and practices, as well as implementation of collaborative natural resource management and transboundary ecosystem management approaches. Awareness creation, education, research and networking were further enhanced through JPOI. Further progress has been realized through public investment programmes and development programmes and projects, and other miscellaneous initiatives. Despite such progress, however, the interventions have remained inadequate in addressing key issues such as poverty eradication, gender and indigenous knowledge and empowerment of local communities.

5.2.1 Policies for the sustainable management of mountains

Policies and legislation specific to mountain environments have been formulated and enacted to promote their sustainable use. In 2001, it was recognized that many countries had established and strengthened policy, legislative and regulatory frameworks, including ratification of regional and global environmental conventions, and the formulation and implementation of various environmental action plans.

However, effective implementation of these policies and laws is still lagging behind, and they often devote limited attention to mountain ecosystems. As a result, mountain populations continue to be among the most vulnerable in the world.

In Africa, only a few countries have made progress toward SMD at different levels. South Africa, for instance, has established subnational, national and local institutions to contribute to SMD. In some countries, national legal frameworks have been adjusted to cater for mountains and mountain communities.

In Uganda, for example, the National Environment Act and the regulations there under contain specific sections on sustainable management of mountain regions. The country has also reviewed policies and laws aimed at organizing and regulating access, and use and management of natural resources within mountain national parks, with an increasing emphasis on the need for a collaborative management framework.

In the Impenetrable Forest National Park in the southwestern mountains of Uganda, a Conservation Trust Fund was put in place to promote community benefits from the National Park conservation, and the Fund has been operating fairly well for over ten years. This is in line with the principles of Chapter 13 of A21, with regard to ensuring sustainable development of mountain

communities while conserving the biodiversity wealth of the mountain ecosystems.

The Democratic Republic of the Congo has been striving to protect and rebuild environments including mountains, even if, after years of conflict, large areas still remain inaccessible for sustainable management programmes implementation. The Congolese National Environment Action Plan highlights specific activities relating to mountain development, designed to reduce pressure on rainforests on the Guinea–Congo border, and rehabilitate and manage protected rainforest areas. Priority actions include a national mountain development strategy to favour populations and strengthen institutional and administrative capacity.

In Ghana, on the other hand, the IYM National Committee is reported to have been tasked to develop a national strategy and action plan for SMD. The country has also developed various alternative livelihood projects in mountain areas to create new income opportunities, minimize deforestation and deter out-migration from mountain areas.

Box 24: Mountains in Intergovernmental Authority on Development strategies

The Intergovernmental Authority on Development (IGAD) was established in 1986, originally as the Intergovernmental Authority on Drought and Development (IGADD), to coordinate the efforts of member States in combating desertification and promoting efforts to mitigate the effects of drought. IGAD has developed and implemented an Environment and Natural Resources Strategy, which was derived from, and guided by, the overall IGAD Strategy.

However, whereas the strategy covers key areas of natural resources including biodiversity, marine and coastal resources, forests, water resources, woodlands and agricultural land, mountain ecosystems are conspicuously missing, and can only be addressed by linkage to these other natural resources contained in the strategy. This omission is striking, given that mountain ecosystems easily hold a central role in sustainability of natural resources in the IGAD subregion. For instance, mountains act as water towers or sources of major rivers such as the Nile. Moreover the IGAD subregion is easily the most mountainous in Africa and a large proportion of the people greatly depend on mountain ecosystems and resources for their sustenance and development.

Box 25: Mountains in the New Partnership for Africa's Development

The NEPAD programme is based on 10 key areas covering a number of issues, some of which have relevance to sustainable development in mountain regions, especially those promoting sustainable use of natural resources. The Environmental Component of NEPAD is the most relevant of the various programme areas to SMD. Completed in 2003, the Environmental Component is driven by an action plan aimed at addressing the region's environmental challenges to ensure sustainable development and poverty alleviation. However, the Action Plan lacks direct and effective consideration of the mountain ecosystems. A number of projects have been developed and implemented, which also contribute to SMD.

5.2.2 Good practices

Numerous programmes, projects and activities to promote sustainable development in mountain regions have been implemented in Africa, including conservation and development, as well as economic, social and cultural programmes and projects.

Sustainable agricultural land management technologies, skills and practices

Mountain farmers cultivate a range of crops, some of which are appropriate for specific elevations and climates, thereby reducing the risk of any single crop failure. Furthermore, domestication of wild plants and cross-fertilization between wild and domestic varieties of crops is often encouraged and has been practised for centuries. Employing these strategies encourages new characteristics to emerge while strengthening a species' genetic diversity and resilience; and in some cases improves yields and minimizes the need for chemical pesticides and fertilizers.

Mountain farming techniques have been refined over time, based on local people's in-depth knowledge of the variations of climate and terrain, and using methods and practices such as contour-bunding and terracing of steep slopes (as seen in the Central African Mountains in the Kigezi region, south-western Uganda; Rwanda; and the Atlas Mountains of Morocco). Other examples include: migratory grazing, especially in mountains surrounded by semi-arid lowlands or areas that experience winters and summers such as in the South African and North African mountains; irrigation; shifting cultivation; and sustainable harvesting, processing and storage of food, fodder and fuels from mountain forests.

The relative geographic isolation and precarious conditions of production means most mountain communities have engaged in both crop agriculture and pastoral activities, thereby taking advantage of different altitudinal zones. Livestock play a vital role in the livelihoods and economies of many mountain areas of Africa, including:

providing high-energy foods (meat and dairy products); animal power (transport and ploughing); organic fertilizer (animal manure); and materials (hides, skins and fur). Transhumance, the seasonal movement of people and livestock between different pastures, is common in semi-nomadic mountain communities in Africa such as the Tibestan.

Through centuries of occupation, local communities in mountain regions have evolved and applied best natural and sociocultural resources management technologies and practices that were well or better adapted to mountain conditions and challenges, but recently, these natural practices were integrated into the so called modern technologies and practices. The following are some of the key examples:

- Terracing steep slopes in order to use marginal land without substantially degrading it, or terracing catchment areas of small dams that serve a village without jeopardizing the water use of downstream users. For example, the Konso terracing practised in Ethiopia; fanya juu terracing in Machakos, Kenya; and contour-bunding and terracing in Tigray in the Ethiopian highlands and the Kigezi region in south-western Uganda.
- Agroforestry (both indigenous and modern), intercropping and post-harvest management. Agroforestry has been used for conservation, soil fertility and soil and water conservation in general, as well as provision of shade to crops such as coffee (e.g. in Mount Elgon, Uganda), and provision of miscellaneous other services such as timber, fuelwood, building materials, fodder, and windbreaks.
- Mixed farming systems, intercropping and post-harvest management, which have been practised to: promote diversified farm income and land husbandry; maximize productivity per unit area, as well as control soil erosion and

Box 26: Improved farming in the Drakensberg mountains, South Africa

In the highest mountain range in Southern Africa, subsistence farmers struggle to make a living and escape from poverty, while dealing with a land distribution inherited from colonialism and apartheid, a hard environment, and degraded land. The Community Development and Outreach Division of the Centre for Environment, Agriculture and Development, with the support of the University of KwaZulu Natal and the Government, is providing training and support to the rural communities in the Drakensberg mountains to improve their farming techniques, preserve their environment, and increase and diversify their production.

manage nutrients; and to improve food security, marketing opportunities and enhance household, regional and national incomes.

- Electrification of mountain areas, to promote crafts and small industries for landless people, mainly young men and women. This allows the diversification of the production base by developing labour-intensive manufacturing and handicrafts, with the purpose of absorbing both surplus peasant labour and produce. This practice is just beginning to take place in some African mountain regions, as is the case in Uganda.
- Transhumance, which is still widely practised in some mountain regions, is a good example of efficient spatial use of land resources practised by mountain people, and is dictated by altitudinal and climate or seasonal changes and variations.
- Construction of furrows and irrigation channels, in order to manage and distribute water for crop production and domestic use. For example, in the Tuareg community in the Atlas Mountains, North Africa, where ingenious management of water resources in otherwise relatively dry mountains has enabled productive agricultural systems based on a variety of crops including fruits and vegetables.
- Local and regional marketing of agricultural products, which is happening in the production systems in many mountain areas encouraged by potential markets in the surrounding lowlands. This opens up development opportunities to the largely isolated and marginalized mountain economies.
- Planting of drought resistant food crops and cash crops for more food security and for ac-

cumulating some cash, such as is beginning to take place in Tanzania.

- Shifting from range grazing to stall-fed cattle (zero grazing), where grazing land is scarce or where the land tenure systems favour dairying and mixed farming. This transformation is happening, for example, in most mountains of East and Central Africa, including Mount Elgon in eastern Uganda, in Kigezi highland in south-western Uganda, and in Rwanda.
- Land reform initiatives, to return land to its original owners where originally dispossessed, and land consolidation in densely populated areas where land fragmentation is a problem. This is normally followed by comprehensive land-use plans which take into account competing land use and land-tenure systems.

Restoration of degraded forests

Many mountain areas have been subject to heavy population pressures, which have resulted in inappropriate clearing and associated degradation. However, efforts have been made to restore the forest cover, driven by two forces. One has been the desire to restore on-site productivity for the benefit of local communities; the other has been a perception that restored forests will provide downstream benefits of improved stream flow and reduced sedimentation. Already benefits are being realized through decreasing erosion and restoring nutrient cycles through the re-establishment of a fully functional ecosystem.

Designation of some areas as World Heritage Sites

In an effort to conserve biodiversity under the Man and the Biosphere programme, selected mountain parks of the world are included in the World Heritage List.

Box 27: African Highlands Initiative

The African Highlands Initiative (AHI), the African component of the International Geosphere-Biosphere Programme, convened by the World Agroforestry Centre (ICRAF), implemented its first phase in the mountains of Ethiopia, Kenya, Madagascar, Rwanda, Tanzania and Uganda between 1995 and 1997. The aim of the Initiative was to improve the livelihoods of the highland communities and reverse natural resource degradation in the densely settled highlands of Eastern and Central African subregions. The activities have integrated mountain ecosystem conservation, empowerment of local communities including gender perspectives, integration of indigenous and modern science-management systems, and promoted improved livelihood and development of the highland communities in Eastern Africa, as portrayed in the annex list of projects and activities.

The Virunga and Kahuzi-Biega National Parks in the Democratic Republic of the Congo; Rwenzori Mountains and Mount Elgon National Parks in Uganda; and Mount Kilimanjaro National Park in Tanzania are all examples of Mountain World Heritage Sites. Other sites under consideration include Imatonga Park in the Sudan and Atlas Mountains Park in Morocco (for flora and watershed). Many of the mountain parks on the World Heritage List receive substantial benefits, such as increased funding and strengthened protection.

Biosphere reserves try to combine conservation with sustainable use of natural resources and go beyond the classical protection concept to promote a wider spatial and conceptual approach. The biosphere reserves management approach is a good example of collaborative management, and it has been successfully applied in several mountain areas of Africa, such as the Rwenzori Mountains, Mount Elgon and Bwindi Impenetrable National Parks.

Conservation can improve the welfare of the local communities through, for example, a rights and royalties system; tourism and trophy hunting; and the cultivation and sale of medicinal plants. However, the scale of testing and adoption of the approach is still limited owing to a number of reasons, including conservatism inherent with country conservation institutions, persistent mistrust between conservation institutions and surrounding communities, as well as uncertainties and inadequate resources associated with testing and adoption of such approaches.

High-quality mountain products

In Africa, the FAO Mountain Products Programme, implemented in the context of the Mountain Partnership, is working to improve the production and marketing of quality local products (for example, in Morocco, see Box 28) by providing mountain people with organizational skills, market linkages, technology and know-how.

Indigenous knowledge and cultural practices

Mountain communities are rich in indigenous knowledge and practices which promote sustainable livelihoods and development; for example, the worshipping and observance of taboos in certain families, clans and tribes can promote conservation of sacred plants, streams and landscapes such as caves and gorges. It is important to acknowledge the very rich and valuable knowledge and cultural practices of the mountain communities and their supportive role to sustainability of mountain ecosystems, and to promote and integrate them in all development initiatives at the national and regional levels.

