Development
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DBN-BIODIVERSITY & ECOSYSTEMS GUIDANCE DOCUMENT

Contents

a) Version Control 3

1. Legislative and regulatory frameworks relevant to biodiversity 3

1.2. The global context 3

1.3. The Namibian context 4

2. The importance of Namibia's Biodiversity 9

3. The importance of and threats to biodiversity 12

a) Version Control

The table below serves to track the key revisions made to this document for change control purposes.

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1. Legislative and regulatory frameworks relevant to biodiversity

1.2. The global context

The Convention on Biological Diversity (CBD) was adopted at the United Nations Conference on Environment and Development (UNCED), known as the Earth Summit, in Rio de Janeiro in 1992. Known informally as the Biodiversity Convention, this internationally legally binding treaty has three main goals:

- conservation of biological diversity;
- sustainable use of its components; and
- fair and equitable sharing of benefits arising from genetic resources

The Conference of Parties (COP) of the CBD is an important body that keeps under review the implementation of the CBD. Thematic working programmes have been initiated and the COP periodically reviews implementation of these thematic programmes of work and decides on their further development. The thematic programmes include Marine and Coastal Biodiversity; Agricultural Biodiversity; Forest Biodiversity; Inland Waters Biodiversity; Dry and Sub-humid Biodiversity, Mountain Biodiversity; Protected Areas Biodiversity; and Island Biodiversity.

Over and above the thematic programmes there are a number of key cross-cutting issues of relevance to all thematic areas. These issues include: Access to genetic resources and benefit-sharing; Alien

species; Traditional knowledge; Innovations and practices; Biological diversity and tourism; Climate change and biological diversity; Economics, trade and incentive measures; Ecosystem Approach; Global strategy for plant conservation; Global taxonomy initiative; Impact assessment; Indicators; Protected areas; Public education and awareness; Sustainable use of biodiversity; Technological transfer and cooperation; Liability and redress; and Bio-safety.

1.3. The Namibian context

Since gaining independence in 1990, the Namibian government has adopted a number of policies that promote sustainable development in the country. This was mainly based on the following two clauses of the Namibian Constitution:

- Article 91(c), which defines the functions of the Ombudsman to include "… the duty to investigate complaints concerning the over utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia"
- Article 95(l), which commits the State to "actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and the utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future…"

Although Article 95 of the Namibian Constitution does not create legally enforceable conditions, it guides policies regarding the enactment, relevance and application of appropriate pieces of legislation. As a result the Namibian government introduced measures for the use of natural resources to address sustainable development based on the constitutional commitment. In essence the constitution guides legislation to guard against over-utilization and over-exploitation of resources, ensure biological diversity and ecosystem functionality, protect the sense of place and character and advocate sustainable resource use.

In 1992 Namibia's Green Plan was drafted to be presented at the Earth Summit in Rio de Janeiro. The document identified the main environmental challenges facing Namibia and specified actions required to address them. The Green Plan was closely coupled to Namibia's 12 Point Plan for Integrated and Sustainable Environmental Management – a strategic document that outlines the most important aspects to be considered on a sustainable development path.

Based on the early foundations laid by Namibia's Green Plan and Namibia's 12 Point Plan, an effort was made to incorporate environmental and sustainable development issues and options into the country's National Development Plans. Principles of sustainable development gained prominence in the Second National Development Plan (2001 – 2006). Based on the same principles Namibia's Vision for 2030 was formulated in 2001/2002, to help guide the country's future five-year development plans. Vision 2030 fully embraces the idea of sustainable development: " The nation shall develop its natural capital for the benefit of its social, economic and ecological well-being by adopting strategies that: Promote the sustainable, equitable and efficient use of natural resources; Maximize Namibia's comparative advantages and; Reduce all inappropriate resource use practices. However, natural

resources alone cannot sustain Namibia's long-term development, and the nation must diversify its economy and livelihood strategies".

The Directorate of Environmental Affairs (DEA) of the Ministry of Environment and Tourism (MET) is the focal point for all biodiversity-related activities in Namibia. MET consists of different directorates that deals with different activities. These directorates address issues of protected area management, management of wildlife resources, forestry biodiversity, traditional knowledge systems, research and planning and community-based natural resources management (CBNRM). By means of the Nature Conservation Act of 1996 MET is appointed as custodian of protected area management and the management of wildlife resources in Namibia.

