LESOTHO'S BIOLOGICAL DIVERSITY

NATIONAL STRATEGY
ON
LESOTHO'S BIOLOGICAL DIVERSITY:
CONSERVATION AND SUSTAINABLE USE

NATIONAL ENVIRONMENT SECRETARIAT

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Foreword

In order to meet the challenges of environment and development, a commitment to sound economic policies and management, and the integration of environmental concerns into decision-making must be seriously taken into consideration by all sectors of the economy.

The first area of national resource degradation in Lesotho is the overriding environmental concern, which has attracted government attention for many years. The solution to this could be brought about by a national strategy and action plan, which encompasses all the sectors of the economy, which have a bearing on the environment. It is clear that the solution requires the blending of development and conservation actions and should not allow for isolated environmental and developmental operations.

This book represents some achievements that have been made by Government in terms of development of overall strategy and action plan to address the overriding environmental degradation. The importance of biodiversity to the Government of Lesotho and the present and future generations cannot be overemphasized.

The great loss of biodiversity throughout the world was not recognized until the initiation of the Rio de Janeiro Conference in 1992, which spearheaded the recognition of the importance of biodiversity to our health and wellbeing. The signing of the Convention on Biological Diversity, which committed countries to taking certain actions aimed at sustainable use of biological diversity and conservation of important globally significant natural resources, which are only endemic in certain parts of the world.

It is in the spirit of meeting our obligations in terms of Convention on Biological Diversity and other important conventions, which are environmentally related, that this book has been produced. It is imperative that Government firmly controls the implementation of this emerging strategy and action plan.

And finally, this book sets some important priorities. With these priorities, we can base our national outlook for the future.

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We are indeed indebted to Associate Professor David P. Ambrose and Dr. Sunitra Talukdar whose valuable contributions in terms of editing and improving on the layout and flow of information in this book has made this a quality final product. It is hoped that this book will stimulate interest/challenge from non-governmental organizations, the Private Sector and Ministries dealing with environmental issues in one way or the other in making appropriate budgetary allocations and work programmes that are in line with what has been proposed as the broad strategy and action.

We would like to thank the UNDP-GEF for the sizeable financial contribution it has made for drafting of the book as well as for making it possible to publish it.

Lastly, we would like to thank Mr. Thulo Qhotsokoane for ensuring that the whole exercise is completed to the satisfaction of the National Environment Secretariat of the Ministry of Environment, Gender and Youth Affairs.

ACRONYMS

BSAP	Biodiversity Strategy & Action Plan
CBD	Convention on Biological Diversity
CBO	Community Based Organization
EIA	Environmental Impact Assessment
FAO	Food & Agricultural Organization
GA	Grazing Association
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GNP	Gross National Product
IUCN	International Union for the Conservation of Nature & Natural Resources
LHDA	Lesotho Highlands Development Authority
LMO	Living Modified Organism
NGO	Non-Governmental Organization
NTTC	National Teacher Training College
NUL	National University of Lesotho
RMA	Range Management Area
SACU	Southern African Customs Union
SADC	Southern African Development Community
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme

Chapter 1 Introduction

A. BACKGROUND

The production of the **Lesotho Biodiversity Strategy and Action Plan** is the culmination of efforts of many persons and institutions, including Government and national and international organizations who have an interest in the environment and the quality of life in Lesotho. These groups are concerned by the deterioration and loss of the national and international heritage of genes, species, habitats and ecological systems which continue unabated. The process has taken many years to unfold and will probably take some more to come to fruition. The following events took place to enable the production of this strategy document:

- In 1988, Lesotho initiated a process whereby environmental concerns were aired and solutions proposed to arrest environmental degradation. The process was prompted by an environmental conference that was held in Maseru during April 1988. The International Conference on Environment and Development produced the preliminary version of the *National Environmental Action Plan* (Lesotho Government, 1989). The draft plan was widely circulated in Lesotho and received a number of comments which were further reviewed and incorporated into a second draft.
- A second impetus came from a Ministry of Agriculture paper, *Agricultural production and marketing policies and management of soil, water and forestry resources to promote increased productivity and improved nutrition in Lesotho.* This second document was combined with the first to produce a second draft of the Environmental Action Plan.
- After the second draft was circulated, a high level technical review meeting was held in Maseru in October, 1988. Over 70 experts from Government, non-governmental agencies and international environmental specialists revised the document and produced the final version of the National Environmental Action Plan. The Plan was motivated by the loss of non-renewable natural resources such as soil; by concern about pollution of the natural environment by solid materials such as tins, bottles and plastics and other waste products; and by consideration that widespread poverty also has an impact, because the survival strategies of desperately poor people may require them to exploit the environment adversely for personal short-term gain. The Ministry of Agriculture had for sometime taken a lead in such issues. Other Ministries, such as Health have since supported the need for a clean and healthy environment.
- On the international front, there were still concerns about the loss of biological resources in the world and especially in fragile ecosystems such as prevail in Lesotho and elsewhere. In recognizing this increasingly desperate situation, the United Nations Environment Programme (UNEP) held a meeting in 1990 with experts from around the world who formed an *ad hoc* working group. The group was to initiate a global programme that would determine the biodiversity present in each country, would identify conservation

requirements, and would also determine the appropriate legal instrument for the conservation of the planet's biological diversity. Following the meeting, an international conference was held in Nairobi in May 1992 to which the nations of the world were invited for the Adoption of an Agreed Text of the Convention on Biological Diversity. The Convention on Biological Diversity was signed by 150 nations at the Earth Summit in Brazil in June 1992. It came into force in December 1993 following ratification by the 30th nation. Lesotho was a participant from the beginning of these world initiatives and ratified the Convention on 10 January 1995. As provided by Article 36(4), the Convention came into force in Lesotho on the ninetieth day after ratification, i. e. 10 April 1995.

- To implement the Convention and to help arrest the deterioration of its natural heritage, the Government of Lesotho with the assistance of United Nations Development Programme initiated the process of determining the status of biodiversity and its management in Lesotho, and determining the strategies and action plans needed to conserve and sustainably use Lesotho's Biodiversity. This process started in January 1997 with the formation of the Planning team to take up the task of drawing such plans. A first stage was to produce a country report which detailed the present status of biodiversity in Lesotho, determining existing gaps in information on biodiversity, and putting forward recommendations for closing these gaps.
- The formulation of the Biodiversity Strategy and Action Plan was a very interactive process with consultations taking place with every stakeholder. Two national consultative workshops were held in Maseru in May and July 1997 attended by over 160 participants including representatives of local communities and community-based organizations; district and national officials; representatives of non-governmental organizations; and international experts. The workshops explored a wide range of policy options to achieve certain goals, and their recommendations form the basis from which this policy document is derived.

There is a growing worldwide concern that the earth's biological wealth is being lost at an alarming rate. The principal causes of this loss are human activities that result in habitat destruction, pollute the environment, over-exploit biodiversity components and increase the invasion of alien plant and animal species. The world's concern is that if these continue unabated, the world stands to lose important life support systems with the consequence that rural living will be undermined through diminished economic opportunities, as options for developing medicines and food are reduced and the natural resource base for tourism is damaged.