Such values and practices can be illustrated using many examples from the region. The World Mountain People Association, created out of a desire to make the voices of mountain people and their needs heard, is currently proposing to create regional centres for interaction and cooperation between mountain populations and national policymakers, national funding agencies and international actors (local and international NGOs).

Box 28: Saffron production in the Atlas Mountains

The Government of Morocco, with support from the Technical Cooperation Programme of FAO and the Mountain Products Programme (within the context of the Mountain Partnership), is implementing a project for the production of saffron in the Anti-Atlas mountains. Working in one of the least developed regions of the country with a local NGO, Migration and development, and the Slow Food movement, the project is generating valuable information regarding the technical, social and economic aspects of production and processing, as well as a comprehensive overview of the entire saffron value chain.

Box 29: Voices from the mountain

The Oral Testimony Programme of the Panos Institute of the United Kingdom and Northern Ireland is aimed at amplifying the voices of the poor and the marginalized living in the world's mountains and highlands. The documentary "Voices from the Mountain" (2005) is an important awareness and communication tool. It features testimonies from those living in mountains and highlands in different regions of the world, including Africa, represented by Ethiopia, Kenya and Lesotho. This kind of initiative could be a great contribution to increased understanding of mountain communities' rights, cultural and heritage values and practices, and their role in ensuring sustainable development in the mountain regions and Africa as whole.

Box 30: Indigenous communities and sustainable mountain management – examples from Africa

In Kenya, the Ogiek Indigenous Community in the Montane Mau forest complex is undertaking the exercise of mapping their ancestral land and is sustainably managing the commonly shared natural resources. Traditional knowledge is being integrated with modern participatory geographic information system technologies and approaches, to document and present their ancestral entitlements.

In the Lebialem Highlands of Cameroon, an innovative community-led and managed microfinancing mechanism has been created. The Fund is for rural livelihoods to engage in beekeeping, wildlife domestication, livestock, and tree crop farming. It is anticipated that this Fund will be scaled up to form the Cameroon Indigenous People's Fund for Conservation.

Although all mountain communities are generally considered to be marginalized and vulnerable, the level of vulnerability may vary within the communities, based on such factors as gender category and physical handicaps. For example, the challenges faced by women in mountains are very different from those faced by men, while the impacts of mountain resources management are of greater longer-term implications to the youths. Therefore, there is urgent need for the integration of gender and vulnerable groups' considerations in all initiatives addressing SMD, to realize full human-resource potential and social justice in the mountain communities.

There are a number of initiatives in the region to mainstream gender issues in national development plans, programmes and projects, including mountain areas. However, as mountain areas continue to face marginalization, especially regarding development and investments, the plight of women and other disadvantaged groups in mountains is exacerbated.

Subregional cooperation and transboundary resource management

Transboundary natural resources management is a relatively new approach and considered to be pertinent, given that mountain ecosystems are typically transboundary, and in many cases, they form boundaries between two or more regions and countries. The transboundary management approach not only respects the integrated nature of the ecosystems regardless of the administrative boundaries, but also provides for cooperation and harmonization of policies and management practices between different communities, regions and countries, and hence the approach is considered one of the best mountain resources management practices.

The East African Community (EAC) and the Nile Basin Initiative are some of the subregional examples,

where the transboundary mountain resources management approach is being adopted, for instance, through the EAC Protocol on Environment and Natural Resources Management. The existing regional and sub-regional conventions and protocols on Conservation of Nature and Natural Resources, and the subregional groupings such as the RECs, could be profitably exploited to further the benefits of transboundary mountain ecosystems management approaches and practices.

The existence of some legal frameworks, as well as bilateral cooperation between states, has helped implementation of transboundary programmes and projects in mountain regions. An example of transboundary mountain ecosystems management approach implemented through the EAC Protocol is the Mountain Elgon Regional Ecosystem Conservation Programme (MERECP). This programme aims to improve the livelihoods of mountain communities and alleviate poverty by creating opportunities for payments for environmental services in the context of mitigation and adaptation to climate change.

The programme is being implemented by the EAC and the member States of Kenya and Uganda, and is co-financed by the Governments of Norway and Sweden. The programme implementation is in response to the need for a regional approach to the management of this important transboundary ecosystem, particularly as a critical water catchment for Lake Victoria, the Upper Nile River and Lake Turkana. If profitably utilized, this arrangement could lead to the formation of institutional frameworks and arrangements for promoting transboundary initiatives on sustainable development in the mountain regions of Africa.

Biodiversity conservation

In February 2004, the seventh meeting of the Conference of the Parties to the Convention on Biological

Box 31: Sustainable management of the Rwenzori – the Ugandan experience

In Uganda, the World Wild Fund for Nature (WWF), in collaboration with the Government, implemented a conservation development project in the Rwenzori mountains between 1990 and early 2000. The project aimed to integrate conservation of the mountain ecosystem in the national park, while building capacity of the local communities surrounding the ecosystem to engage in sustainable development practices based on natural resource use.

Implementation of the project led to the development of a new activity, the Rwenzori Mountain Conservation and Environmental Management Project, implemented in two phases from 2004 to 2012. The project, which was funded by the Norwegian Agency for Development Cooperation, contributed to the sound watershed management, the sustainable use of natural resources and biodiversity conservation in this mountain ecosystem. One of the key achievements was a forest landscape restoration initiative to offer opportunities for sustainable development outside the Park.s anticipated that this Fund will be scaled up to form the Cameroon Indigenous People's Fund for Conservation.

Diversity (COP7), held in Kuala Lumpur, adopted the programme of work on mountain biological diversity. It promoted the ability of mountain ecosystems to provide goods and services needed for human well-being, poverty alleviation and meeting the MDGs. In particular the work programme approaches included: establishment of regional and transboundary collaboration; establishment of cooperative agreements; and strengthening collaboration with the Mountain Partnership and regional conventions on mountains.

The implementation of the work programme in Africa has met with mixed results. While significant efforts were made, insufficient financial resources constrained activities.

Disaster risk management in mountain regions

Disaster risk management in mountain areas is receiving increasing attention, particularly in the context of climate change. The incidence of disasters in African mountain regions is on the increase, particularly in the form of landslides and floods. The International Centre for Integrated Mountain Development has developed a training manual for flash flood management, including potentially dangerous floods from glacial lakes. To facilitate regional flood management, it has developed a web-based system for sharing precipitation and discharge data.

To enhance data availability, the Centre is exploring the possibility of using rainfall estimates based on satellite information as a component in early warning systems for floods and flash floods. Such a center is missing in the African region. Disaster prediction information collection and sharing initiatives as developed by the International Centre for Integrated Mountain Development are non-existent, and yet vital for SMD in Africa.

Resource mobilization and funding mechanisms

Achieving SMD requires substantial, predictable and sustained investments in conservation and development in the mountain regions. Generally, a wide range of international assistance (both financial and technical) has been mobilized for capacity-building, and implementation of programmes, projects and activities on SMD. There is, however, no accurate information easily available on the level and spatial or geographical distribution of the financial and technical assistance provided and deployed.

Moreover, several development cooperation initiatives are located in mountain regions and comprise components that address sustainable development in mountains. However, there is no disaggregated information to enable the quantification of the level of resources and investments that accrue directly to mountain areas and communities. The fact also remains that the levels of development project activities and investments in moun-

Box 32: World Bank funding for sustainable mountain development

The report to the Sixty-fourth session of the General Assembly in 2009 submitted that a preliminary portfolio analysis of World Bank investments relevant to SMD indicated investments of about \$344 million globally for the period 2007–2009. Of this, the Middle East and North Africa received only \$40 million, while for Africa and South Asia only smaller amounts were directly associated with SMD. The bulk of the rest went to Latin America (\$93 million) and Eastern Europe (\$63 million), which indicated a glaring marginalization of African mountain regions and communities.

tain areas are proportionately less than those in the lowlands, hence the problem of continued marginalization.

In recent years, many climate change mitigation and adaptation projects have been developed but progress in implementation remains elusive due to severe funding bottlenecks. However, it is expected that this area of investment will gradually grow over the coming years and address some of the challenges in mountain regions of Africa. Additional investments from new and innovative climate change financing mechanisms, such as carbon trading and adaptation funds, are also expected to be increasingly available for mountain regions as they participate in the ongoing global efforts in climate change adaptation and mitigation; and adopt the “green economy” development path.

One of the new and potential approaches to resource mobilization and participation in mountain ecosystems conservation is payment for ecosystems services (PES). Mountain regions have a significant potential for the development of innovative financing mechanisms such as PES (or environmental services) schemes, given the

global importance of their resources (water, biodiversity and energy, among others).

The FAO Sustainable Agriculture and Rural Development in Mountain Regions project, funded by France and Switzerland, published a discussion paper in 2007 which provides a comparative overview of existing methods and tools aimed at adding value to mountain externalities, and draws success elements for the implementation of payment for environmental services.

5.2.3 Research and dissemination events

The first African Intergovernmental Consultation on SMD, which was held in Addis Ababa from 3 to 7 June 1996, was easily the most important step taken in mobilization and sensitization on SMD in Africa. This was the first time the African nations met to share views, as part of the follow-up to the Earth Summit. The meeting resulted in strong recommendations, calling for corrective policies and actions for enhancing sustainable development and conservation in mountain ecosystems.

Box 33: Key meetings and conferences

High Mountain glaciers and climate change: challenges to human livelihoods and adaptation, Norway, June 2009: the Tromsø Conference gathered leading scientists from glaciology, geography resource management and related fields to discuss the latest research on high mountain glacier melting and consequent effects on downstream regions. The sharing of research results and experiences was of great relevance to Africa, and also provided an impetus to ongoing efforts to understand better the mountain glaciers and climate change, as well as issues of adaptation for sustainable livelihoods of the mountain communities and downstream regions.

Fifth World Water Forum, Istanbul, Turkey, March 2009: the Forum held a side event on the theme “Mountains of the World: Water Towers for the 21st Century?” An important message emerged from the event: mountain water resources are under increasing pressure; innovative management approaches, cross-sectorial institutional mechanisms and forward-looking political decisions were observed to be required in order to face the future challenges.

Mountains as Early Indicators of Climate Change, Padova, Italy, April 2008: the objective of the Conference was to exchange state-of-the-art research on mountains and to evolve understanding on the ecosystem services they provide to the globe not least water (UNEP, 2008). The focus was on the role of mountains as early indicators of climate change, and on the impacts of global warming on mountain ecosystems. The Conference proceedings pointed to the acute vulnerability of mountains to climate change, and the need for coordinated and concrete adaptation strategies to ensure achievement of the MDGs, and in particular sustainable livelihoods and development for the mountain communities.

International Union for the Conservation of Nature/World Conservation Union (IUCN) Congress, Bangkok, Thailand, November 2004: awareness creation and communication on conservation and sustainable development in mountain areas was one of the key thematic areas of the congress, in particular in as far as climate change impacts are concerned. The rapidly melting mountain glaciers due to global warming, and associated increased risk of major flood, and the lack of monitoring of this phenomenon, were singled out among the biggest challenges ever faced.

Global Mountain Partnership Meetings: these include: (a) the first global meeting held in Merano, Italy, 5-6 October 2003, during which the Guiding Principles on the aims, structure, functions, governance and membership criteria of the International Mountain Partnership were discussed, approved and endorsed; and (b) the Second Global Meeting of the Mountain Partnership (Cusco, Peru, 28-29 October 2004), which resulted in the adoption of the mountain partnership Governance Paper and the Cusco Framework for Action, which later served as a central document to steer the future action of the Mountain Partnership.

Box 34: The Global Change Research Network for African Mountains

The Global Change Research Network for African Mountains was launched at Makerere University, Kampala, in July 2007, under the auspices of the Mountain Research Initiative, the Global Mountain Program, the African Highlands Initiative and a variety of other organizations and institutions.

Makerere University is currently the home base for the Global Change Research Network for African Mountains. Four key working groups were established in Kampala, namely: climate change; land use and land cover change; livelihoods and decision-making; and biological systems.

Participants urged Governments to consider the recommendations in all national development policies and programmes, and to collaborate at regional and international levels for SMD. However, implementation of the recommendations soon lagged far behind the spirit of urgency and the enthusiastic atmosphere that had prevailed at the meeting.