The NNBP is one of the core programmes of the DEA in the MET which operates nationally to support and implement the CBD in Namibia. The NNBP was established in September 1994 with the objectives to:

- Improve the quality, quantity, focus and accessibility of biodiversity information in Namibia;
- Improve development planning and policy integration to sustain biological diversity and ecological functioning;
- Analyse the adequacy of existing conservation measures;
- Plan locally suitable means to monitor, analyse and mitigate processes threatening biodiversity and ecological functioning;
- Strengthen human and technical capacity in Namibian institutions concerned with biodiversity inventory and conservation work;
- Coordinate, support and stimulate activities, which help implement the Convention on Biological Diversity.

The NNBP has established thematic working groups, composing of more than 150 professionals from governmental, non-governmental, private sector, academic and research institutions, to provide technical guidance and direction of the programme. Work programmes within the NNBP were aligned with the national development process, including the second National Development Plan and Vision 2030. Two of the important outcomes of the NNBP include a thorough review of the country's biological diversity (Biological Diversity of Namibia in 1998) and a guiding 10-year strategy (Biodiversity and Development in Namibia 2001-2010 in 2000).

Priorities for biodiversity conservation in Namibia were outlined in the Namibia Biodiversity Strategy and Action Plan 2001 – 2010 (NBSAP). NBSAP is a policy document that provides the overall guidance for the implementation of Article 95 (l) of the Namibian constitution. Article 95 of the constitution addresses the need to put up measures that will promote and maintain the welfare of the people. Among these are measures aimed at "the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future…"

In essence, the following key areas make up the NBSAP:

1. Conserving biodiversity in priority areas (e.g. national parks, communal and commercial area conservancies, conservation of endemic and threatened species, and ex-situ and in-situ conservation)
2. Sustainable use of natural resources (harvesting of natural resources, agricultural biodiversity, indigenous knowledge systems, bio-prospecting and bio-trade, and biotechnology)
3. Monitoring, predicting and coping with environmental changes and threats (long-term planning and decision making, the ecosystem approach, indicators and assessments, ecosystem functions and services, biosystematics, climate change, desertification and land degradation, alien invasive species, pollution, and rehabilitation and restoration of degraded ecosystems)
4. Sustainable land management (land use planning and land reform, biodiversity compatible land uses and management systems, eco-agriculture, sustainable forest management, sustainable desert savannah and woodlands management, and ecological functions of Namibia's endemic rich mountain ecosystems)
5. Sustainable wetland management (ecosystem function, conservation areas, integrated land and water management, and awareness)
6. Sustainable coastal and marine ecosystems (reduce impacts, aquaculture, marine protected areas, pollution control, taxonomy, bio-prospecting, integrated coastal zone management, and awareness)
7. Integrated planning biodiversity conservation and sustainable development (integrated planning and implementation, streamline policy and legal frameworks, decentralisation, devolution of natural resource management, and institutional partnerships)
8. Namibia's role in the larger world community (implementation and adherence to international treaties, wise use of international assistance, strengthen national capacity of natural resources management, and international research and management collaboration)
9. Capacity building for biodiversity management in support of sustainable development (public awareness, capacity building to manage biodiversity and sustainable development, participation of disadvantaged groups, strengthen participation of communities [e.g. in bio-prospecting and bio-trade], and strengthen Namibian centres of [biodiversity-related] excellence)
10. Implementing the strategy and action plan (form NBSAP implementation unit, strengthen national biodiversity task force and national biodiversity programme unit, streamline biodiversity issues in national development planning and budgeting processes, and develop financial implementation plan).

Line ministries directly dealing with biodiversity in Namibia are the Ministry of Environment and Tourism (MET), the Ministry of Lands and Resettlement (MLR), the Ministry of Agriculture, Water and Forestry (MAWF) and the Ministry of Fisheries and Marine Resources (MFMR). These ministries are mandated with clearly defined key roles in the conservation of biological biodiversity.

An important act that stipulates the functions and roles of MET is the Environmental Management Act (2007). The purpose of this act is to give effect to the articles of the Namibian Constitution that

deals with policies related to the use of the country's natural resources and makes provision, amongst other things, for the regulation of

- Environmental Assessments;
- Provisions on environmental rights and duties of Namibians;
- Establishing binding national environmental principles; and
- Setting principles of environmental management.