With these concerns in mind, there is a clear need for action at the international level. However, it should be recognised that the world's biodiversity wealth is in the poorer nations, while its consumption is in the richer well developed countries. The world's biodiversity hot spots are not in North America, Europe nor South-East Asia but rather in Africa, elsewhere in Asia, and in South America. The initiative for conservation of biodiversity is from industrialized countries where there is a realization that species diversity is diminishing. If the diversity of species is to be preserved for the present and future generations, there clearly exists a need for cooperation that must include global agreements concerning biodiversity. This is the essence of the Convention on Biological Diversity.

In June 1992, representatives of the nations of the world met in Rio de Janeiro at the United Nations Conference on Environment and Development, better known to most people by a name which captures the imagination, the 'Earth Summit'. At the conference, 152 nations signed the Convention on Biological Diversity, which in essence reconciles environment and development by coupling environmental objectives with the aspirations of developing countries. This landmark treaty recognises that the conservation of biodiversity is a concern of all humanity and more importantly, it emphasizes the fact that natural resources are the property of individual countries. It thus places decision making at national level.

Lesotho participated fully during the negotiations leading to the United Nations Convention on Biological Diversity. The treaty was opened for signature in June 1992 at the Earth Summit, and has been seen, the Convention became operational in December 1993 when sufficient countries had deposited instruments of ratification.

The three main objectives of the Convention on Biological Diversity are:

Conservation of biodiversity;

Sustainable use of biological resources; and

Fair and equitable sharing of benefits arising from the use of genetic resources.

The last mentioned of these objectives concerns the relationship between countries which provide genetic resources and those which, using their technology and know-how, develop products from them.

The Convention sets out a number of guiding principles for the conservation and sustainable use of biological diversity, including: provisions on the establishment of protected areas; development of methods to promote the sustainable use of biological resources; the environmental responsibility of different sectors of society; and education and research. Whereas the Convention recognizes that States have sovereign rights over their own genetic resources it recommends that countries set out measures for enabling access by other countries to their genetic resources. The Convention then makes recommendations concerning financial support for the efforts of developing countries to conserve biodiversity. The Convention also calls on States to develop national action plans or programmes for the conservation and sustainable use of biological diversity and to integrate these plans into national sectoral planning. The Convention is nevertheless sufficiently flexible to allow each country to design its own policies but in a broader context of conserving biological diversity as set out in the articles of the Convention.

It is within this framework that Lesotho has undertaken to develop a national **Biodiversity Strategy and Action Plan** (BSAP). The BSAP process started with a desktop country study where an inventory of the country's biological resources was compiled, and eventually produced in published form (Ambrose, Pomela & Talukdar, 2000). This country study further identified the threats to biological resources, the value of biological resources, and existing information gaps which impede the country's ability to conserve and sustainably use biological resources. This information was used as a basis for the production of the BSAP.

Considering that environmental problems are products of the impacts of many uncoordinated human activities and natural processes, their mitigation and solution call for coordinated programmes and activities by different sectors of Government and society. The formulation of the national Biodiversity Strategy and Action Plan is done with this in mind, and provides a framework for the implementation of the National Environmental Policy in matters concerning Biodiversity. The National Environment Policy document was adopted by Cabinet in 1996.

Policy formulations with regard to the environment and sustainable development are embodied in three framework documents: the *National Environmental Action Plan* (Lesotho Government, 1989), the *National Action Plan for Implementation of Agenda 21 in Lesotho* (Lesotho Government, 1994) and the *National Environmental Policy for Lesotho* (Lesotho Government, 1998). This Strategy and Action Plan is in support of these three framework policy documents. The conservation of biodiversity is acknowledged to be a priority of Government and an immediate objective in this regard is the preparation and implementation of a National Biodiversity Management Programme whose supporting principles will emanate from this document.

Experience should be drawn from the past for success to be achieved. However, there was previously no clear overall biodiversity conservation policy and no clear coordination of efforts. This strategy paper proposes that these be remedied by defining clearly the roles of institutions and individuals responsible for conservation and utilization of biological components. It describes the institutional linkages to be established and to be clearly defined.

B. ELEMENTS OF BIODIVERSITY

1. Biodiversity Defined

The term *biological diversity* (or *biodiversity*) refers to the numbers and variability existing among living organisms and life supporting systems found in the living world (McNeely *et al.*, 1990). Biodiversity encompasses all species of plants, animals and microorganisms, together with the ecosystems and ecological processes within which the species and organisms are found. Biodiversity includes natural wild types, as well as domesticated varieties of crops and livestock. Three levels of complexity are recognized: genetic, species and ecosystem diversity.

- **Genetic Diversity** relates to the variety of inherited material (genes) passed from generation to generation, and is a measure of variability within and between closely related species.
- **Species Diversity** refers to the number of different species found in a given area, country or region. The world's species diversity is conservatively estimated at some 12.5 million species (World Conservation Monitoring Centre, 1992). However, only about 1.7 million species have been scientifically described and named. The great majority of species, especially insects and micro-organisms, are not yet known to science.

- **Ecosystem Diversity** describes the variety of life-supporting systems found in marine, freshwater and terrestrial environments that constitute the global biosphere, including for example forests, wetlands, grasslands, deserts, lakes, rivers, and coral reefs. Ecosystems are composed of communities of living organisms interacting with their physical environment in complex ways but tending towards the state of equilibrium through a recycling of essential components of life: water, oxygen, carbon, nitrogen, and other key elements.

Biological diversity, as defined in the Convention on Biological Diversity (1992)

'Biological Diversity' means:

the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

With the increasing human population, expansion of agriculture into marginal areas, destruction of natural habitats and increased exploitation of the resource base in general, biodiversity is in decline throughout the world. An estimated 27 000 tropical species are disappearing each year (Wilson, 1992) and the extinction process seems certain to continue as human impact on the environment becomes ever more pervasive. A wealth of biodiversity resources is therefore being lost without any formal recognition of its existence or assessment of its potential. Apart from purely ethical and aesthetic considerations, this wastage is a major cause for concern on more utilitarian grounds: it leads to the permanent loss of biological assets and reduced effectiveness of environmental services provided by fully functional ecosystems.

2. Biological Diversity of Lesotho

2.1. Biological Resources of Lesotho

Lesotho for its size (30 300 km^2) has a remarkably rich variety of plants and animals, a significant number of which are endemics. Biological inventories for certain areas of Lesotho have been compiled, notably by the Range Management Division (Rubbright, 1995), at Sehlabathebe (Lynch & Watson, 1990), and particularly within the areas impacted by the Lesotho Highlands Water Project (Loxton, Venn & Associates, 1993; AfriDev Consultants, 1996). For mammals (Lynch, 1994) and birds (Harrison *et al.*, 1997) there have been extensive national surveys, but of limited duration, and in the case of mammals the survey was largely confined to the Maloti. There has been no continuous monitoring by a Botanical or Zoological Survey, nor detailed record keeping by a National Museum. Since the accurate assessment of biodiversity is dependent on scientific studies over a lengthy period, Lesotho, in common with many developing countries, has yet to be thoroughly investigated and its biodiversity is therefore likely to be understated.