Several other conferences took place in Africa and the rest of the world focusing on mountain regions (see Box). These conferences provided platforms for African scientists to share knowledge and experiences in the region, as well as opportunities for raising awareness and information sharing between experts and policymakers on the management of mountain ecosystems in the face of specific challenges.

In general terms, limited research work, documentation and dissemination have been done on African mountains; in particular research work on climate change management, fragile ecosystems and biodiversity, and on innovations for stimulating and guiding sustainable development. However, in recent years there have been some significant contributions that have improved the understanding of Afro-Alpine climate dynamics, particularly from work done on Kilimanjaro (Tanzania/Kenya) and the Rwenzori mountains (Uganda/Democratic Republic of the Congo) (see Box 34).

The Global Observation Research Initiative in Alpine Environments has established and maintained a worldwide long-term observation network in Alpine environments to document biodiversity and habitat changes and to assess risk. Over the years, the network has grown with the setting up of new monitoring sites in different mountain regions of Africa, including UNESCO biosphere reserves in the Rwenzori Mountains astride the Uganda-Democratic Republic of the Congo border. A number of African countries with mountain ecosystems are participating in the Initiative, which involves both local and international researchers and experts working together. This arrangement has provided an opportunity

for capacity-building, through rich knowledge and information generation; and sharing of the information and experience.

By means of satellite technology, scientists at the European Space Agency and UNESCO have produced detailed maps on inaccessible zones in Central Africa that have helped to monitor the habitat of the region's threatened mountain gorillas. A comparison of the satellite images taken over the sites between 1990 and 2003 has provided an accurate picture of the impact on the mountain environments caused by deforestation, poaching and the arrival of refugees.

Research on the dynamics and magnitude of glacier retreat in African mountains is still very limited compared to what has been accomplished in other mountains of the world, especially the Alps in Europe, the Himalayas in Asia and, more recently, the Andes in South America. Due to high variations in ecosystem processes and response in mountain environments, there is a need for site-specific mountain research data and information for accurate prediction and proper planning.

While mountains of international interest, such as Mount Kilimanjaro, Mount Kenya and Mount Rwenzori, have well-established science programmes focusing on glacier recession, ice core data and contemporary climate monitoring, many other high-altitude ranges exceeding 3,000 metres above sea level have few or no climate or cryogenic records (Grab, 2008). Despite the challenges, there are areas where progress has been made. Selected research initiatives in Africa are summarized in Box .

5.2.4 Partnerships and networking

An important element to promote the implementation of the Mountain Agenda is the formation of networks and partnerships between groups, organizations, and individuals interested in sustainable development in mountain ecosystems. Generally, there has been an in-

Box 35: Selected research initiatives in Africa

Global Atmosphere Watch (GAW) is the long-term global atmospheric chemistry programme of the World Meteorological Organization (WMO). As part of this initiative, the Kenyan Meteorological Department maintains a high altitude station on Mount Kenya. From the 1990s onwards, WMO/GAW stations were established at 3,678 m and 4,200 m above sea level to monitor standard meteorological data, and since 2002, carbon monoxide and ozone are also monitored at the sites. Results are used not only to analyse on-site processes dynamics but also for comparisons with other mountain environments, and for predictions of the past and present atmospheric and climatic variables necessary for predictions of environmental change in this mountain area and beyond.

The **Mountain Research Initiative** is a multidisciplinary scientific organization that promotes global change research in mountain environments around the world. The Initiative has developed a database as a central networking tool to connect people from research, Governments, NGOs and the private sector involved in the issue of global change in mountain regions. Many researchers from Africa are working with those from other regions including developed country regions, and research findings are helping to generate information necessary for SMD.

The **Mountain Research and Development** initiative has also been operating for a long time, spearheaded by the International Mountain Society. The Mountain Research and Development publication – the leading interdisciplinary and development-oriented journal specifically devoted to the world's mountain regions – is an important product of this initiative. Participation of African researchers, albeit still comparably small, and the use of information in the publications by African experts, policymakers and other mountain development organizations and individuals, represents a very important landmark progress.

The **Global Mountain Biodiversity Assessment** of Diversitas, an international biodiversity programme founded in 2000, has also developed internationally accepted research guidelines for specific fields, and has published three synthesis books. It has a network of over 400 researchers and policymakers who work in the field of mountain biodiversity in all major mountain regions of the world, and more than 1,000 members from over 71 countries are subscribers. The work of the Global Mountain Biodiversity Assessment contributes to the Mountain Programme of work of the Convention on Biological Diversity and the International Year of Biodiversity. As part of this initiative, the Global Biodiversity Information Facility is designed to become a standard tool for conservationists and managers of mountain areas, as well as the global change research community.

Glacial mountain research: regular work on the glacial mass balance and glacial surface area extent has taken place on Mount Kilimanjaro, the highest mountain in Africa. Although the rapid ice retreat on the mountain has always been assumed to be due to climate warming, recent work has demonstrated that the causes of ice volume reductions are somewhat more complex than merely 'climate change'. Several factors such as precipitation dynamics, the ice mass geometry, radiation dynamics and geothermal activities have influenced recent decadal-scale mass balance changes on Kilimanjaro; thus calling for more research to establish ultimate facts about this phenomenon.

Serious data gaps remain on the Rwenzori Mountains, yet recent observations indicate rapid glacier retreat, which is a matter of grave concern and require urgent investigations. Ongoing work post 2000 has also placed increasing emphasis on the implications that climate/glacial changes have on this mountain ecosystem, especially hydrology. More recently, Italian researchers have established climate observations at high altitudes in the central Rwenzori, which should hopefully assist in filling one of the major data gaps.

A significant amount of work has been done in the Drakensberg – Maluti System, particularly on peri-glacial and glacial geomorphology. Although there have been several short-term climate assessments for the high Drakensberg, the establishment of long-term observations is urgently required. Current research is focused on developing chronologies of historical climate change (last 160 years) based on documentary evidence, and satellite-based climate studies on snowfall distribution patterns. The work on snow mapping will be used for risk- assessment mapping and disaster-risk reduction initiatives.

creased number of networks, which has helped to ensure that the challenges and opportunities facing mountain people and their environments are shared both within mountain communities and beyond. Many African countries are part of these networks. However, there still remain a number of problems and limitations inherent in the use of this method, especially those related to limited capacity in the use of information and communications technology (ICT), and non-existent or poorly

developed ICT infrastructures in many relevant country institutions and affected communities.

Some of the mountain-related networks in Africa and their activities are summarized in Box.

5.2.5 Education and awareness

Since UNCED in 1992, there has been a steady increase in awareness creation on the fragility of the environment

Box 36: Selected mountain-related networks

The **Mountain Partnership** (originally known as the International Partnership for Sustainable Development in Mountain Regions) is a multi-stakeholder, voluntary alliance dedicated to improving the well-being, livelihoods and opportunities of mountain people, and protecting mountain environments around the world. Launched as a Type 2 outcome of the World Summit on Sustainable Development (WSSD) in September 2002, the Mountain Partnership provides a cohesive framework and platform in which to enhance collaboration in the implementation of the Mountain Agenda, and especially JPOI, which called for on-ground action at the policy, programme and project levels. It is seen as an important approach to addressing the various interrelated dimensions of sustainable development in mountain regions.

The secretariat of the partnership consists of central and decentralized hubs hosted by FAO in Rome (central hub), and regional centres for Latin America, North America and Asia/Pacific, as well as the Environmental Reference Centre hosted by UNEP in Vienna. However, there is no decentralized hub for the African region, and this has partly contributed to reduced capacity, specific initiatives and benefits in African mountain regions, compared to other regions of the world. Evidence is available to the effect that, many African countries have derived significant benefits from Mountain Partnership initiatives in their efforts to foster sustainable mountain development, including significant mountain development processes and activities based on, or linked to, this global partnership.

The **Mountain Forum** is an international NGO, with its global secretariat in Nepal and five regional nodes. The Forum is a global electronic network of networks that promotes SMD through information sharing, mutual support, awareness-raising and advocacy. Many African countries subscribe to the networks. The European Mountain Forum, for example, welcomes participation from individuals and organizations from seven main geographical areas in Europe, North Africa and the Middle East sharing the Mediterranean basin. The Mountain Forum E-consultations hosted under the international Mountain Partnership have provided a vital platform and an opportunity for African mountain development experts and other stakeholders to exchange information and experiences with their colleagues in the different African countries, as well as countries in other regions of the world.

and its natural resources, particularly in Africa. Mountain areas have been identified to be among fragile ecosystems, and most vulnerable to unsustainable utilization systems and practices (UNEP, 2001), and have been so classified in a number of mountain countries. One of the most important initiatives on awareness creation was the International Year of Mountains (IYM). This was a landmark progress that ushered in active participation of countries in different initiatives and activities that further enhanced the mountains development cause more than ever before, since UNCED 1992.

During the three years preceding IYM (1999–2001), a number of achievements were reported in countries espe-

cially with regard to increased education and awareness-raising, and resource mobilization for implementation of the Mountain Agenda. The IYM interim report, produced mid-way through 2002, indicated significant progress made in awareness creation, at the national, regional and international levels, with emphasis put on activities which would ensure that the 2002 IYM was a catalyst for long-term effective action. In a bid to raise awareness of the challenges of mountain systems, 11 December was declared International Mountain Day.

Table 3 summarizes the themes of International Mountain Day since its establishment.

Table 3: Themes of International Mountain Day

Peace: key to sustainable mountain development	2004
Mountain tourism: making it work for the poor	2005
Managing mountain biodiversity for better lives	2006
Facing change: climate change in mountain areas	2007
Food security in mountains: high time for action	2008
Reducing risks saves lives	2009
Mountain minorities and indigenous peoples	2010
Mountains and forests	2011
Celebrating mountain life	2012

5.3 Implementation challenges and constraints

Population demographics

Population densities of mountain regions in Africa tend to be low compared to the densities found in lowlands, yet the habitable parts of the mountains can be very densely populated, particularly where the agricultural potential is greater than in the plains. Some mountain areas in Africa have also the world's highest rural population densities. For example, the Virunga volcano region of Rwanda has a population density of 400 people per km², and in the southern Ethiopian mountains and Mount Elgon slopes population densities reach 1,300 people per km². This presents a major challenge of balancing resource-use capacity and population demands, and increases in ecosystem degradation, resource-use conflicts and out-migration in the mountain regions, all of which are the ills hampering resource productivity and sustainable development efforts.

Transport and communication infrastructures in mountains require high investment costs in construction and maintenance because of the fragile and difficult terrain. At the same time, mountains remain more isolated than lowlands making them less attractive to investments, and further exacerbating marginalization and underdevelopment.

Out-migration, particularly by young people, poses further challenges for the development of mountain communities. One of the primary reasons for out-migration is the search for better and wider employment, social, economic and political opportunities. While mountain communities have long functioned as reserve of labour for the lowlands, today more people leave mountain areas for lowlands, and more temporary or seasonal migration is turning into permanent migration.

This out-migration process has led to a number of impacts, both positive and negative. In the densely populated mountain communities, the process has constantly led to relief from population pressure and sometimes provided additional income to the mountain people from remittances of incomes earned from outside the mountain communities. On the other hand, migration from African mountains has been observed to have a

strongly gendered effect, as it is mostly young men who migrate, thus, leaving women and older people behind to provide for the family and continue farming the land or herding the livestock.

Mountain water resources under pressure

Mountain water resources have increasingly been coming under pressure, with serious implications for both mountain and lowland areas. Research work has indicated mountain discharge proportions of 20–50 per cent of total discharge in humid areas, while in semi-arid and arid areas the contribution of mountains to total discharge amounted to 50–90 per cent, with extremes of over 95 per cent. It further indicated that, about 44 per cent of mountain areas provided supportive or essential water resources for the lowland dwellers and function as “water towers”.

Lowland regions, which today heavily depend on mountain water resources, might be adversely affected by altered discharge patterns from mountains and increasing demands for water for food production. Increasing demand on river water coupled with increased population pressure and land degradation (especially in the headwaters) are a looming threat to sustainability of the water resources and use, both upstream and downstream. This situation presents a special challenge with respect to managing shared water resources.