The Environmental Management Act contains thirteen principles of which nine are very relevant to biodiversity management:

- Renewable resources shall be utilized on a sustainable basis for the benefit of current and future generations of Namibians;
- Community involvement in natural resource management and sharing in the benefits arising there from shall be promoted and facilitated;
- Public participation in decision making affecting the environment shall be promoted;
- Fair and equitable access to natural resources shall be promoted;
- Equitable access to sufficient water of acceptable quality and adequate sanitation shall be promoted and the water needs of ecological systems shall be fulfilled to ensure the sustainability of such systems;
- The precautionary principle and the principle of preventative action[1] shall be applied;
- There shall be prior environmental assessment of projects and proposals which may significantly affect the environment or use of natural resources;
- Sustainable development shall be promoted in land use planning;
- Namibia's movable and immovable cultural and natural heritage including its biodiversity shall be protected and respected for the benefit of current and future generations.

The act also impliedly refers to international multi-lateral environmental agreements such as the Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972; World Heritage Convention, 1975; Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973; Vienna Convention for the Protection of the Ozone Layer, 1985; Montreal Protocol on Substances that Deplete the Ozone Layer, 1987; United Nations Framework Convention on Climate Change, 1992; United Nations Convention to Combat Desertification, 1992 and the United Nations Convention on Biological Diversity, 1992.

The Ministry of Lands and Resettlement (MLR) focuses on land reform aspects, surveying and mapping and develops integrated land use plans for the regions in the country. This ministry is mandated to ensure that the resettlement process of the landless is done in a sustainable manner.

The Ministry of Fisheries and Marine Resources (MFMR) is responsible for the coastal and marine biodiversity, freshwater fisheries and aquaculture. There exists a bilateral co-operation agreement between Namibia and South Africa and Angola for the management of research in the Benguela

[1] The precautionary principle (or precautionary approach) to risk management states that if an action or policy has a suspected risk of causing harm to the public, or to the environment, in the absence of scientific consensus (that the action or policy is not harmful), the burden of proof that it is not harmful falls on those taking an action that may or may not be a risk

Current Large Marine Ecosystem (BCLME). This is a broad-based multi-sectoral initiative aimed at sustainable integrated management of the Benguela current ecosystem as a whole. It focuses on fisheries, environmental variability, sea-bed mining, oil and gas.

The Ministry of Agriculture, Water and Forestry (MAWF) aims at promoting sustainable development, management and utilization of water and agricultural resources, including indigenous plant resources. The National Botanical Research Institute (NBRI) within MAWF is involved in the inventory of indigenous plants of Namibia. In addition, the research division is involved in research projects looking at livestock improvement, fruit tree farming, rangeland management, crop-modelling and agro-meteorology, vegetation surveys, indigenous plants, value addition on plant products, agro-ecological zoning and the mapping and characterizing soils.

The MAWF holds the mandate over one of Namibia's most precious resources water. The growing recognition that water is a crucial resource in Namibia and essential determinant in national economic planning and health structured many of the aims of documents such as Vision 2030 and the Second and Third National Development Plans.

Some prominent aspects include the efficient and sustainable use of water; equitable access to potable water; keeping water unpolluted; appropriate tenure over water resources; the conservation and protection of water resources; and regular monitoring initiatives on water in Namibia. The vital ecological role of water is acknowledged in Namibia's Drafted Wetland Policy (2004), which aims to manage national and shared wetlands wisely.

The policy complements also the Forest Act (2001), which consolidates the legislative frameworks relating to protection to any living tree, bush or shrub within 100 m from any river, stream or watercourse. Removal of such plants requires a special permit. Important is its clause for the protection of riparian vegetation that, in effect, also legislates against soil erosion and the implied causes related to destructive activities.

Other line ministries such as the Ministry of Education address aspects of biodiversity through its Directorate of Science and Technology. This directorate addresses the legal framework for biotechnology and bio-safety. The National Institute for Educational Development (NIED) of the ministry ensures the incorporation of environmental aspects in the school curricula at different levels.

The Directorate of Youth in the Ministry of Youth, National Service, Sport and Culture has an environmental education section that involves the youth in important environmental issues. In addition the national museum of Namibia, which is also part of this ministry, plays a major in biodiversity taxonomy, curatorship and conservation.

There are also a number of non-governmental organisations that play an important role in biodiversity conservation in Namibia.

Many of these organisations were formed as conservancies through Namibia's CBNRM Programme. The Nature Conservation Act of 1996 enables the establishment of conservancies legally gazetted

areas on state communal land where local communities are appointed as custodians of natural resources through empowering legislation.