A summary of the known numbers of Lesotho plant and animal species is shown in the table which follows. Historical species are those for which there has been no record in the past 50 years, i. e. all known records are earlier than 1950. However, clearly such data is biased towards large

species, for which older records can be traced. Of the species recorded as 'historical', most were commonly present in the past (although a few may have been vagrants), and these can be regarded as now extinct in Lesotho, although most still occur in neighbouring countries. However, two species, the Quagga (*Equus quagga*) and Blue Duiker (*Philantomba monticola*) are globally extinct. For plant species, the number of historical species is not accurately known, although at least two species of trees, *Smodingium argutum* and *Prunus africana*, which formerly occurred in Lesotho, are now believed to be extinct in the country, the last example of *P. africana* having disappeared too recently to be 'historical'. There are two other tree species for each of which there is a single surviving specimen in the Sehlabathebe National Park.

EXTENT OF KNOWN LESOTHO BIODIVERSITY AT SPECIES LEVEL			
GROUP	NUMBER OF CURRENT SPECIES	NUMBER OF HISTORICAL SPECIES	TOTAL
Mammals	63	19	82
Birds	318	22	340
Reptiles	40	3	43
Amphibians	19		19
Fish	14		14
Invertebrates	1 279		1 279
Plants & Thallophtyes	3 092	1	3 093
Based on data in Ambrose, Pomela & Talukdar (2000)			

In terms of the major divisions of **mammals**, the overall Lesotho record has representatives of 11 orders and 26 families (27 families if the Springhare is, as suspected, also present in Lesotho). This compares with a total of 15 orders (2 of them of marine animals) and 48 families (7 of them of marine animals) in Southern Africa as a whole (Skinner and Smithers, 1990). However, this total record includes historical species, and omitting these, it has dwindled so that today, 2 of the orders and 4 (and probably 6) of the families are no longer found in Lesotho. Amongst the 19 mammals for which there have been no records since 1950, two have suffered global extinction. Of these, the **Blue Antelope**, is known from archaeological deposits within Lesotho (Mitchell, 1993) as well as from rock paintings within the former boundaries of Lesotho (Loubser, Brink & Laurens, 1990). The other extinct mammal is the **Quagga**, whose English name derives from the Sesotho *qoaha*. This member of the zebra family was common in western Lesotho in the early nineteenth century (Arbousset, 1842; Casalis, 1884). It probably disappeared from Lesotho by the 1850s, but survived in the Free State until 1878 (Skinner & Smithers, 1990). 14 species of large mammals had become extinct by 1900, and in the present century at least 5 further species have been lost, and 9 others, if surviving, have but a precarious existence. Two of these, the **Eland** and **Oribi**, were extinct in Lesotho by 1905, but the establishment of reserves in South Africa on

Lesotho's eastern border provides a linkage with Lesotho's own Sehlabathebe National Park. This has made it possible for these animals to return to Lesotho from time to time, although so far not to the extent of establishing breeding populations. A number of Lesotho mammals (some already extinct in Lesotho) are also threatened species in South Africa, and the Lesotho list includes 5 threatened species, 8 rare species and 3 indeterminate species in the South African mammal Red Data Book (Smithers, 1986). It is of some regional conservation interest, however, that two of these Red Data Book species, the **White-tailed Mouse** and **Sclater's Golden Mole**, have been recorded quite frequently in mammal surveys. Indeed Lesotho might be regarded as a regional stronghold for the White-tailed Mouse (Eksteen, 1997).

Overall, Lesotho's 340 recorded **bird** species contain representatives of 23 orders and 65 families, although if purely historical species are discounted, this reduces to 21 orders and 61 families. The total is a high proportion of the 26 orders and 91 families found in Southern Africa as a whole (Maclean, 1993). However, 143 out of the 340 bird species recorded for Lesotho (42% of the total) have been recorded less than 10 times, and amongst these are 22 species which have purely historical status, there having been no records during the past 50 years. 56 other species have not been recorded during the past 15 years (Ambrose, 1998). Although a number of the records from the distant and more recent past are of vagrants which never became established in Lesotho, a significant number of species have vanished because of habitat loss. Amongst these are grassland species such as the **Ostrich** and various species of **Crane** and **Bustard**. Changes in agricultural practice and animal husbandry, as well as the extinction of most antelope species have led to the loss of other species such as the **Redbilled Oxpecker**. On the other hand, increasing numbers of trees in towns and woodlots have provided opportunities for new species, and birds such as the **Redbreasted Sparrowhawk** (which hunts from tree cover) and species of Barbet, notably the **Blackcollared** and **Crested Barbets** (which nest in holes in trees and have recently become established in Lesotho). Some other species such as the **European Starling** and **Indian Myna** have also added Lesotho territory to their range as part of an expansion throughout the subcontinent. Regarded as a 'vulnerable' species, the **Southern Bald Ibis** (*mokhotlo* in Sesotho), is endemic to Lesotho, South Africa and Swaziland, and Lesotho plays host to a number of active colonies, those in Lesotho occurring particularly in the Maloti. The eastern mountain district of Mokhotlong in fact takes its name from the Sesotho name for the bird. The **Cape Vulture** is an increasingly threatened species, and today no breeding colonies remain in the Free State. Colonies which survive in the Maloti have been extensively monitored by members of the Vulture Study Group (Maphisa, 1997). Donnay (1990) estimated there were 1 500 individual birds, including 552 breeding pairs, in some 23 breeding colonies. One of the most accessible of these colonies was in the gorge at Semonkong, attracting bird watchers even from overseas. However, despite the Cape Vulture being a protected species in Lesotho, a policeman recently used the vultures as target practice for his rifle, and the colony is today extinct. Six less accessible colonies are parts of sites designated as 'Important Bird Areas' (Barnes, 1998). The **Lesser Kestrel** is another vulnerable species, a Palaearctic migrant whose breeding grounds range from Europe to Central Asia. In Lesotho, there are some well-populated roosts on gum trees (including in the centre of Maseru), and there is no obvious population decline. The **Yellowbreasted Pipit**, is a fourth vulnerable species, which has been only infrequently reported from Lesotho, most records being from the

Sehlabathebe National Park. There are, however, recent records from the Mohale catchment (Allan *et al.*, 1996), and Clancey (1997) suggests that the bird was formerly more widely distributed within Lesotho. Possibly the most spectacular of Lesotho's birds is the **Bearded Vulture**. In southern Africa, Lesotho is today the main breeding ground of this rare bird, which once had a much larger range. According to Brown (1988), the southern African population is 631 birds, including 203 breeding pairs, of which 122 pairs breed within Lesotho. The Lesotho population is far from secure. A breeding site in Maphotong Gorge in Lesotho had the best viewing conditions of any site in southern Africa (Brown, 1990), and was even used to make a television documentary about the bird. It has been abandoned since 1983 after one of the adult birds was caught in a gin trap. In another documented event, a single herdsman killed five Bearded Vultures in a trap (Ambrose, 1983). Increased access to remote parts of the Maloti as a result of the Lesotho Highlands Water Project, has also led to the shooting of Bearded Vultures (Loxton, Venn & Associates, 1993). Young birds are particularly vulnerable when they first learn to fly and are often taken and killed by local boys. Since only one chick is raised per year, and birds take several years to reach maturity, the effect on the population of the loss of even one bird is considerable. Other birds of Lesotho conservation interest include the **Black Harrier**, **Ground Woodpecker**, **Drakensberg Siskin**, **Orangebreasted Rockjumper**, **Mountain Pipit**, **Wattled Crane**, **Black Stork**, **Rudd's Lark**, **White Stork**, and **Corncrake**, each of which is discussed in some detail in Ambrose, Pomela & Talukdar (2000).