Unless the African highland water resources are fairly and sustainably managed, there is a high risk of intolerable strain on relations between highland and lowland communities. Characterized by fertile soils and reliable rainfall, the mountainous regions of the continent are a cradle for agricultural intensification, with a significant impact on the lowland's water supplies. A good example is Mount Kenya in Eastern Africa, where over two million people rely on water supplies from the mountain. In recent years, farmers in the highlands around the mountain have been using more and more water for crop irrigation, which has significantly reduced downstream water flow, thus, causing a negative impact effect on those whose survival depends on lowland pastures, cattle ranching and tourism in wildlife parks.

Natural resources degradation

Mountain ecosystems used to comprise a pristine environment but this is no longer true. Mountains are rich in natural resources, which have attracted an array of

users, with a consequent increase in pressures. In most mountain areas, there are already intense pressures from human activity, leading to severe degradation of the resource base. This is expected to worsen with the increasing population density, resulting from both natural increase, and mobility from outside in search of natural resource extraction, tourism and recreation.

Furthermore, today migration to mountain areas is facilitated by recent developments in communication infrastructure, which is gradually reducing the obstacle of inaccessibility. Clearing of forests for road construction, agriculture, settlements, tourism and recreation facilities are on the increase in mountain areas of Africa, as Governments attempt to open the areas and to foster development. However, these processes are causing unprecedented degradation pressures on mountain ecosystems, and have obvious consequences for their sustainability. Managing mountain resources sustainably and for poverty eradication is thus one of the key challenges.

Mountain hazards and disasters

Mountain hazards and disasters are mostly caused by the fragility of the mountain environment, mainly in the form of rugged and steep slopes, largely covered by unconsolidated earth materials that are prone to soil erosion, landslides and related phenomena. Like elsewhere in the world, records are available to suggest that mountain people in Africa face hazards and disasters that stem from both natural causes such as earthquakes and volcanoes, and those that are caused or triggered by human activities such as soil erosion, floods, landslides, fires and conflicts.

Volcanic eruption-related disasters are limited to a few active volcanoes such as Nyamulagira and Nyiragongo in the Central African mountains of the Democratic Republic of the Congo, which have recently erupted several times causing extensive damages by hot lava flows. Volcanoes comprise of accumulated lava and ash which breaks down to form some of the world's most fertile soils that support prime agriculture, and hence, the high population densities associated with the continent's volcanic mountain regions. Whereas volcanic eruption cannot be prevented, the associated disaster risks (such as the number of victims and the damage incurred) can be reduced through better planning and preparedness.

Many African mountains such as the Atlas in Northern Africa and Rwenzoris in Eastern Africa are prone to earthquakes caused by the collision of continental plates (which originally created the mountains themselves) and are subject to seismic activities that often trigger other disasters such as landslides. Disasters are exacerbated by high rainfall, steep slopes and unstable or unconsolidated materials in mountains. Steep mountain slopes promote the rapid movement of rocks and soil as well as large amounts of water and snow, causing avalanches, floods and landslides. Mountain environments today, face an escalation of these risks from the increase in lowland and highland populations and related settlements and infrastructure, in addition to the intensification of land-use and natural resources extraction, often through inappropriate methods.

5.4 Conclusions and recommendations

The sustainable use of fragile mountain resources is possible, provided good management systems, technologies and practices are used during implementation of relevant and well-developed programmes, projects and activities. As modern high-yielding crops face evolving diseases and pests, the biodiversity in mountain regions will become even more important. Furthermore, often the genes that provide resistance to these new diseases can be found in traditional, mountain-growing species. In this regard, the introduction of biotechnology in mountain agricultural systems and practices may pose serious threats to established good practices and skills, if not cautiously handled.

Funds invested in programmes, projects and activities that are implemented in countries are normally provided in aggregate form, making it difficult to determine the components and proportions of these investments that are dedicated to or focus on mountain areas and communities. Even when it is possible to identify investments located in mountain regions, the proportion of the investment that directly benefits the community is either not easily known or minimal. Deep understanding and appreciation of the benefits of ecosystem conservation accompanied by availability of alternative sources of livelihood, and the involvement of indigenous people and local communities in the management mountain ecosystems, help to reduce resource-use con-

flict and promote sustainable development in mountain regions.

The absence of a mountain-focused convention may be partly to blame for the slow and largely ineffective implementation of sustainable development initiatives in the mountain regions of Africa, although use has been made of relevant sections of other international and regional conventions and protocols such as the United Nations Convention to Combat Desertification, the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change. There are pertinent interlinkages between the various components of mountain ecosystems and resources and the utilization or management systems subjected to them, understanding of which fosters synergized implementation of initiatives to achieve sustainable development in the mountain regions.

Recommendations

Institutional mechanisms

There is a need to promote the establishment of regional and subregional organizations and strengthen existing ones such as the African Ministerial Conference on the Environment, the Nile Basin Initiative and RECs, and encourage them to prioritize integration or strengthen the component of SMD in the strategies and programmes of the subregions, which are important vehicles for the promotion of SMD in Africa.

In this connection, institutional mechanisms and arrangements at the subregional, national, and mountain community levels are necessary to promote and coordinate sustainable development initiatives in mountain regions and communities. A database of all actors, beneficiaries, and the level of investment and progress made in implementation of the Mountain Agenda, should be established and managed.

Since it has become increasingly acknowledged that mountain ecosystems are perhaps the last remaining forgotten ecosystems in terms of legally binding management instruments, there is need for considering development and implementation of a convention or protocol to ensure sustainable development in mountain regions globally.

Funding for mountain areas

It is important to provide enabling conditions and incentives for investment by the private sector in sustainable development in African mountain areas, and include appropriate funding in national budgets in order to enhance well-being and reduce disparities.

There is an urgent need for more rigorous and innovative resource mobilization for implementation of initiatives to secure sustainable development of communities and productive ecosystems in mountain regions, including the now increasingly fronted PES approach.

Investments in programmes, projects and activities at national and subregional levels, should be disaggregated to indicate the proportion going to mountain regions and communities as well as the contributions of these regions to development. This is critical for enabling determination of levels of investments and likely impacts, and the need to improve on or change the investments, where necessary.

Political commitment

Political leaders and policymakers should be sensitized and mobilized to appreciate research and investment in mountain regions among national and subregional priorities, and to use the resulting information to make informed decisions on mountain ecosystems management.

Up-scaling good practices

There is an urgent need to up-scale and replicate good management practices, technologies, and success stories. New management approaches such as collaborative management and other forms of community involvement in ecosystem management in different mountain regions of Africa need to be more widely implemented to consolidate sustainable development efforts.

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6. Tourism

Key messages

With developments in the travel and tourism industry, Africa has the opportunity to capitalize on its advantages which include price competitiveness, a strong affinity for tourism, and rich natural and cultural resources supported by efforts towards environmental sustainability. However, a number of obstacles remain to develop the sector, notably improving safety and security, upgrading health and hygiene levels, developing infrastructure and access to African sites, and fostering the region's human capital. Improvements in these areas would contribute to the role of tourism to foster sustainable development in Africa.

Despite the significant potential of the tourism industry to contribute to poverty reduction, the focus of tourism development has been on its contribution to economic growth without attempts to capitalize on its important social and environmental benefits. The potential contribution of tourism to sustainable development in the region can only be realized if efforts are made to mainstream the interlinkages between the tourism sector and sustainable development into government processes and institutions.

Pro-poor, national tourism development strategies that are developed in a participatory manner and ensure equity in the distribution of benefits between communities, investors and governments, are needed. Such policies need to integrate social and environmental sustainability, ensuring the preservation of natural and cultural wealth of the communities.

Cross-sectoral and transboundary collaborations need to be stepped up, ensuring policy coherence and harnessing the benefits of regional cooperation to address the challenges in sustainable tourism development. In this regard, education, health and infrastructure development are critical to promote a healthy development of the sector. Moreover, investment policies and the regulatory environment should be conducive to the specificities inherent in investments for the tourism industry.

Capacity-development programmes that address both the supply and demand sides need to be established. This would raise awareness and understanding of sustainable tourism requirements, and help raise the standards of the industry in Africa. Capacity development for marketing and the use of social media and ICT are also urgently needed to respond to a fast changing tourism demand.

In the last two decades, tourism has experienced phenomenal growth that has seen the industry occupy a significant role in the global economy. The industry is today ranked the fourth in the export category worldwide after fuels, chemicals and automotives, accounting for 30 per cent of total commercial services exports.

In 2009, the global tourism industry accounted for 5 per cent of total economic activity, generating over \$1 trillion per annum or about \$3 billion per day and employing 6-7 per cent of the total workforce. In the same period, the industry contributed about 9.4 per cent of global GDP and employed over 235 million people worldwide (World Economic Forum, 2011).

The emergence of tourism as a major industry is a remarkable opportunity to take advantage of a sizeable, complex industry that is governed by the laws of supply and demand. Historically, mass tourism was promoted with little regard for the general impact on the environment and social and economic structures of the locations where the tourism activities took place. With a growing awareness of the links between the quality of the environment – on which a large percentage of tourism activities in Africa depend – and the economic value accrued from the product, there has been a concerted shift towards protecting natural resources.

Despite the continent's wealth of natural and cultural attraction the relative performance of tourism in Africa lags behind the global average. The contribution and importance of travel and tourism differs significantly between North Africa and Sub-Saharan Africa. In North Africa, tourism is already the most important generator of economic development and jobs, while sub-Saharan Africa has a long way to go to capitalize fully on the continent's tourism potential.

There are some African countries where tourism is one of the major sources of foreign exchange and with the high amount of imports in Africa, earning foreign exchange is vital for economies. Even if the number of visitors in some countries is less than others, their spending contributes significantly. For more than half of the African countries, tourism contributes more than 10 per cent of total exports. Expansion of tourism is associated with accelerated economic growth, public finances, improved exports and infrastructural development.

6.1 International commitments related to tourism

Even though the fundamental issues impacting tourism have not changed much over time (peace and security, climate change, biodiversity depletion, environmental degradation, global financial shocks etc.), the intensity has caused the sector to wake up and take a second look at how it has remained resilient over the years. Figure 4 shows how tourism can impact sustainable development in a variety of manners.

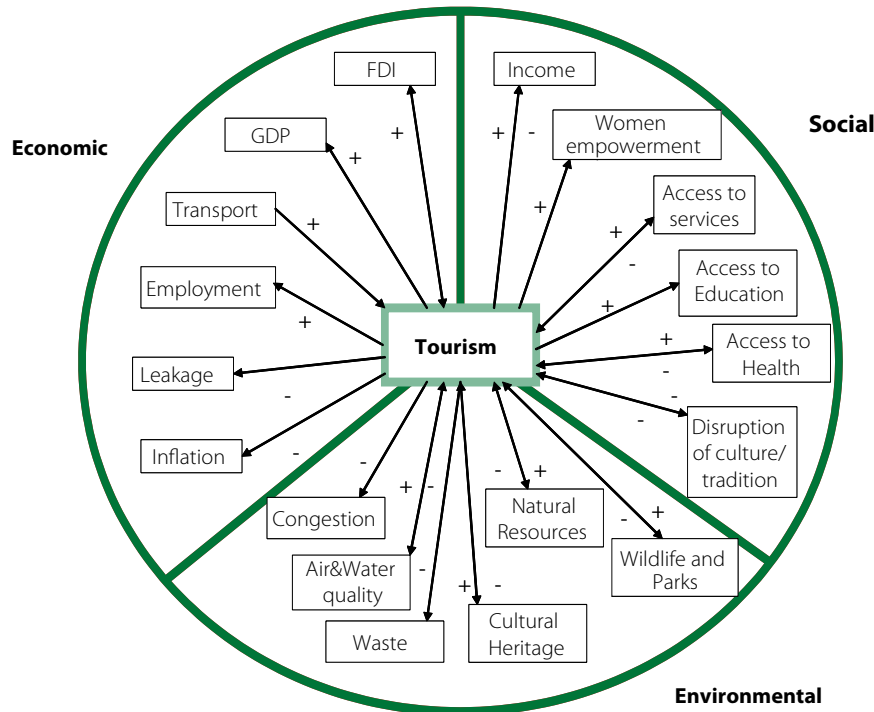
The magnitude and direction of the impacts will depend on the type of tourism and the underlying conditions in the area impacted. The international instruments designed to promote the future of sustainable tourism have principally been A21, PFIA21, and JPOI of the World Summit on Sustainable Development (WSSD), which provide a platform on which to address new challenges and opportunities and share lessons learned and best practices. Other international agreements relevant for sustainable development are listed in Box .