Conservancies facilitate livelihood diversification and rural development, aiming at alleviating poverty while the sustainable use of biodiversity is promoted at the same time. CBNRM forms thus a major platform within the strategic planning of the MET, it is incorporated within the scope of Namibia's Third National Development Plan and the number of registered conservancies is one of the indicators for measuring Namibia's Millennium Development Goals and ensuring environmental sustainability. Currently there are 59 communal conservancies in Namibia, managing more than 16% of the land surface and engaging about 12% of Namibia's population. Many more are in various stages of formation. It is believed that the eventual 90 proposed conservancies may cover around 21% of Namibia.

Namibia's establishment of conservancies is among the most successful efforts by developing nations to decentralize natural resource management to the communal level and simultaneously combat poverty. In fact, it is one of the largest-scale demonstrations of CBNRM and state-sanctioned empowerment of local communities in the world.

CBNRM still is the most sensible solution to manage natural resources on communal land, especially in areas where wildlife is abundant, the scenery attractive and the location in terms of conventional tourism routes advantageous. Although there is no doubt that CBNRM principles as being advocated by the operational activities of most conservancies have greatly benefit wildlife conservation in Namibia, the need now exists to shift to an integrated natural resource management approach to benefit wider audiences of communal people.

2. The importance of Namibia's Biodiversity

The overwhelming feature of Namibia's climate is its aridity. Everywhere in the country precipitation is lower than over the rest of the sub-continent, accompanied by a variability and unpredictability in rainfall that increases to the west and south. The more moist north-eastern parts of the country have the greatest overall diversity of species, but most of Namibia's endemic species occur in its more arid parts – around inselbergs, near the escarpment and in the succulent-Karoo in the southwest (where it rains also in winter).

While drought implies a protracted period of insufficient rainfall, that occurs regularly, aridity is a permanent feature on Namibia's climate. About 40% of the land surface of Namibia could be classified as arid, 40% as semi-arid, 5% as sub-humid, and a narrow rim in the west and southwest that could be better described as hyper-arid or desert (15%). Over 85% of the country, these climatic zones order themselves in savannah landscapes that are of a varying ecological constitution, but the boundaries between them are neither static nor abrupt, because the land is also exposed to high inter-annual variability.

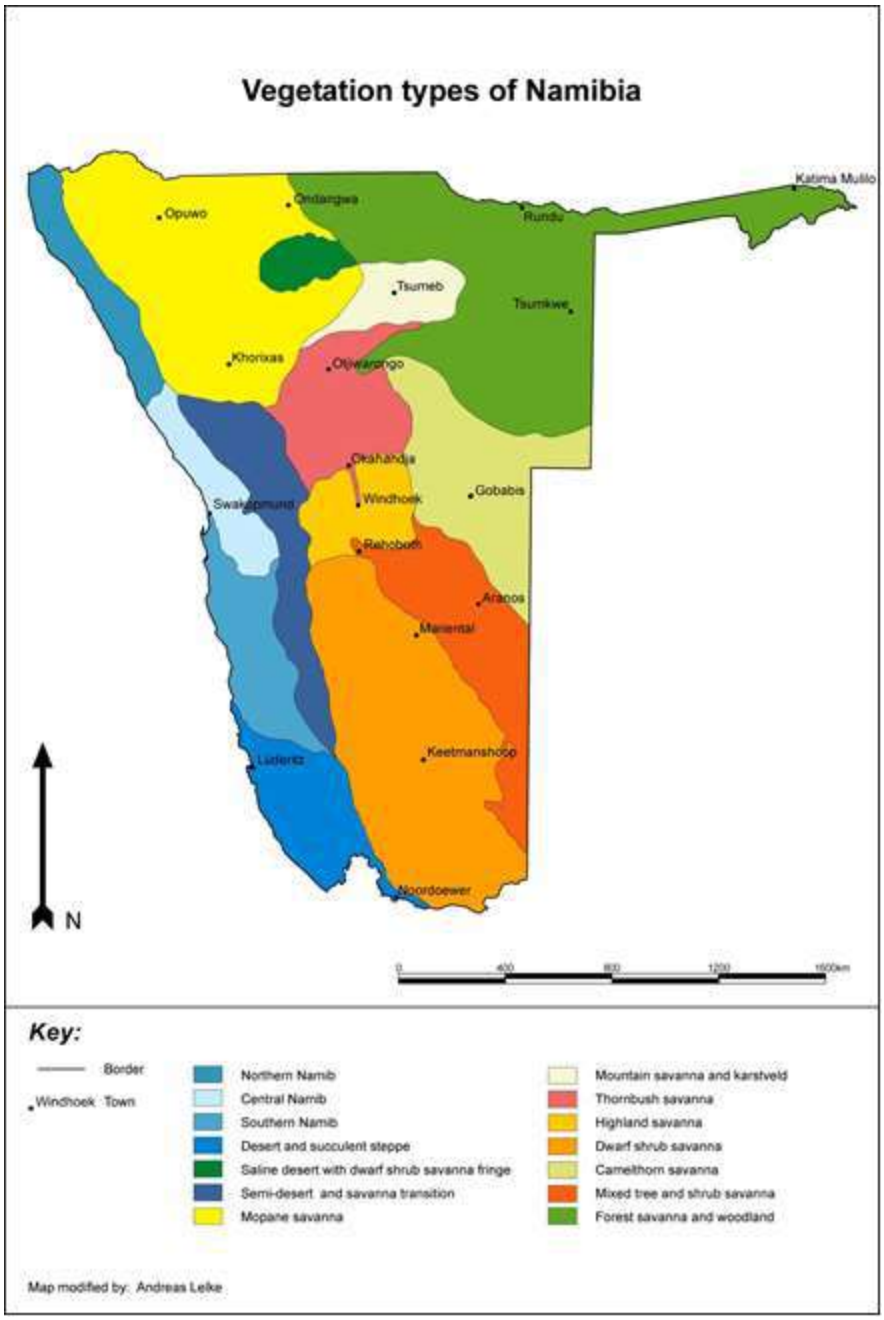
Drainage courses of the rivers function as lifelines of an otherwise inhospitable terrain. Their presence is typified as narrow, green linear ribbons that cross the arid landscapes. These ephemeral wetlands