There has been no **reptile** survey of Lesotho comparable to those undertaken for mammals and birds. Systematic reptile surveys have only taken place nationally in the Lesotho Highlands Water Project Phase 1A (Loxton, Venn & Associates, 1993) and Phase 1B (Mouton, 1996a) areas, as well as downstream from the Mohale damsite along the Senqunyane and Senqu rivers (Mouton, 1996b). Bourquin and Mosenye (1989) provide a list of 53 species of reptiles which *may* occur in Lesotho, but their checklist is more useful for details of 20 identified species collected in Lesotho and now held in South African museums. The *South African Red Data book - reptiles and amphibians* (Branch, 1988) contains entries for only four of the 43 reptiles on the Lesotho checklist. Of the 'vulnerable' species, one is the **African Rock Python**, which is already extinct in Lesotho, as indeed is also the case in neighbouring regions, the last python being killed in the Eastern Cape in 1927. The **Giant Girdled Lizard**, also known as the **Sungazer** or **Giant Zonure**, is called *phathakalle* in Sesotho. It is a 'vulnerable' species with a quite restricted distribution in South Africa. At present there are just two Lesotho records, although it may occur more widely in the Maputsoe to Hlotse area. There are also two 'restricted' reptile species. Bourquin & Mosenye give them status as Lesotho species on the basis in each case of a single specimen from 'Mont-aux-Sources' lodged in the Transvaal Museum. In the case of **Lang's Crag Lizard**, Branch (1988) confirms it extends into Lesotho and states that it lives in small colonies at high altitudes (2 500 to 3 000 m). In the case of the **Spiny Crag Lizard**, it is found at a lower altitude (1 500 to 2 500 m) along the Natal Drakensberg and in Golden Gate National Park. Lesotho records are not mentioned.

As with reptiles, there is no published survey of Lesotho **amphibians**, although a Southern African Frog Atlas Project is under way, and is seeking Lesotho participation (Harrison & Bishop, 1995). The standard work on southern African frogs and toads is that of Passmore and Carruthers

(2nd ed., 1995). Its species distribution maps, which often include part or all of Lesotho, are apparently often inspired guesswork. Branch (1988), in a listing of 53 southern African endemic frogs and toads, includes only four definite Lesotho records. Bourquin & Mosenye (1989) traced South African museum specimens from Lesotho for 16 species. The first systematic collecting has been undertaken as part of baseline biological surveys for the Lesotho Highlands Water Project (Loxton, Venn & Associates, 1993; Mouton, 1996a & 1996b). Overall, Lesotho now has 19 known anuran (frog and toad) species, which compares with approximately 98 species in South Africa and some 1600 species worldwide. Nevertheless, the species diversity is high compared with some other parts of the world such as Europe, where the whole continent has just 19 species. Moreover, the present Lesotho total of 19 species is almost certain to increase, both because new species are being discovered and described and because several other known species are likely to be found to occur when systematic survey work has been completed. Of red data species of frogs, listed by Branch (1988), the **Aquatic River Frog**, *Rana vertebralis* (also known as the **Water Rana** and the **Umbraculate Frog**) is very nearly a Lesotho endemic species, but is common in streams throughout much of the Maloti. Less common but still widespread in the Maloti is a second near-endemic species, the **Lesotho River Frog**, *Rana dracomontana* (also known as the **Drakensberg River Frog** and the **Mountain Rana**).

Although species of **fish** outnumber those of all other vertebrate classes globally, in Lesotho they are the smallest class. The Orange-Vaal system is relatively low in species diversity, having just 13 indigenous species, of which 8 species have been recorded in Lesotho. This number of species is the lowest of any major river basin in central or southern Africa, the Zambezi for example having more than 100 species while Lake Malawi has over 230 described species (Bowmaker *et. al.*, 1978). Apart from the eight indigenous species, Lesotho's fish include two introduced species of trout, which provide sport fishing in mountain streams; the Common Carp, found in both dams and rivers, and also farmed commercially in fishponds on a small scale; and three species of sunfish and bass which have been introduced into Lowlands dams. Amongst Lesotho's two red data book fish species (Skelton, 1987), the **Maloti Minnow** is Lesotho's only known true endemic vertebrate species. The fish was first discovered (Barnard, 1938) in the headwaters of the Mkhomazana in KwaZulu-Natal, but since the South African population is now certainly extinct, the species is now endemic to Lesotho. The fish, originally named *Labeo capensis* (Barnard, 1938), was renamed *Oreodaimon quathlambae* (Greenwood & Jubb, 1967), only to undergo a further change of name to *Pseudobarbus quathlambae* (Skelton, 1988). The Maloti Minnow has subsequently been found to occur in the headwaters of a number of Lesotho rivers (Rondorf, 1976; Skelton & Mashapha, 1989). The second threatened species, the **Rock Catfish**, *Austroglanis sclateri*, although rare downstream in the Orange, has been found to be fairly common in Lesotho (Rall & Steyn, 1996; Steyn *et. al.*, 1996). It is considered to be the best indicator species to determine the necessary instream flow requirements to be taken into consideration when designing future Lesotho Highlands Water Project dams (Rall, Steyn & Rall, 1995).

Mammals, Birds, Reptiles, Amphibians and Fish are members of the phylum Chordata or Vertebrates. All other animals are described as **Invertebrates**, and they belong to a number of different phyla, which are the major divisions of the animal kingdom. The best known invertebrate

phylum is that of the Arthropods, animals with jointed legs. The main classes of Arthropods are the Arachnids, which include scorpions and spiders; the Crustaceans, which include shrimps and crabs; the Myriapods, which include centipedes and millipedes; and the Insects, which exhibit extreme diversity, there being worldwide 950 000 described species, and an unknown total number which is likely to be in the range of 8 million to 100 million species altogether (World Conservation Monitoring Centre, 1992). In southern Africa, there are 26 orders, 579 families and some 80 000 recorded species of insects (Scholtz & Holm, 1985). For Lesotho the figure is 21 orders, 190 families and 1 168 recorded species (Kopij, in press). 118 of the insect species, almost exactly 10% of the total, are endemic to Lesotho, not having been recorded anywhere else in the world. Knowledge of Lesotho's invertebrate fauna derives to a large extent from the Lund University expedition to southern Africa which spent 22 days in Lesotho in 1951 collecting at a wide range of sites, including the Lowlands, Foothills, Orange River Valley and sites in the eastern Maloti. The specimens collected were submitted to expert entomologists throughout the world, and the findings published in a 15-volume series which was completed only 25 years after the original expedition (Hanström, Brinck & Rudebeck, 1955-76). Collecting in Lesotho has also been undertaken by other institutions, which have also recorded new invertebrate species from Lesotho. There are altogether 134 known Lesotho endemic invertebrate species, and the locations of the endemic holotypes (the specimens from which the published descriptions of new species are made) give an indication of the institutions which have been active in this field. No less than 100 of the total holotypes are in the Zoological Institute at Lund University, Sweden, and the remainder are in institutions in France, Great Britain, South Africa and Zimbabwe. No holotypes have been deposited in Lesotho itself. Overall, omitting subspecies, Lesotho has 1279 recorded invertebrate species. They are members of 835 genera, 242 families and 45 orders. However, many families of insects are chronically underrecorded. For example, only 3 species of Lesotho ants and only 4 species of Lesotho houseflies have been recorded, although there are respectively 593 and 364 described species of the families Formicidae and Muscidae in southern Africa (Scholz & Holm, 1985). Determining which of Lesotho's invertebrates are threatened is difficult because of the large number of species involved. Many of the numerous endemics are only known from the type site, and these have at best indeterminate status. Butterflies are a group which has its own Red Data Book (Henning & Henning, 1989). This is possible because they belong to a well-studied and well-known group of families within the Order Lepidoptera. Four Lesotho butterfly species are considered rare and one is considered indeterminate. Amongst the rare species is a Lesotho endemic butterfly, **Pringle's Widow**, *Torynesis pringlei*, discovered in 1977 at Ha Rafolatsane, and so far only found in and around the Sehonghong valley in Mokhotlong District (Henning *et al.*, 1994).