In 1996, the World Travel & Tourism Council, the United Nations World Tourism Organization (UNWTO) and the Earth Council joined together to

Box 37: Africa's tourism in the global context

Africa's limited share of the 3.2 per cent of international tourism receipts accounted for approximately \$30 billion in 2008. From 2005 to 2007, Africa recorded exceptional growth in tourism receipts (9 per cent to 11 per cent per annum) compared to a global average of just 5 per cent. Only Asia recorded higher growth during the period. However, tourism receipts in Africa declined by about 2 per cent between 2007 and 2008.

Tourism development in Africa differs between the north and south. North Africa attracts more than half of all tourism receipts to the continent. Key countries dominating the region's tourism landscape are Egypt, Morocco, South Africa and Tunisia. Other main destinations are Kenya, Ghana, Mauritius and Tanzania. The type and extent of tourism in these countries varies also due to their geography. Different parts of Africa have different niches of tourism – from safaris in national parks to coastal and cultural tourism – hence, the diversity of tourist attractions across the continent. For example, Southern and East Africa is abundant in game parks while tourists looking for ethnic tourism prefer West Africa, and Ghana and the Gambia have 'heritage' tourism. Diaspora travelling by families is prevalent in North Africa.

Figure 4: Linkages between tourism and sustainable development

Key: + indicates positive influences, - indicates negative influences.

Box 38: International agreements relevant to sustainable tourism

- Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971)
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)
- Convention for the Prevention of Marine Pollution from Land-based Sources (1974)
- Manila Declaration on World Tourism (1980)
- Convention on Biological Diversity (1992)
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992)
- Draft Declaration on the Rights of Indigenous Peoples (1992)
- United Nations Framework Convention on Climate Change (1992)
- Draft Declaration of Principles on Human Rights and the Environment (1994)
- Charter for Sustainable Tourism (1995)
- Berlin Declaration: Biodiversity and Sustainable Tourism (1997)
- Conference of the Parties to the Framework Convention on Climate Change, Kyoto Protocol (1997)
- Agenda 21 for the Travel and Tourism Industry (1998)
- Global Codes of Ethics for Tourism (1999)
- Quebec Declaration on Tourism (2002)
- Davos Declaration: Climate Change and Tourism (2007)

launch an action plan entitled Agenda 21 for the Travel and Tourism Industry: Towards Environmentally Sustainable Development – a sectoral sustainable development programme based on A21. The four paragraphs on sustainable tourism of PFIA21 (adopted in 1997) emphasized the need to consider further the importance of tourism in the context of A21. Of particular concern was the degradation of biodiversity and fragile ecosystems, such as coral reefs, mountains, coastal areas and wetlands. The text called on the Commission on Sustainable Development to develop an action-oriented international programme of work on sustainable tourism, and noted that international cooperation would be needed to facilitate tourism development in developing countries.

In 2002, WSSD addressed sustainable tourism in Chapter IV, paragraph 43 of JPOI to promote sustainable tourism development, including: non-consumptive and ecotourism to increase the benefits from tourism resources for the population in host communities, while maintaining the cultural and environmental integrity of the host communities and enhancing the protection of ecologically sensitive areas and natural heritages; and to promote sustainable tourism development and capacity-building in order to contribute to the strengthening of rural and local communities.

The potential for tourism to contribute significantly to poverty alleviation is considerable. The challenge in implementing sustainable tourism programmes remains

bridging the gap between economic benefits and tangible poverty alleviation. In most countries, many development plans accept that tourism contributes significantly to economic growth. However, economic growth does not necessarily lead to less poverty. Equally, while many small-scale projects have been developed to link tourism with poverty reduction, large-scale poverty reduction from tourism depends upon developing and implementing clear strategies articulated and monitored through national Poverty Reduction Strategy Papers. This calls into play the strength of the policies adopted by individual countries and regional blocks.

6.2 Concrete actions taken, progress made and achievements

Despite the immense tourism resources, in particular cultural heritage, tourism has not received significance as a tool for sustainable development. However, attempts are being made to overcome this challenge. Although the uptake has been slow overall, key landmarks have been witnessed in the efforts to implement the A21, PFIA 21 and JPOI commitments. In many cases of country initiatives, direct reference to the implementation of A21 initiatives may not be made, but the overall net effect contributes positively to the Agenda's objectives.

Box 39: Indicative list of main commitments and goals contained in JPOI, PFIA21 and A21 on tourism

- a. Enhance international cooperation, foreign direct investment (FDI) and partnerships with both private and public sectors, at all levels, for tourism development;
- b. Provide technical assistance to developing countries and countries with economies in transition to support sustainable tourism business development and investment and tourism awareness programmes, to improve domestic tourism, and to stimulate entrepreneurial development;
- c. Promote the diversification of economic activities, including through the facilitation of access to markets and commercial information, and participation of emerging local enterprises, especially small and medium-sized enterprises;
- d. Develop programmes, including education and training programmes, that encourage people to participate in, develop and benefit from ecotourism;
- e. Assist host communities in managing visits to their tourism attractions for their maximum benefit, while ensuring the least negative impacts on and risks for their traditions, culture and environment, with the support of the UNWTO and other relevant organizations; and
- f. Promote, as appropriate, environmentally sound leisure and tourism activities, building on The Hague Declaration of Tourism (1989) and current programmes of the UNWTO and UNEP, making suitable use of museums, heritage sites, zoos, botanical gardens, national parks, and other protected areas.

Box 40: The African Union New Partnership for Africa's Development Tourism Action Plan

The Strategic Focus in Tourism as outlined in the Tourism Action Plan for the AU NEPAD aims at establishing tourism as a key instrument in the region's transformation and development. The Action Plan recognizes the industry's potential for economic diversification, foreign exchange earnings, government revenue generation, and as a vehicle for regional integration through transboundary activities. While recognizing the challenges that the continent faces, the Action Plan takes cognizance of the fact that its effective implementation relies heavily on African countries creating an enabling and conducive environment for tourism development, and that the RECs have a correspondingly important role in the subregions.

The Action Plan focuses on the issues that are best implemented at the subregional and continental level, with clear linkages to on-going national activities. The challenge facing African countries is to ensure effective implementation of the Action Plan by building on existing initiatives. It is important to note that successful implementation will largely depend on the extent to which tourism activities, being multi-faceted economic activities, are linked to other sectors of NEPAD, such as infrastructure.

6.2.1 Policies for sustainable tourism development

In Africa, socio-economic development is inextricably linked to people, resources and the environment. Thus, environmental conservation has a direct relationship with the structure and functioning of the economy. JPOI clearly states that, for the achievement of the internationally agreed development goals, there needs to be substantial efforts by the countries themselves in the development of national policies and development programmes to realize targets set within the Rio Declaration. Several African countries, such as Egypt, Ghana, Kenya and South Africa, have integrated tourism in their national development plans, demonstrating the industry's concrete contribution to national development.

A number of African countries (including Botswana, Nigeria, Rwanda, South Africa, Tanzania and Uganda) have developed Tourism Master Plans with the assistance of the UNWTO and development partners. In addition to national-level efforts, regional and subregional initiatives to foster the sustainable development of tourism can be identified in Africa. These efforts towards enhancing sustainable development precepts were driven by the need to search for a solution to the unique challenges facing African countries. Past efforts of regional integration in Africa was indicative of a wider need to overcome fragmentation, marginalization and improve the continent's position in the global political and economic arena. The most important of these efforts are the Abuja Treaty establishing the African Economic Community and the more recent Constitutive Act of the African Union.

Sustainable tourism development has acquired cross-country significance. NEPAD has identified tourism as an important vehicle to address the current devel-

opment challenges facing the African continent. The forty-first meeting of UNWTO Commission for Africa in 2004 approved the NEPAD Tourism Action Plan. A main objective of the Plan was to provide an engine of growth and integration, and to contribute to poverty eradication. Most African Governments have now included tourism in their national development strategies (UNWTO, 2006).

Recognizing that tourist attractions in their countries to a large extent complement each other, the East African Community (EAC) partner countries have agreed to work together to promote the industry and maximize gains. Tourism is one the productive sectors identified under the areas of cooperation agreed upon in the EAC Development Strategy, including the development of a tourism marketing plan and strategy. East Africans now enjoy equal treatment i.e. same rates apply to locals and East African visitors accessing accommodation facilities or visiting tourist attractions in any of the EAC countries.

The Strategy has also provided the platform for the establishment of the East African Tourism and Wildlife Coordination Agency. Similarly, recognizing the need for a unified approach to tourism development under the umbrella of regional integration, the Intergovernmental Authority on Development (IGAD) is developing a tourism master plan for the IGAD region.

6.2.2 Transboundary resource governance for sustainable tourism

Article 11 of the Southern Africa Development Committee (SADC) Protocol on the Development of Tourism clearly states that SADC, within the Southern African States, introduced the Trans-frontier Conser-

vation Area (TFCA) straddling two or more international borders where the natural and cultural resources were collaboratively managed by the Governments or authorities involved. This mode of transboundary resource governance was aimed at promoting sustainable regional tourism as well as growth in cross-border tourism. Another initiative of TFCA was the promotion of community-based tourism.

Furthermore, the Sustainable Tourism Network Southern Africa (STNSA)⁶ was launched in the subregion with the aim of establishing an integrated, subregional approach to sustainable tourism development in SADC member countries, as well as providing a channel for those countries to exchange experiences and best practices regarding sustainable tourism policy and practice throughout Southern Africa.

The Greater Limpopo Transboundary Natural Resources Management (TBNRM) Initiative straddles the borders of Mozambique, South Africa and Zimbabwe. Its purpose is to increase collaboration among the three countries for the sustainable management of shared resources to achieve social and economic development for the communities in their countries. It is planned that tourism-related activities will play an important role to further sustainable resources management and community welfare.

6.2.3 Ecotourism and community-based tourism

Ecotourism is the fastest-growing tourism product in the world and Africa, for its natural endowments constitutes an obvious destination. In countries such as Kenya, Rwanda, Tanzania and Uganda, tourism has become an agent for environmental preservation efforts. In addition to ecotourism, the region is seeing a growing effort towards community-based tourism development, with the double benefit of ensuring protection of natural and cultural heritages, and providing local communities with alternative livelihood opportunities.

This notwithstanding, the East African subregion has demonstrated mixed results as far as sustainable tourism development is concerned. In Kenya for instance, overdevelopment with attendant negative environmental impacts has predominated in parts of the Kenyan coast, and despite the importance of wildlife tourism to the

national economy, the link between tourism and conservation has often failed to materialize. For example, despite the tremendous economic value of the Masai Mara National Reserve in southern Kenya, conservation is struggling with resident large mammal populations declining, while wheat farming in the lands surrounding the Mara continues to be on the rise (Nelson, 2007).

The main cause of this unfortunate scenario is that the economic benefits from tourism do not sufficiently translate into local incentives to conserve wildlife on private and communal lands. Most tourism revenue accrues to district-level governments and local elites, bypassing the majority of the area's residents (Thompson and Homewood, 2002). Community-based tourism can help address this challenge.

For instance, the Community-Based Ecotourism Project in Ghana combines natural resources management, cultural and historic preservation, and community livelihood enhancement. Fourteen ecotourism sites, encompassing wildlife sanctuaries, artisan markets and sacred cultural sites are developed and promoted through the Ecotourism Project. Numerous community development projects have benefited from the revenue of these ecotourism sites, including the construction of a primary school, academic scholarships, and the international promotion of female artisan cooperatives and their handicrafts.