act as important ecological corridors. Consequently species diversity and their populations are the highest around and along wetlands in comparison to the rest of Namibia. The periodical water supply from intermittent floods feed directly the riparian vegetation and underground water supplies on which a whole collection of animals indirectly depends.

Namibian botanists are still using broadly the system of vegetation types proposed by Giess in 1971, which is a very coarse classification (Map 1). Vegetation underpins to a great extent the general patterns of biodiversity, although the occurrence of animals such as insects and birds may warrant a coarser amalgamation. Namibia's vegetation is strongly influenced by rainfall and to a lesser degree by other climatic factors such as frost. In the northeast, where the rainfall is the highest and most reliable, vegetation is the densest and also the tallest. From here the vegetation becomes progressively shorter and sparser to the west and the south – mirroring the decline in rainfall and the increase in rainfall unpredictability. This general pattern is complicated by changes in landforms and soils, and the availability of underground water. As a result the 14 vegetation types of Giess have been reviewed to distinguish five biomes, sub-divided into 29 broad types nowadays.

In general terms Namibia is rich in endemic species. The whole country falls within a major zone of evolution for biotic groups such as fish moths, sun-spiders, geckos, tortoises, some succulents and melons. It is especially plants, invertebrates, reptiles and frogs that show a high degree of endemism, with a much lower tendency among fish, mammals and birds. Most of Namibia's endemic species are found in a zone running along the escarpment and congruence between endemism hotspots, speciation and rocky outcrops is particularly high.

Namibia is exceptionally rich in insect diversity. Apparently less abundant, aquatic insects in Namibia are confined to the availability of surface water resources and have thus peak seasonal occurrences, especially where it relies on ephemeral floods. Terrestrial insects are very rich in diversity and it is believed that only 20% of the 40,000 species occurring in Namibia is catalogued. The largest insect families are detrivores, herbivores, predators and parasites – reflecting the dominant, and mostly rapid, processes that depend so much on the short rainy periods. Endemics total 1,541 species, mostly confined to the parts of Namibia with rocky outcrops.



Map 1: Vegetation zones of Namibia, according to Giess (1971)

Southern Africa is noted for its species richness and endemics in reptiles, including several specialists. The 261 lizard species recorded to occur in Namibia is probably the richest lizard fauna on the African continent. The distribution of reptiles is strongly influenced by the availability of surface water, implying a strong correlation with wetlands. Lizards are the most endemic and show the highest level of speciation (especially among geckos), followed by tortoises and snakes. About 67% of Namibia's reptiles are classed as of conservation concern and seven species (and 27 more possible) are classified as threatened. Tortoises are the reptile family of greatest concern. In general, the pet trade, habitat destruction and the introduction of alien species threaten reptiles.