The flora of Lesotho, even though it has been profoundly modified by human intervention, nevertheless contains a diverse range of plants, of which a significant but unknown number are Lesotho endemics. Lesotho specimens are distributed in a number of different herbaria, many of which are outside Lesotho, and no botanist since Jacot Guillarmod (1971) has yet done the necessary comparative work to make a recent definitive check-list of Lesotho endemics. Preliminary work shows, however, that including lower plants, there are at least 44 endemic species as well as some endemic subspecies. The best known and largest endemic is the **Spiral Aloe** (*Aloe polyphylla, kharatsa*) typically found (at least in the past) growing at heights

of 2 500 m to 2 800 m above sea level. Despite theoretical legal protection, its market value is well known, and it has vanished in the past 30 years from virtually all sites in the Front Range of the Maloti and also from sites within a few kilometres of roads (Talukdar, 1983). Fortunately sites still exist in remote parts of eastern Lesotho where there are still some thousands of plants. The preservation of this plant, which appears on the Lesotho 20s coin and is also the emblem of the National Environment Secretariat, is a major challenge to all who care about the environment. The first enumeration of Lesotho plant species was undertaken by Phillips (1917), but is not an exact picture of Lesotho flora because he included some species from outside Lesotho's present boundaries. Jacot Guillarmod (1971), in her standard flora of the country, listed 1537 species of flowering plants from 95 families of plants and 526 genera. An attempt was made recently (May, unpublished) to undertake a comprehensive listing of plant species, from which the numerical total of 3093 plants (which includes non-flowering plants and thallophytes) has been computed which is quoted here. The basic source for the listing was a major compilation (Arnold & de Wet, 1993) of all plants in the South African National Herbarium in Pretoria, a listing which also shows which plants were recorded as being from Lesotho.

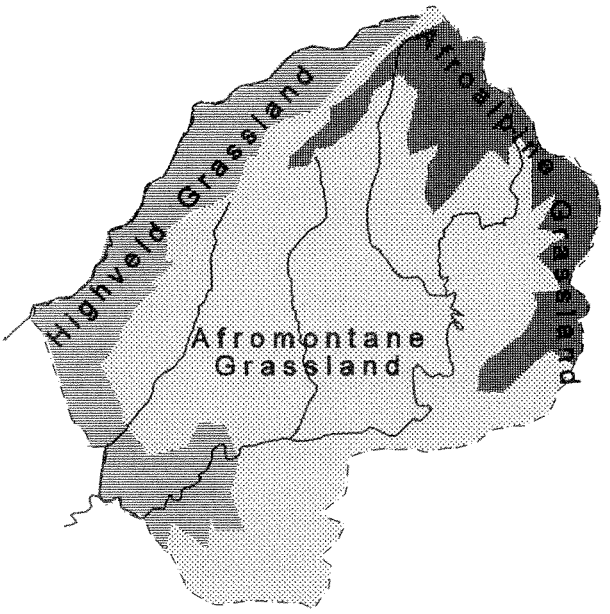
Most publications concentrate on higher plants, also called vascular plants, which are plants with tissues which conduct water and nutrients. These are the **Pteridophytes** (ferns and fern allies including *Psilotum*), **Gymnosperms** (seed-bearing but non-flowering plants), and **Angiosperms** (flowering plants). There are also various lower plants and in particular the **Bryophytes**, better known as liverworts, hornworts and mosses. The bryophytes of Lesotho have been recently studied in some detail by Hodgetts, Matcham & Duckett (1999), and their report adds many new Lesotho species to the previous total which stood at 165 mosses and 39 liverworts, including several hitherto unrecorded species. Fungi and algae, collectively known as **Thallophytes**, are structurally simple compared to the more familiar land plants. They now have their own Kingdom, separate from the Plant and Animal Kingdoms (Guttman & Hopkins, 1983). For convenience only, they have been placed in this report with plants. Fungi have important symbiotic relationships with a wide variety of plants and also with animals such as termites. Soil fungi are known to be very important to the successful cultivation of trees such as pines, a fact utilised by Lesotho foresters. Overall Lesotho's botanical diversity and conservation needs have recently been reviewed by Talukdar (1994). The highlands of Lesotho and the Drakensberg range are an important centre of biodiversity in southern Africa, with up to 30% of the plant species found there being endemic to the area (Cowling & Hilton-Taylor, 1994).

The Lesotho Biodiversity Country Study also includes detail on the genetic diversity of plants and animals used in crop and livestock production (Ambrose, Pomela & Talukdar, 2000). When done in appropriate areas and ways, agriculture does not result in negative effects on natural systems. However, bad agricultural practices result in biodiversity losses within and beyond the natural habitats where they take place, resulting in losses of species and ecosystem functions, and internal losses in production. In many parts of the world, including Lesotho, the spread of agriculture has contributed to the fragmentation of natural habitats, particularly of grasslands, wetlands and forest areas. This occurs mainly through extending farming systems into frontier zones accompanied by clearing of natural vegetation. Conversion to monocultural farming systems also greatly adds to erosion of the diversity of naturally occurring organisms

and habitats far from the original site. Since Independence in 1966, agriculture in Lesotho has suffered a decline in the size of its available genetic pool. Government policies have emphasized high productivity with imported species at the expense of indigenous species diversity. Although numerous, Lesotho's livestock population is largely derived from exotic stock imported over the past century. Dominant breeds include the dual purpose draught-dairy Brown Swiss cows, milk producing Friesian and Jersey cows, wool producing Merino sheep, mohair producing Angora goats; and the hardy Basotho pony horses, well adapted to the harsh climate and seasonally poor diets. Overall, there is much concern in the narrowness of species and genetic diversity of the domesticated species, both plant and animal. The Department of Livestock Services is currently reviewing its policies in respect of diversity of genes in domestic animals. A regional programme supported by FAO is soon to start cataloguing genetic resources of farm animals in member states. This will provide information about the genetic resources of farm animals in the country and the extent of their diversity.