Laikipia and Samburu districts, in the central part of Kenya, north of Mount Kenya, give a positive example of how well-designed tourism investments can lead to major conservation gains. In this area, tourism investments have been structured as jointly owned ventures, in the form of lodges or tented camps, between private investors and the local land-owning communities. Over 400,000 hectares of land has been set aside since the late 1990s by local communities for conservation and ecotourism developments in locally managed 'conservancies'. Tourism development has been the main rationale for these land-use decisions, and facilitation and leadership from private sector and NGO actors have played key roles.⁷

In the savannahs of northern Tanzania, effective models for community-based ecotourism have also emerged as

6 For more information, see <http://www.sustainabletourismnetwork.co.za/about-stnsa>

7 These include the Laikipia Wildlife Forum and Lewa Wildlife Conservancy. The Kenya Wildlife Service also provided strong support to the development of these ventures.

Box 41: Sustainable tourism

“Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three pillars to guarantee its long-term sustainability.

Sustainable tourism should:

1. Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.
2. Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to intercultural understanding and tolerance.
3. Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation.

Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. Achieving sustainable tourism is a continuous process and it requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary. Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience to the tourist, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them.” (UNWTO, 2004).

Box 42: Responsible and sustainable tourism development to create benefits for local communities

“In the past ten years, the term responsible tourism has been growing in popularity. Not only because it has been thought to be a unique selling point for already established businesses to gain competitive advantage, but also, and most importantly if managed properly, it can be used as a means to provide benefits to local communities in destinations, such as sustainable local economic growth, empowerment through entrepreneurial opportunities, sustainable community development and at the same time, it can emphasize on the wealth of the local natural, cultural, social and historical heritages if preserved from destruction.

The concept in West Africa is still new for the most part of the countries. The Gambia is at the forefront, with a Government-backed organization called ASSET (Association of Small-Scale Enterprises in Tourism), whose mission is to link small-scale community-owned sustainable-tourism projects together in order to provide global opportunities for growth, and for the development of community development projects. Unfortunately, even though there are various associations in other countries who try to spread the word, the concept of responsible tourism has not been developed. This should be addressed given the potential for West Africa in terms of natural, cultural and historical resources that could be used in a responsible way for tourism.

At West Africa Discovery, we have set ourselves an ambitious project to play a role in the development of the responsible tourism concept in West Africa, and have started linking people together in order to create a network of like-minded people who can work together towards their similar goals. We have also decided to create an extensive database of responsible and sustainable tourism projects in order to create marketing opportunities for the small-scale to medium-scale tourism projects that have already implemented or are striving to implement criteria and policies outlined in the Cape Town, Kerala and Belize declarations on Responsible Tourism in destinations.”

West Africa Discovery (29 March 2010).

a result of private-sector leadership and engagement at the local level, notably, the contractual model. This has seen a range of tour operators lease community lands for either permanent lodges or non-permanent campsites in at least two dozen different villages in the northern part of the country, mostly areas near or adjacent to Serengeti and Tarangire National Parks where community lands offer high-quality tourism products. This

contractual model integrates tourism with indigenous pastoralist land-use patterns and provides payments directly to elected village governments, which are corporate entities capable of entering into contracts and managing financial resources on behalf of their constituent community.

Where it exists, the success of ecotourism ventures can be attributed: (a) to visionary and committed private-sector leadership (this is essential for tourism enterprises that create community benefits and conservation incentives); and (b) to local institutional capacity (this is vital for sustaining such ventures, particularly in terms of defending local land and resource claims from the external expropriative pressures, and effective NGO facilitation. In terms of forging private-community partnerships and building local capacity for tourism management, both can be invaluable.

6.2.4 Capacity development for tourism

Tourism initiatives typically contain strong training and education components to help local populations acquire new job skills and adapt to changing local economies. Necessary skills such as hospitality, marketing, tour guiding, small-business skills, and scientifically based conservation techniques are cross-sector themes in tourism training.

Box 43: Conservation of the mountain gorilla

The Mountain Gorilla Habitat Conservation Project in Africa holds promise for future nature-based tourism activities. The gorilla is listed on the World Conservation Union/International Union for the Conservation of Nature and Natural Resources Red List of Threatened Species, with its habitat overlapping some of the poorest and most conflict-ridden areas of the world. As a consequence, direct anthropogenic threats for the gorilla include loss of habitat through rapid agricultural expansion, slaughter for meat, and the demand for live specimens overseas.

Despite these circumstances, signs of hope remain. The mountain gorilla populations in the Democratic Republic of the Congo, Rwanda and Uganda have increased by 10 per cent during the past ten years (from 320 to approximately 355 individuals). The United States Agency for International Development (USAID) and its partners are promoting regional conservation approaches with an emphasis on transboundary coordination, anti-poaching, community participation, economic alternatives such as ecotourism, research, and habitat conservation

Box 44: Coastal management partnership – Tanzania

In Tanzania, a Coastal Management Partnership programme was implemented to establish effective coastal governance. Environmental issues include coral reef destruction and coastal erosion, overfishing, loss of mangrove forests, and overuse of the commons. Non-sustainable practices have negatively affected the welfare of poor coastal communities.

The Coastal Management Partnership programme, which facilitates a participatory, collaborative, and transparent process for public and private stakeholders to conserve and develop coastal ecosystems, addresses improved management of coastal and wildlife resources in Tanzania. In 2003, coastal tourism investment guidelines were developed together with a tourism management plan for the Kilwa district.

Box 45: Kakum National Park – Ghana

In 1991, the 360-hectare Kakum National Park was established in Ghana. Considered a biodiversity hotspot, the park serves as a refuge for several endangered species, including the forest elephant, Diana monkey, and the bongo. An innovative tourist attraction, the Kakum Canopy Walkway, opened in 1995. The “Hidden Connections” interpretive display promotes conservation by educating park visitors about the importance of rainforests and how to protect them. Within six years of its inception, the park was receiving 40,000 tourists annually, generating more than \$75,000 for park maintenance and community development.

In addition to environmental conservation, the Kakum National Park circuit includes several forts for slave-trade purposes, dating back from the fifteenth century, that are classified as historical World Heritage Sites. In collaboration with Conservation International, the Government had recently undertaken a project that renovated facilities with tourism potential and installed interpretive facilities at Cape Coast and Elmina “castles”. These sites now rank among the most important destinations for Afro-American visitors to the continent.

Box 46: Community-based conservancies – Namibia

Two thirds of the country's 1.7 million people live in impoverished rural areas and depend on natural resources for their economic well-being. Severe droughts and heavy poaching in the country caused wildlife numbers to drop dramatically in the 1980s, with adverse consequences for tourism enterprises and ecosystem stability. In 1993, with USAID and WWF assistance, newly enacted legislation allowed Namibian communities to have rights over wildlife if community members could meet the standards to register as a conservancy (a type of community-based management institution).

Once conservancies were established, the community received assistance in adopting effective game management practices, negotiating with the private sector, and benefiting from tourism revenues. As a result, wildlife numbers have increased significantly, and many communities derive income from handicraft sales, trophy hunting contracts, and game meat distributions. Some 31 communal area conservancies now exist, with an additional 10 approaching registration and 40 more in the process of formation. These activities were undertaken under the country's Living in a Finite Environment (LIFE) project.

Several tourism projects integrate training and capacity-building into the project model. During the 1990s, the Botswana Natural Resources Management Programme, with funding from USAID, supported the Ministry of Education in enhancing conservation-based education through teacher-education workshops and the revision of primary school curricula. Other workshops addressed community mobilization, enterprise development, and natural resources monitoring. These workshops led to a national conference on community-based natural resources management in July 1999.

Additional examples of enhanced training opportunities come from Ghana and Tanzania. The Tourism Capacity Development Initiative for Ghana improved the capacity, quality and performance of the tourism industry through training in marketing and product development, human resources development (including technical training for tour guides), and institutional capacity development. Train-the-trainer conferences have been held in Tanzania for accomplishing institutional capacity-building among such local conservation organizations as Roots and Shoots, and Malihai.

6.2.5 Tourism and the empowerment of women

USAID has been instrumental in promoting gender equity, especially women empowerment in tourism-related matters. For example, in Tanzania, a group of village women formed the Naisho Women's Group ("naisho" means "increase" or "multiply" in Maasai) to work toward preserving their culture and alleviating gender inequality and poverty. Seeking to capitalize on a newly paved road to a wildlife corridor, Naisho established the

Esilalei Cultural Boma in 1999 to bring dollars to the village.

In 2001, USAID and the African Wildlife Foundation began working with Naisho on community-based approaches to natural-resources management. The women were trained to diversify and raise the quality of their handicrafts. In 2003, an Agency-funded permanent hut for handicraft sales was opened. As a result, Naisho's annual income increased sharply from \$400 in 2001 (when USAID support began) to \$2,050 in 2003. While appearing small, these earnings are helping to bring development to the village.

Micro-funding is extremely important for many women attempting to establish their own enterprises, since traditional forms of funding may not be accessible. Such funding is especially important to tourism-related activities, which rely more heavily than most other sectors on smaller-scale businesses, where women excel. Operating through more than 500 implementing partners in 2003, USAID served a record 5.6 million poor clients through loans for micro-enterprises and other purposes valued at \$1.3 billion. Some 94 per cent of all loans were repaid on time, 65 per cent of the clients were women, and 55 per cent of the loans were held by very poor clients. More than 3.1 million micro-entrepreneurs received business development services from Agency-assisted institutions, resulting in improved market access, productivity, and earnings. While the share of this funding specifically pertaining to tourism-related activities is impossible to ascertain, it is regarded as significant.

6.3 Implementation challenges and constraints

The African Steering Committee of Ministers of Tourism has identified and categorized the constraints that impinge on the successful development of a vibrant tourism sector into four classes, namely: generic, structural, tourism supply assets, and tourism's sustainability. In addition, despite the immense economic potential of the sector, it still suffers inadequate appreciation in some African countries with heads of States and Governments, financial institutions and the general public still being insufficiently aware of tourism's economic importance for their countries.

Image and security perception

As a destination, Africa suffers from a poor security and quality image. This is of significance noting that tourism is mostly an international commercial undertaking. The brand credibility of the continent's tourist offers and services is low. Moreover, there are incorrect portrayals of the actual situation on the ground in several African countries, due to lack of awareness and knowledge of the varied tourism resource offers in Africa.

International tourism coverage is generally partial and the continents' share of positive international media voice is limited. Moreover, self-marketing by many African countries is inadequate. Advertising and publicity are often not allocated sufficient budgets for a significant impact to be made internationally. Many times little human and financial resources are allocated for advertising, sales trips, professional public relation services, etc.

Political conflict and strife covered extensively by the international media sometimes fails to give a picture of which countries are safe and which ones are not, particularly if they are located adjacent to each other. For instance, in early 2008, election-related violence threatened to bring Kenya to a halt. Tourism arrivals dwindled to a near stand-still, and there were several cancellations and some diversions to neighbouring countries. Although the violence was localized the perception was grim and tourists stayed away. The year 2009 was a slow year for tourism in Kenya but this picked up and recovered with 2010 recording the highest receipts ever.

Furthermore, negative historical occurrences tend to stick to some destinations. Countries such as Burundi, the Democratic Republic of the Congo, Rwanda, the Sudan and Uganda have experienced genocide and violent dictatorships in years past. Even though they are experiencing a new prosperous, more stable dispensation, are safe for travel and have some unique products to offer, some travellers still tend to keep away.

Relatively low industry standards and weak support services

The tourism industry throughout Africa operates below international competitive standards and thus, is characterized by typically seasonal, low-wage work, inadequate service, and there is significant leakage of tourism-generated revenues. The Tourism Action Plan for AU/NEPAD is a move in the right direction; however, no specific priority projects or programmes have been identified yet.

Support services to the industry are the key to development of tourism in Africa. The availability of a rich variety of resources places it in good stead to offer exceptional experiences to visitors that can compete with other destinations globally. In areas where known brand name facilities are not operational, the accommodation standards tend to be quite low and lacking in a functional grading system. Countries such as Botswana, Kenya, Morocco, South Africa, Tanzania, Tunisia and Uganda, have functional market-based hotel grading systems. Those that do not have them tend to have high leakages and repatriation of tourism profits.