Frogs and toads are the only amphibians found in Namibia. Although scarce, frogs and toads are not completely absent and are chiefly confined to perennial and the more reliable seasonal water sources, but are also essentially arid-adapted.

A total of 658 species of avifauna have been recorded in Namibia. Compared with equatorial parts, Namibia's avifauna is fairly limited, but its arid endemics are a diverse and varied group. Namibian endemics, which constitute only 2% of the country's avifauna, represent 90% of the world's population. Bird richness is unrelated to the actual surface size of any biome and because birds are so mobile, they are not easily confined to a biome. Corridors have a strong positive correlation with their occurrence. Availability of surface water is another contributing factor. The majority of Namibian endemics are to be found in the savannah and desert biomes and their transition, probably because of a combination of these factors.

Namibia is blessed with healthy numbers of an impressive array of large, well-known mammals, some of which are greatly threatened in other countries, in addition to a rich fauna of small, lesser-known mammals. There exists, however, a paucity of data on distribution and conservation status of most species. A total of 208 terrestrial species are believed to occur in Namibia – representing 74% of the southern African and 24% of the continents' richness. Fourteen species, including 11 rodents and small carnivores, are considered endemic to Namibia. Most are associated with the Namib and the escarpment.

The distribution pattern of smaller species has changed little over time, but most of the larger, the edible and those with commercial value as well as large predators have suffered huge range reductions. Those that suffered the most are Plains Zebra (Equus burchelli); wildebeest (Connochaetes taurinus) and lion (Panthera leo), but springbok (Antidorcas marsupialis), gemsbok (Oryx gazella), kudu (Tragelaphus strepsiceros) and leopard (Panthera pardus) have not experienced major changes. A major factor underlying this stabilisation was the shift in ownership of game outside parks from the state to landholders in 1967. Since then the numbers of game on commercial farmland multiplied to levels where it is claimed that more game are to be found outside than inside parks. It however does not always promote sound biodiversity principles – it cannot prevent individual overexploitation or the introduction of alien species.

3. The importance of and threats to biodiversity

So far, less than 2 million species have been identified, many of them small creatures such as insects. Scientists reckon that there are many millions of species, and estimates range from three to 100 million.

The exact figure of species is not easy to calculate because biodiversity also includes genetic differences within each species – for example, between varieties of crops and breeds of livestock. Another dimension of biodiversity is provided by the variety of ecosystems found on Earth. In each ecosystem living creatures form a community, interacting with one another and with the air, water, and soil around them. It is this complex combination of life forms and interactions with each other that

sustains biodiversity and has made Earth a uniquely habitable place for humans. Biodiversity provides a large number of goods and services that sustain our lives, so varied as to be almost infinite. For example, it would be impractical to replace, to any large extent, services such as pollination performed by insects and birds going about their everyday business.

Managing biodiversity sustainably is in our self-interest. Biological resources are the pillars upon which we build civilizations. Nature's products support such diverse industries as agriculture, cosmetics, pharmaceuticals, pulp and paper, horticulture, amenities, construction and waste treatment. The loss of biodiversity threatens our food supplies, opportunities for recreation and tourism, and sources of wood, medicines and energy. It also interferes with essential ecological functions.

Our personal health, and the health of our economy and human society, depends on the continuous supply of various ecological services that would be extremely costly or impossible to replace. "Goods and Services" provided by biodiversity include:

- Provision of food, fuel and fibre
- Provision of shelter and building materials
- Purification of air and water
- Detoxification and decomposition of wastes
- Stabilization and moderation of the Earth's climate
- Moderation of floods, droughts, temperature extremes and the forces of wind
- Generation and renewal of soil fertility, including nutrient cycling
- Pollination of plants, including many crops
- Control of pests and diseases
- Maintenance of genetic resources as key inputs to crop varieties and livestock breeds, medicines, and other products
- Cultural and aesthetic benefits
- Ability to adapt to change

While loss of species has always occurred as a natural phenomenon, the pace of extinction has accelerated dramatically as a result of human activity. We are creating the greatest extinction crisis since the natural disaster that wiped out the dinosaurs 65 million years ago. These extinctions are irreversible and, given our dependence on food crops, medicines and other biological resources, pose a threat to our own well-being. It is unethical to drive other forms of life to extinction, and thereby deprive present and future generations of options for their survival and development.

The reduction in biodiversity also hurts us in other ways. Our cultural identity is deeply rooted in our biological environment. Plants and animals are symbols of our world, preserved in flags, sculptures, and other images that define us and our societies. We draw inspiration just from looking at nature's beauty and power.