2.2. Special Features of Lesotho's Major Ecosystems

The most recent South African contribution to mapping veld types or vegetation types has been a conscious revision of the work of Acocks (1953, revised 1975) to create a new map of the **Vegetation of South Africa, Lesotho and Swaziland**. It is the work of a number of contributors (none from Lesotho) and is edited by Low and Rebelo (1996). The vegetation of southern Africa is divided by the map and accompanying booklet into seven vegetation types or biomes (forest, thicket, savanna, grassland etc), subdivisions of which yield 68 different vegetation types. There are some problems with the classification as it relates to Lesotho, but it can be usefully used as a basis for classifying Lesotho's major ecosystems which are shown in the adjoining map. The three vegetation types of Low & Rebelo (1996) most commonly found in Lesotho are shown in a generalised map on this page. All three types fall within the *Grassland Biome*. The **Highveld Grassland Zone** as shown corresponds approximately to the Lowlands of Lesotho and the lowest part of the Senqu Valley. The **Afroalpine Grassland Zone** corresponds to the summit plateau over 2 500 metres, but within that area, the part where rainfall is generally 1 000 mm or more per annum. The **Afromontane Grassland Zone** consists of the remainder of the Maloti, the upper Senqu Valley, and the Foothills. Within these zones can be found small areas of woodland and forest which might properly be considered part of the *Forest Biome*, although on all but the largest scale maps, their extent (often a few hectares at a time) cannot be plotted. Shrubland and thickets occupy somewhat



larger areas. Also within the zones are found **Wetlands**. Despite their small extent, they are host to a wide range of species. Present land use has profoundly modified much of these three vegetation zones within Lesotho. Large parts have been taken over for cultivation, the exact area of which has been variously estimated between 12% (Lesotho Government Bureau of Statistics, 1972) and 25% (Lesotho Government Ministry of Agriculture, 1988) of the area of Lesotho.

The **Highveld Grassland Zone** is very densely populated with people and animals and has been entirely transformed by human activity and settlement. Grassland can still be found on plateau summits and steep hillsides, but even these are seriously overgrazed except when set aside as reserved areas, *maboella*, for thatching grass. Approximately half of the area in this zone has been cultivated, and poor agricultural practice has led to severe gully erosion affecting an estimated 600 km^2, 2% of the national land total. Approximately 1 200 km^2 of land in this zone is now taken up by settlements and roads. It has been suggested that the main reason why the grassland did not become afforested in the past was the high incidence of lightning-induced veld fires. Lesotho with some 5 to 12 strikes per km^2 per year has one of the world's highest incidences of lightning (Manry, 1983). Today, with the veld overgrazed, such fires do not normally rage over large areas. Despite heavy demands for firewood for domestic purposes, noteworthy small patches of **indigenous forest** still occur along river banks and under mainly south-facing escarpments, estimated to have a total area of some 20 km^2. There is also a larger area of shrubland and thickets, some exotic, on slopes generally too steep or rocky for cultivation. Plantations of exotic trees, mainly pine and eucalypts, have been established in this zone mainly since the mid-1970s. The Blue Wattle, (*Acacia* x *dealbata*, *boloukatlele*) is an exotic which has invaded extensive areas of formerly mainly indigenous shrubland (Talukdar, 1981).

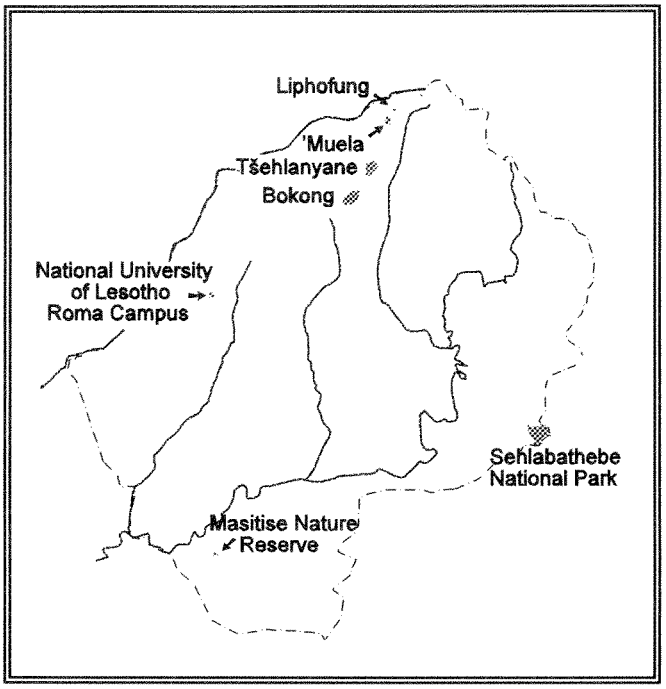
The **Afromontane Grassland Zone** covers slightly more than half of the area of Lesotho, and includes most of the Maloti. Most of it consists of basalt mountains, but sandstone and other sedimentary rocks are found in the lowest valleys. Settlements are found throughout the area, generally up to an altitude of about 2 500 metres, and approximately a quarter of the whole area has been cultivated, although fields on steep slopes have often had to be subsequently abandoned as a result of soil erosion. Grazing of animals takes place throughout the whole area, although on higher slopes it is confined to summer months. 'Seboku grassland' or 'sweet veld', dominated by the grass *Themeda triandra*, Red Grass, is found at lower altitudes and on northern slopes. At higher altitudes and on south facing slopes, 'letsiri grassland' or 'sour veld' is typical, dominated by *Festuca caprina*, Goat Fescue. There is also **indigenous forest** in a number of deep valleys, where it has survived firewood gatherers. It also occurs as narrow strips along river banks in remoter areas. Thickets of indigenous trees can exist in favourable areas up to 2 500 metres. Some areas are typically dominated by *Rhus* species (*kolitšana*, *tšinabele*) while others are dominated by *Leucosidea sericea* (*cheche*). *Chrysocoma ciliata* (*sehalahala*) typically forms a dense low cover of shrubs in overgrazed areas. The zone constitutes a significant portion of the Maloti/Drakensberg or Eastern Mountains hot-spot. Consequently, the area is one where a number of endemic plant and animal species (some of them Lesotho endemics) occur. Of the Lesotho endemic plants, the Spiral Aloe (*Aloe polyphylla*, *kharatsa*) is the most spectacular and best known.

The **Afroalpine Grassland Zone** is not clearly delimited by a vegetation or altitudinal boundary, and while 2 500 metres has been used for the map, others use 2 750 metres. Killick (1990) considers the alpine belt begins at 2 865 metres. Apart from Killick, other recent accounts of the flora of this zone have been given by Hilliard & Burtt (1987) and Mokuku (1991). The Zone is characterised by severe climatic conditions. Rainfall is generally over 1 000 mm per year, and snow and frost can occur throughout the year. Winter temperatures can fall to -20 °C at night, and during winter months daily average temperatures may be below freezing point. The area is above the level where field crops can be cultivated, and there are only a few human settlements with special purposes such as Oxbow (resort), Letšeng-la-Terae (diamond mine), and Sani Top (border post). In summer, however, the whole area is grazed and herders occupy small huts at cattle posts. These are usually occupied from November to May. As mapped, the zone has been shown as covering the northern and eastern portions of the summit plateau of Lesotho, which is where the highest rainfall occurs. Other areas smaller in extent which rise above 2 500 metres have been considered as part of the Afromontane Grassland Zone. The Afroalpine Grassland Zone is typically of 'sour veld' grass (*Festuca caprina*, Goat Fescue or *letsiri*), and is often severely overgrazed, leading to invasion by the low woody shrub *Chrysocoma ciliata* (formerly *C. tenuifolia*) (*sehalahala*).