The high end of the tourism spectrum in Africa is relatively highly rated. The gap, however, exists in mid-range, business value accommodation. This targets the budget traveller who often finds that two and three star professionally managed facilities are usually limited and have low value for money. Efforts to improve and standardize quality of accommodation in the hospitality sector have been made in East Africa and Southern Africa. The food in Africa is unique and tasty but may not always appeal to the specific palates and preferences of visitors. This, coupled with poor hygiene and preparation, often leads to a low rating of food offered, particularly in developing tourism destinations.

Degradation of natural wealth of a community

A major problem for the development of a strong tourism sector in Africa is the lack of a common understanding of what sustainable tourism or ecotourism

means. This ambiguity leads to violations of environmental regulations and standards. Hence, environmental problems evolving from tourism are manifold. Firstly, the tourism industry is very resource and land intensive and will mean an increased stress on resources available which may lead to competition for resources. Consequently, the interest of the tourism sector will often be in conflict with local resource and land-use practices. Secondly, tourism is also a major generator of wastes. In most tourist regions of developing countries, sewage, wastewater and solid waste disposal are not properly managed or planned. Lastly, tourism is also responsible for a considerable proportion of increased volumes and mileage in global transport and hence the associated environmentally damaging pollutant emissions.

These tourism-related changes are particularly deleterious when local residents rely on those natural areas for their sustenance. Resulting economic losses can encourage socially deleterious economic activities such as prostitution, crime, and migrant and child labour. In addition to this, restricted access to natural resources for the local residents as well as environmental degradation is persistent. Tourism is not, as many people assert, a clean and non-polluting industry and the industry has not shown sufficient willingness to (internalize or) compensate the cost of conservation of biodiversity in, for instance, protected areas, even though they can profit from it.

Delicate balance of promoting cultural tourism and preserving social wealth

Integrating cultural heritage with tourism remains a bottleneck. Cultural tourism is linked with the desire of people to learn about others and to explore their history and culture. The social wealth of a community can be degraded by the intrusion of large numbers of uninformed foreigners into local social systems, which may undermine pre-existing social relationships and values. This is particularly a problem where tourism business is centred in traditional social systems, such as isolated communities or indigenous peoples.

In different regions of the continent, there has been a tendency to erode traditions and local culture and in some instances abuse human rights and dignity. Tourism is a powerful agent of change. International tourism acts as a catalyst for the transition from traditional ways of life to so-called modern, Western forms of society. Accordingly, it often brings with it the introduction of new behaviour trends and norms, which may be con-

trary to traditional norms existing in the host community, and can come into conflict with its cultural identity and threaten the traditional value systems. This can produce unique social impacts upon the hosting community, including the interruption of local customs and lifestyles, the spread of infectious diseases, changes in local demographics, and changes in local housing and labour markets.

Access and infrastructure

With limited and expensive air access in an era of low cost airlines, visitor time constraints and last minute travel decisions, it is one of the most challenging tourism growth areas in Africa. Though immigration procedures and requirements have improved in many African countries in the past five years, challenges come with regional travel when multiple visas need to be purchased. This increases the cost and transfer time of travel. Southern and East Africa are working towards having a single visa in much the same format as the Schengen visa in Europe.

Many tour operator and destination opinion leaders cite both limited and expensive air and land transport as major challenges to developing tourism products in Africa. Much needs to be done in most African countries to improve the ground transport infrastructure. Road infrastructure outside of major cities often remains a challenge. This is a key issue as many of the unique tourism sites and conservation areas are in rural areas. With some only accessible by four-wheel drive cars or by air, this limits the possibility of more people accessing the site affordably, while at the same time increasing the price premium of so-called exclusive destinations and limiting the influx of tourists to fragile social and environmental systems.

Availability of health facilities and trained doctors and nurses may also have a strong implication of the travel choices of potential tourists. Many African countries are ill-equipped to deal with the potential impact of major health threats on the travel industry. Travellers are primarily concerned with the welfare of their health while they travel and how emergencies would be handled. Uncertainty about this can significantly impact the decision a tourist makes on where to travel to.

Other services to the tourism industry

Limitations in information technology systems and bandwidth reduce business efficiency and visitor access

to communication. Reducing the cost and increasing the efficiency of computer systems and internet should be strongly encouraged.

Fixed telecommunications have limited networks in many African countries due in part to cable vandalism and weather damage coupled with a slow maintenance response time. The situation has been improved remarkably by cell phone use and network expansion. An innovative entry of mobile banking has opened up the possibilities for access to funds even in very remote areas. Foreign exchange and international banking function well in most tourism countries. Credit card use and technology are limited and visitors can be ill advised on the pitfalls associated with cash availability and exchange. The challenge remains to correctly portray the in-country realities of the financial services available within each country.

6.4 Conclusions and recommendations

The vast potentials of the tourism industry to contribute positively to the future of African economies cannot be overstated. However, it will need to be given the prominence it deserves and will involve the concerted efforts of various stakeholders using relevant evidence and data to promote its development (Pereira, and others, 2003).

Moreover, the effects of climate change on tourism do cause changes in the ecosystems and natural resources needed to sustain the tourism economy. Climate change impacts that affect tourism in African countries include: beach erosion, saline intrusion, droughts, flash floods and landslides, coral-reef bleaching, less productive fisheries and agricultural systems, changes in the preferences of tourists, etc. Natural disasters, such as rising sea levels, flooding, desertification, erosion and other health-related problems, are now rampant in African countries.

Harnessing the potential role of tourism in contributing positively to development in Africa requires efforts to mainstream the interlinkages between the tourism sector and poverty reduction and sustainable development into government processes and institutions. To this end, the following areas for policy consideration are important.

Recommendations

Pro-poor, national tourism development strategies

- Well-conceived, properly articulated and realistic tourism-policy objectives should be developed. This should be a multi-year, multi-stakeholder process, involving social, economic and environmental sectors.
- National tourism development strategies must be clearly pro-poor. In this regard, they should include local communities in planning and decision-making; foster local involvement and control over tourism development; ensure a high level of local inputs in service provision to tourists and minimize leakage, while ensuring the required quality-standards of services for the tourists are met; and ensure that an alternative livelihood is provided where tourism development leads to reduced access to local common resources for the local population. Tourism development policies must contribute to raising gender awareness and enhance women's participation in and contribution to the tourism sector.
- Tourism policies should be based on country specific evidence to identify priorities and develop arguments to engage effectively in the policy process. In this regard, tourism-related data collection and management should be strengthened.

Cross-sectoral coordination

- The increasing importance of tourism and its potential role in contributing positively to development in Africa can only be realized if efforts are made to mainstream the interlinkages between the tourism sector and poverty reduction into government processes and institutions. Greater cross-sectoral understanding and coordination is vital to the broad strategies advocated in this report.
- Cross-sectoral policies aimed at encouraging tourism development include those aimed at enhancing public health and safety, air policy, human resources development, institutional capacity and environmental protection.

Regional cooperation

- Regional cooperation remains the key opportunity for addressing the challenges in tourism development in Africa since most countries in the region often face similar problems and could benefit from cross-pollination of ideas and resources towards dealing with issues of sustainable-tourism management.
- Tourism-based partnerships and strategic alliances are an important and growing aspect of the tourism industry's future development and need to be addressed in policy and planning discussions. A form of partnership well suited to tourism is "co-opetition" which merges healthy competition and cooperation towards a common united goal.

Investment-friendly enabling environment

- An appropriate legal framework to support tourism is needed in the region, which attracts FDI while at the same time, ensuring equity in tourism benefits-sharing between communities, investors and Governments, within a framework of social, economic and environmental sustainability.
- The Governments of many African countries include tourism under general investment incentive schemes such as exemption of import taxes and tax holidays. However, few countries have suitable, dedicated incentive schemes aimed at tourism capital investment and geared at reducing the risks associated with slow and difficult market entry.
- In this context, forging private-public sector partnerships for tourism development may prove a win-win approach, and further expand tourism entrepreneurial initiatives and investment opportunities. These partnerships would need to adapt to the timing and modalities of the policy process and engage with sector working groups, donors and other stakeholders.

Capacity development

- Enhanced support for sustainable tourism activities and related capacity development is re-

quired to fully harness the potential of the sector to contribute to poverty eradication in the context of sustainable development.

- To achieve change towards more sustainable tourism, programmes on both the supply and demand sides need to be established. For example, capacity development work with local authorities, dissemination of best practice and support for technical cooperation to both public authorities and the private sector, and awareness-raising programmes aimed at changing the behaviour of tourists.
- Awareness and understanding of natural-resources conservation issues need to be improved among local communities and tourists alike, as well as national government officials and lender/donor agencies. Awareness-raising, training, and human-resource development are necessary steps to the implementation of strategies for conserving biodiversity. Field training should also be an integral component of tourism human-resource development. Moreover, countries need to strengthen tourism-related data collection and management.

Marketing

- The importance of marketing instruments and tools needs to be better understood by African actors. Marketing and promotion are often overlooked when countries establish a tourism sector, yet establishing regional and international credibility and branding is a critical component of generating demand for the product in sufficient quantity for it to be viable.
- The use of social media, such as websites, blogs and Facebook, is increasingly meeting the demands of the modern tourist to receive information in real time. These new communication instruments should be better harnessed to market the region as a tourist destination.

Information and communications technology, and telecommunication development

- Development of a vibrant ICT sector will enable tourism operators to make their products visible to the international market on a com-

petitive platform. Africa is growing its telecommunication base particularly as pertains to mobile telephony and this, with the addition of commerce potential, has made the possibilities endless. A unique product developed in Kenya, M-pesa, which supports mobile banking, has further simplified access to rapid transfer of funds and an efficient way of doing business.

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7. Harnessing the interlinkages for sustainable development

Biodiversity, forests, biotechnology, mountains and tourism are interconnected in ways that determine their contribution – individually and jointly – to poverty eradication and sustainable development. Understanding the complex interactions that exist across these sectors and natural resources is crucial to harnessing synergies and trade-offs in their management, and avoiding duplication of efforts or contradictory policies. It also fosters the balanced integration of environment, economic and social objectives for the achievement of sustainable development.

Actions in any one sector often have negative or positive implications for other sectors. The implication may reflect the extent to which sustainable management of natural resources for meeting poverty reduction goals are effective and influence other social, economic and environmental outcomes. The interlinkages approach helps understand the relationships between various natural-resource processes and development goals and also the expected and unanticipated effects of policy in diverse sectors.

The inherent interlinkages between the themes are important to consider when planning and designing sustainable development policies and interventions. Annex I summarizes the main synergies and trade-offs, both positive and negative interlinkages which stem from direct and indirect implications of processes, actions and policies in the various sectors.

7.1 Biodiversity and other themes

Biodiversity provides the required genetic pools for biotechnology R&D for different sustainable development sectors, including food production, health, forests, livestock, tourism and other economic activities. Biodiversity provides the raw material for biotechnology and other related science, technology and innovations that improve forests, tourism and mountain ecosystems and products.

Conversely, biotechnology also offers specific and appropriate tools and techniques for conserving biodiversity, reforestation and rehabilitation of denuded natural habitats to re-establish ecological balance needed for the survival of fauna, flora and microorganisms. These support conservation efforts in forests and mountains alike.

Improvement of biodiversity directly impinges on tourism especially through nature tourism. Biodiversity conservation supports protection of threatened wildlife species that are great tourist attractions, while supporting efforts to conserve fragile ecosystems that are prone to denudation through degradation of land, water and vegetation.

There are also several negative interlinkages between biodiversity and the other themes. These negative interlinkages constitute entry-points for addressing inherent trade-offs between cross-sector actions and policies. The loss of biodiversity reduces opportunities for tourism and biotechnology development; and inappropriate tourism and biotechnology developments may adversely affect biodiversity reserves.

7.2 Forests and other themes

There are strong and significant interlinkages between forestry, mountains, biodiversity and tourism, and other sustainable development goals and natural resources. Forests protect fragile ecosystems, such as wetlands, that are important for biodiversity. They are often planted to protect sensitive sites acting as riparian buffer zones, galleries, barriers, shelterbelts, windbreaks to ecosystems and their functions. Forests are also vital for ecosystems conservation through prevention of soil erosion, preservation of water quality, shading crops and livestock, absorbing carbon as a climate change mitigation process, and conservation of biodiversity.

Biotechnology applications continue to be used extensively in Africa to rehabilitate denuded natural habitats such as forests and mountains through micropropagation and replanting of forestry species. Through tissue culture techniques, species that are difficult to propagate using seeds and vegetation can be restored in the natural habitats and forests through clonal propagation. Forests are key tourist attractions and habitats for major wildlife and unique sceneries that are popular with tourists to Africa.

Forests are also vital for ecosystems conservation through prevention of soil erosion, preservation of water quality, shading crops and livestock, absorbing carbon as a climate change mitigation process and conservation of biodiversity through provision of habitats for many spe-

cies of plants and animals, many of which form the basis for the tourism industry thriving in such ecosystems.

The interlinkages are more pronounced in specific natural resources such as mountains and biodiversity hotspots. Negative impacts of forests on the other themes may include, for instance, biodiversity loss and restrictions of ecosystems services from mountains through forest monocultures. Uncontrolled forest harvesting threatens biodiversity thereby jeopardizing tourism objectives.

7.3 Biotechnology and other themes

Biotechnology can be used as a tool for adding value to biodiversity, forestry, mountain ecosystems and other natural-resource conservation processes. Through biotechnology, opportunities exist for acquiring scientific knowledge or for intervening directly in plant and animal improvement/alteration for increased production or survival. Biodiversity on the other hand, has provided biotechnology with the requisite raw materials including plants and animal components, bacteria and microorganisms.

Biotechnology applications are used for reforestation of forests and natural habitats which re-establishes the ecological balance needed for the survival of fauna, flora and microorganisms. Denuded mountains are also restored through reforestation and vegetation replenishment using clonal propagation. Restoration of forests, rehabilitation of mountain ecosystems and natural habitats contributes significantly to climate change mitigation and ecosystems.

However, there are some negative interlinkages between biotechnology and the other themes, including: the risks of accidental or intentional introduction of dominant genes through transgenics, which may affect biodiversity; the potential for introduction of invasive alien species that may cause imbalances in mountain and forest ecosystems, thereby affecting biodiversity in different ways; and the erosion of culture and germplasm through exploitation of intellectual property rights and biotechnology resources by science-tourists and conferences and exportation of raw materials and technology.

7.4 Tourism and other themes

African tourism continues to burgeon while supporting developments in many different sectors. There are both positive and negative interlinkages with biodiversity, biotechnology, forests and mountains that make tourism management integral to sustainable development in Africa. A large part of the tourism industry in Africa depends on natural resources, including biodiversity and forests. Sustainable management of forests and biodiversity, therefore, contributes to the growth of the sector. At the same time, tourism is an important source of financing for biodiversity conservation and acts as an impetus for private biodiversity-conservation efforts. There are many economic alternatives presented to local people through tourism that help reduce overexploitation of wild land and wildlife resources on protected areas.

Biodiversity conservation supports protection of threatened wildlife species that are great tourist attractions while supporting efforts to conserve fragile ecosystems such as mountains, which are prone to denudation through degradation of land, water and vegetation. Moreover, African mountains are prime and unique environments for tourism including attractions of snow-capped mountains, and for sports such as mountain climbing which is prominent in Mount Kilimanjaro, Mount Kenya and the Table Mountains of South Africa. Most biodiversity hotspots and tourism destinations are associated with important mountain ecosystems.

Unsustainable tourism development may, however, negatively affect biodiversity, forest and mountain ecosystems – and thus impact on the social and cultural heritage of the receiving communities. In many countries, the over-use of natural resources often results in loss of biological diversity and disruption of local social and cultural structures.

7.5 Mountains and other themes

The interlinkages between African mountains and the other themes (biodiversity, tourism, biotechnology and forestry), is related to endowment of mountain ecosystems with its diverse flora and fauna, water, arable land and other nature-based resources. Mountain

ecosystems form sanctuaries for threatened species and serve as a source of germplasm for biotechnology input. Mountains conserve genetic diversity and resources from which biotechnology developments may draw or depend.

Denuded mountain ecosystems are generally conserved through biotechnology. Mountains harbour many endemic species and genetic resources, and are nature's last stronghold for those species that are threatened or totally extinguished from adjacent lowlands. Mountains have a diversity of forestry species and resources. African mountains are prime and unique environments for tourism.

Conversely, mountain conservation policies and practices may exclude the livelihood goals of local communities while the attractions of mountains and population pressures lead to biodiversity loss due to unsustainable activities which in turn, affect people's livelihoods. Mountains are fragile and there is high-risk hazards arising from degradation such as deforestation and other inappropriate practices, including those linked to tourism expansion and forest exploitation through infrastructural development.

7.6 Policy coherence and adaptive governance to harness the interlinkages

The continent's natural resource-base endowments must continue to be managed through integrated approaches. The interface between forests, biodiversity, biotechnology, tourism and mountains clearly shows the need for multi-scale, inter-institutional and intersectoral coordination. This is critical to addressing the various interlinkages in sustainable development which interact across spatial as well as temporal scales and boundaries.

The underlying interlinkages offer opportunities for more effective responses at the national, subregional, regional and sectoral levels. Such actions will demand better institutional regimes through policy harmonization and monitoring; increased understanding of the interlinkages through integration and policy coherence; broad-based participation; adaptive governance; and science, technology and innovation.

The interdependence between forests, biodiversity, biotechnology, tourism and mountains calls for coherence in policies both in the regional and global sense, as well as in domestic and foreign policies – such as trade, investment, agriculture and fisheries, taxation, security, innovation, migration, climate and environment (OECD, 2011). Even development cooperation efforts should be supported by mutually reinforcing policies across a wide range of economic, social and environmental issues to ensure greater results and impact (World Bank, 2010).

Enhancing policy coherence for sustainable development requires a comprehensive approach to development across all sectors and subregions, thus ensuring increased collaboration and knowledge sharing, and enhanced partnerships. This should be boosted by: evidence-based analysis of the costs of incoherent policies in contrast to benefits of more coherent policies; a comprehensive assessment and monitoring of the impact of policy in all themes in order to sufficiently ensure coherent and consistent policy advice; and by identifying more holistic policy options including any trade-offs or synergies between them. This should also include the setting, monitoring and harmonization of international as well as national goals and targets.

In this regard, integrated data and sound scientific information on interlinkages between sectors are critical. Investments must continue on science and technology infrastructure, and capacities for development knowledge and information, with focus on cross-thematic knowledge management and information needs.

Adaptive governance that promotes flexibility, collaboration and learning to cope with the challenges of integrated development is needed. For Africa, adaptive governance approaches offer opportunities for managing the complex interlinkages and hence manage uncertainty that pervades the different facets of society, economy and environment. Adaptive management will yield incremental and cost-effective evolution of institutional structures. Coherence in the interventions within and among various sustainable development regimes is achievable through adaptive governance, supported by enhanced knowledge and information infrastructures. Broadening the participation of all actors, including the private sector, will further enhance ability to harness the interlinkages for sustainable development.

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Annex I: Interlinkages between biodiversity, biotechnology, forests, tourism and mountains

KEY TO NATURE OF THEMATIC INTERLINKAGES

-Positive (synergistic) interlinkages between themes

-Negative (trade-offs) interlinkages between themes

	Biodiversity	Biotechnology	Forests	Tourism	Mountains
Biodiversity		Gene diversity/pool for biotechnology R&D for sustainability sectors (food production, health, forests, live-stock, etc.). Raw materials for biotechnology. Tools and techniques for conserving biodiversity, reforestation and rehabilitation of denuded natural habitats to re-establish ecological balance needed for the survival of fauna, flora and microorganisms. R&D and support for capacity and technology development for biodiversity conservation.	Sustainable Forest management policies and practices conserve biodiversity as they maintain habitats to biodiversity. Forests protect fragile ecosystems such as wetlands and mountains that are important for biodiversity conservation. Forests are often planted to protect sensitive sites acting as riparian buffer zones, galleries, barriers, shelterbelts and wind-breaks to ecosystems and their functions.	Improvement of biodiversity for nature tourism (ecotourism). Biodiversity conservation supports protection of threatened wild-life species that are great tourist attractions. Joint promotion of biodiversity conservation and threatened species. National parks and reserves are natural channels for biodiversity conservation. Tourism is a source of financing for biodiversity conservation and acts as an impetus for private biodiversity conservation efforts.	Mountain ecosystems have one of the most diverse flora and fauna and thus a significant potential for conservation of vast species of plants and animals. Equity in benefits of biodiversity with (among others) mountain communities. Biodiversity conservation and protected areas in mountains. Mountain ecosystems form a sanctuary for threatened species and as germplasm for biotechnology input.
Biotechnology	Threats to biodiversity by introduction of dominant genes through unintended transgenics. Bioethics and biosafety trade-offs if local biodiversity custodians are not recognized in use of biodiversity resources for biotechnology. Loss of biodiversity reduces opportunities for biotechnology development; and inappropriate biotechnology developments may adversely affect biodiversity reserves.		Technologies for forest species improvement through disease resistance and infusion of climate change resistant genes. Restoration and rehabilitation of forests and natural habitats contribute significantly to climate change mitigation and ecosystems resilience. Forests are habitats for special species useful in biotechnology in restoring denuded environments. Research for biotechnology solutions to key crop production, livestock, human health and pests.	Biotechnology-based tourism including conferences – Africa has hosted many international and regional biotechnology conferences that also propel tourism and travel. Tools for conservation of flora and fauna for tourism. Rehabilitated ecosystems and natural habitats contribute to enhancement of tourism from restored natural aesthetics of the mountain landscapes and the diversity of fauna and flora.	Mountains conserve genetic diversity and resources from which biotechnology developments may draw or depend. Denuded mountain ecosystems conserved through biotechnology. Clonal propagation for restoration and vegetation replenishment of denuded mountains. Mountains harbour many endemic and threatened species, genetic resources, and are nature’s last stronghold for those species that have been extirpated in adjacent lowlands.

	Biodiversity	Biotechnology	Forests	Tourism	Mountains
Forests	Forest monocultures lead to threats to biodiversity. Forest harvesting threatens biodiversity. Need to maintain biological diversity may threaten forest monocultures and lumbering industry, and thereby affect livelihoods of communities.	Potential for introduction of invasive alien species through biotechnology.		Forests are key tourist attractions and habitats for major wildlife and unique scenarios popular with tourists to Africa. Tourism is a source of financing for forest conservation. Economic alternatives for local people to reduce overexploitation of wild land and wildlife resources on protected areas.	Mountains have a diversity of forestry species and resources. Vulnerability of mountain communities to tourism effects on forest establishment and services. Forest reserves mainly linked with African mountain areas and key water towers for major basins. Forests protect fragile ecosystems including mountains and hill sanctuaries.
Tourism	Destruction of biodiversity through infrastructure (hotels, roads, airports, etc.) Increased tourism pressures may lead to loss of biodiversity and lead to ecosystems and general landscape degradation; which in turn, reduces the intrinsic value of the tourist attractions.	Erosion of culture and germplasm through exploitation of IPR and biotechnology resources by science-tourists and conferences and exportation of raw materials and technology.	The tourism sector poses a threat to forest reserves as infrastructure (roads, hotels, etc.) is expanded to accommodate more visitors and reach new destinations. Inundation of mountain ecosystems through tourism infrastructure and waste.		Mountains are prime and unique environments for tourism. Ecotourism promotes sustainable mountain management. Income from tourism and related services improves wellbeing of mountain communities (employment and provision of social services). Economic alternatives for mountain dwellers to reduce pressure on mountain resources.
Mountains	Attractions of mountains and population pressures lead to biodiversity loss due to unsustainable activities and climate change; and these in turn affect people's livelihoods.	Potential for introduction of invasive alien species that cause imbalances in mountain ecosystems.	Mountains are fragile; there is a high risk of hazards arising from degradation such as deforestation and other inappropriate practices. Activities in forest products and non-forest product extraction threaten mountain ecosystems including water flows and habitat loss.	Conservation of mountains is threatened by unsustainable tourism investments in key mountain areas. Mountains are specific tourist attractions as parks and for sports (snow-capped mountains, volcanic mountains and special nature reserves), due to their attractive and adventurous landscapes. These activities put pressure on mountains.	