Wetlands include a number of features including natural water reservoirs in the form of pans (areas without external drainage some of which become seasonally dry), marshes (typically with reedbeds), tarns (shallow pools and pans which typically form on sandstone), and bogs and sponges (also called mires (Backéus, 1988)), which in more recent literature have been classified as midslope and valleyhead fens, the latter being situated at the sources of streams and rivers (Marneweck, 1996). Pans occur at a few places in the Highveld Grassland Zone, both at lower altitudes (near Mafeteng, for example) and on the summit of several plateaus (Qeme, Boleka, Kolo, Masite). Marshland has suffered from reeds being harvested to such an extent that they do not regenerate. Erosion gullies have also cut back, draining former swamplands. Places where marshland with reedbeds survives include Tebetebeng, Mohlaka-oa-tuka, and Koro-Koro. On the other hand, areas of open water have increased in the Lowlands as a result of the building of dams for soil conservation, fish farming, water supply or sewage disposal. Although the area involved is not large, these new wetlands have had an important role in attracting aquatic plants and birds. Within the Afromontane Grassland Zone, relatively large areas of open water are a new phenomenon. They are dominated by the 36 km^2 Katse Reservoir, and include a number of smaller impoundments such as Letšeng-la-Letsie in the south. Tarns are a conspicuous feature at Sehlabathebe and bogs and sponges occur throughout the Maloti on or close to the summit plateau where streams and rivers rise. They are particularly important features of the Afroalpine Grassland Zone close to Lesotho's eastern border. Destruction by trampling by cattle is a matter of extreme concern. There is biodiversity loss, declining water quality, and loss of the regulating function of the bogs in ensuring a more uniform downstream flow. Rivers and streams provide ecological niches related to but different from more static wetlands. The building of major dams to divert headwaters elsewhere is having profound effects on rivers downstream.

2.3. Protected Areas and Sustainable Development

At present, there are only two nature reserve areas in Lesotho legally established specifically to protect biodiversity *in situ*. These are the Sehlabathebe National Park and the Masitise Nature Reserve. Together, they total 6 495 ha. Four other nature reserves are currently being established in the north of Lesotho, within the Lesotho Highlands Water Project Phase 1A area at Bokong, Tšehlanyane, 'Muela and Liphofung. In addition, the Roma campus of the National University of Lesotho is a declared bird sanctuary, and also includes a Botanical Garden established over 30 years ago for teaching purposes. The combined total of 10 602 ha is equivalent to 0.35% of Lesotho's land area, a figure well below that which the International Union for the Conservation of Nature and Natural Resources (IUCN) suggests for protected areas. This figure is not surprising, however, given the nature of land use in Lesotho, and the high density of population.



Protected Areas in Lesotho

Despite the extremely small extent of gazetted protected areas in Lesotho, there are other sustainable use areas. These include the traditionally reserved areas which are used to conserve thatching grass or village fuelwood; Range Management Areas (RMAs); and Forest Reserves for supplies of fuelwood, but which also have a soil conservation function. Although the boundaries of all such existing areas are well known to the local people, not all have been specifically mapped and therefore the total extent of such land is difficult to estimate. However, those RMAs for which the areas have been determined total 198 627 ha which is about 2 000 km^2. The gazetted nature reserves together with the 'sustainable use' protected areas total 209 134 ha which is 6.9% of Lesotho land area. Certain other areas such as the summits of the Fortresses of Thaba-Bosiu and Mount Moorosi are protected as historical monuments (Lesotho Government, 1969), but not as nature reserves. In addition, an area of about 5 000 ha in Quthing District is currently being considered as an IUCN-categorized 'Managed Resource Area'.

Proposals for other nature reserves have existed for many years (Associated Research Consultants, 1974). Amongst these, the Qeme Fauna and Flora Park (Lesotho Government, 1997) is part of plans for tourism. Because of its remoteness, and the consequent cost of travel, few Basotho can ever expect to visit Sehlabathebe. However, Qeme is easily accessible and could provide facilities for many more people to appreciate. The most recent Tourism Development Plan for Lesotho (Marketing Services International, 1994) recommends three things: upgrading facilities at

Sehlabathebe National Park, establishing Managed Resource Areas, and creating a Drakensberg-Maloti Alpine Park in the north-eastern region of the country, where it would link with existing parks in KwaZulu-Natal. This park was proposed long ago (McVean, 1977) and has recently received a new stimulus from the 'Peace Parks' movement (Douglas, 1997), which originating from an International Union for the Conservation of Nature (IUCN) 1988 Commission, encourages the creation of Transfrontier Conservation Areas. Such initiatives may go some way to increase Lesotho's participation in the conservation of nature at the international level and meet the minimum of 10% protected area recommended by the IUCN. They are also in conformity with Article 8 of the Convention on Biological Diversity (see Appendix) which begins:

Each contracting Party shall, as far as possible and as appropriate:

a) Establish a system of protected areas or areas where special measures need be taken to conserve biological diversity;

b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need be taken to conserve biological diversity....

As has been mentioned above, national plans have focused attention on tourism development sites and less on nature conservation. However, there should be a closer integration of nature conservation and tourism development in order to achieve sustainable development. Although there are difficult problems to tackle for nature conservation in Lesotho to take hold, there needs to be an attempt to rationalize the issue. The problem of insufficient attention given to the protection of Lesotho's cultural and natural heritage has been several times stated (Ambrose, 1983; Witzsch & Ambrose, 1992; Ambrose 1999), and a complex array of factors has contributed to the current state of affairs. In the past there have been a general lack of political will and no popular consensus. Conservation was regarded as a high priority of Government but there was no overall conservation policy. Administrative responsibilities were divided between various organizations in different Ministries, and there was little co-ordination of activities. Institutional management capacity was limited and further weakened by loss of qualified and experienced staff to parastatals and the private sector.

Despite all this, there are reasons to be optimistic about the future. With political change in South Africa, the sub-region is opening up to world markets and international investments in trade and tourism seem destined to expand significantly. There is however fierce competition among the nations of the region. To benefit from these transformations, Lesotho has to attract more visitors to its territory, through promotion of a distinctive image and development of infrastructure and tourism attractions, in particular its cultural and natural heritage. This would complement the thinking behind the latest Tourism Development Plan (Marketing Services International, 1994) which provides a clear economic justification for greater coordination, closer collaboration and progressive integration of initiatives in the areas of nature conservation and tourism development.

C. THE VISION, MISSION, AND GUIDING PRINCIPLES FOR BIODIVERSITY POLICY AND STRATEGY FOR LESOTHO

1. A Vision for Lesotho

Lesotho's diversity of life systems are supported and protected by a nation which is environmentally conscious; whose people are in balanced existence with the natural environment, while deriving undiminishing and continuing benefits from the conservation and sustainable use of its biological diversity.

2. The Mission of Government

The Government of Lesotho, in collaboration with interested and affected parties, strives to conserve the country's biological diversity in the context of *sustainable development* which is in harmony with the environment and the environmental components such as biodiversity upon which all life forms depend.

3. Guiding Principles

The formulation and implementation of the Lesotho Biodiversity Strategy and Action Plan, in response to national needs and to international obligations to the Convention on Biological Diversity, is guided by the development and application of an appropriate biodiversity policy and strategy. In the context of the Vision and Mission, the Government and the People of Lesotho are guided by these principles in their approach towards biodiversity conservation and sustainable use:

1. Conservation of biodiversity has **intrinsic importance** relevant to the requirements of human life through agriculture, medicine, scientific research, cultural practices, tourism, and other socio-economic developments.
2. The Government of Lesotho believes that conservation and sustainable use of biological diversity becomes part of a sustainable development endeavour when people who live near the biological resource are **empowered to be involved** in designing and managing biodiversity conservation projects relevant to their own communities.
3. **Public awareness and participation** in biodiversity issues are attained by well packaged and targeted information on biodiversity so that biodiversity conservation and sustainable use can be achieved.
4. It is the duty of every Mosotho to **care and protect** and to **avoid negative impacts** on biodiversity, and to use biological resources efficiently, equitably and sustainably.
5. The **sustainable use** of the biological resources of Lesotho are dependent upon (a) such resources being used at a sustainable rate within their capacity for renewal; (b) maintaining the ecological integrity of natural systems which produce the resources; (c) minimizing or avoiding the risk of irreversible change on environment; (d) adequate investments being made to provide inducements for conservation and sustainable use of biodiversity; and (e) avoiding and minimizing adverse impacts of the use of non-renewable biological resources.

6. Benefits arising from the use of genetic resources are **shared fairly and equitably** among Basotho. To achieve fair and equitable sharing of biological resources, it may be necessary to restrict the rights and access of privileged groups and individuals to use biological resources, while the rights of disadvantaged communities may be increased in order to uplift their socio-economic status.
7. Government realizes that it is **not the sole custodian** of the country's biodiversity but rather that every Mosotho is an equal partner and thus must be allowed to participate in decisions about the ways in which biodiversity should be conserved and used.
8. Government recognizes that **traditional and customary knowledge** that supports the conservation and sustainable use of biodiversity should be recognized, protected, promoted, maintained and used in a manner that will support the sustenance of biodiversity in Lesotho.
9. Decisions relating to the conservation and use of biodiversity in the country will be based on the best **applicable knowledge** available. In cases where there is lack of information, steps should be taken to collect the necessary information, but caution must be taken that where threats of serious and irreversible damage to biodiversity may occur, lack of full scientific knowledge should not be the reason not to take action to prevent degradation and loss of biodiversity.
10. Decision-makers and consumers of biological resources should be **guided by economic approaches** which assess the full social and environmental costs and benefits of projects, plans and policies that impact upon biodiversity and which internalise costs borne by society. These will both reflect the economic loss that results when biodiversity is degraded or lost and also reflect the value gained from conserving biodiversity. Generators of waste will bear the environmental, social and economic costs to society resulting from pollution or any other consequence of their actions which is deleterious to biodiversity.
11. Interested and affected individuals and groups will have the opportunity to participate in decisions about the ways in which biological resources are to be used and conserved and because biodiversity transcends political, institutional and social boundaries, **coordination and cooperation** on biodiversity-related issues in the country, region and internationally should be actively pursued. Coordination will also be sought between other policies, plans and programmes that may have implications for the conservation of biodiversity and the sustainable use of its components.
12. To implement the goals and objectives for conservation and sustainable use of biodiversity, **integration** into sectoral planning efforts (e.g. Agriculture, Forestry, Wildlife, Fisheries, Industry, Education, Health, etc.) should be sought at all levels.
13. This policy will not be an end to itself, but rather will become part of an **iterative process** which will be monitored and reviewed regularly both to maintain continuity and to modify strategies as need arises. Such modifications should reflect social, economic, political and environmental changes as well as scientific and technological advances nationally and in the world at large.

Chapter 2 A Biodiversity Strategy for Lesotho

> *Each Contracting Party shall, in accordance with its particular conditions and capabilities:*
>
> *a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and*
>
> *(b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.*
>
> Article 6 of the Convention on Biological Diversity

In accordance with its obligations under the Convention on Biological Diversity (see above and also boxed elsewhere in this chapter), Lesotho is drafting plans and policies which will coordinate the necessary measures required for the conservation and sustainable use of Lesotho's biodiversity, together with strategies for avoiding or minimizing adverse impacts on biodiversity. The measures for conservation and sustainable use of biodiversity apply both inside and outside protected areas and include protection, maintenance, restoration, and enhancement of biodiversity in Lesotho. The measures required to avoid and minimize adverse impacts on biodiversity include good land management practices, with a special emphasis on improved participation by local communities in the planning and management of their immediate environment, thus enhancing a culture of conservation with development amongst the people.

This chapter, which is the core of the Biological Strategy and Action Plan, contains details of Lesotho's goals, objectives, and strategies or actions for meeting the key obligations of the Convention on Biological Diversity, obligations which include with the *conservation* and *sustainable use* of biodiversity. The Convention on Biological Diversity describes *conservation* as meaning protection, preservation and sustainable use of biological resources. The approach here will be to separate these two objectives in the text. For our understanding is that *conservation* denotes protection and preservation whereas *sustainable use* denotes use with care, development, and progress in use of biological components. We underscore here *sustainable development* and align ourselves with developing countries in this respect. *Goal 1* will address issues that concern *conservation* of biodiversity and *Goal 2* will address issues that concern its *sustainable use.*

GOAL 1.

CONSERVE THE DIVERSITY OF LANDSCAPES, ECOSYSTEMS, HABITATS, POPULATIONS, SPECIES AND GENES IN LESOTHO

Although Lesotho is a small country, it has a range of ecosystems, landscapes, habitats, populations and genes comparable to that of many larger countries. Because of its mountainous topography, fragile soils, erratic rainfall and environmentally unfriendly agricultural practices, Lesotho is very vulnerable to disturbance. Based on these considerations, the approach to conserving and sustainably using its biological diversity has seven main objectives:

- Identification of biological components necessary for conservation and sustainable use in the context of sustainable development in the country (1.1);
- Establishing and managing efficiently a system of Protected Areas to near the minimum required under International Agreements and Conventions, especially areas that are identified under the Ramsar Convention, which is concerned with Wetlands of International Importance (1.2);
- Protecting and maintaining biodiversity in and outside of protected areas (1.3);
- Promoting and maintaining sustainable development in areas adjacent to protected areas (1.4);
- Restoring and rehabilitating degraded ecosystems (1.5);
- Strengthening measures for the conservation and sustainable use of biological diversity outside of natural habitats (1.6); and
- Controlling the introduction and spread of harmful alien species (1.7).

Objective 1.1

Identification of biodiversity components and systems and processes that threaten biodiversity in Lesotho

One of the most fundamental steps towards achieving the goals stipulated in this strategy document requires the identification of important biodiversity components and the processes that threaten those components and systems. Although fragmented and scattered, there already exists some knowledge in the country about biodiversity and ecosystems. Two actions are therefore needed: the location of this body of knowledge; and provision of a system of orderly storage to provide easy access and strategic use of the information. Although many aspects of Lesotho have been studied in detail, there is relatively little information about some of the processes threatening Lesotho's biodiversity. It is however self-evident that human activities in a communal land

allocation system such as Lesotho's are primary threats to biodiversity: they impact negatively on agricultural land and on rangelands, causing serious degradation of landscapes.

To attain the prescribed objective, Lesotho Government will take a systematic and coordinated approach to identifying important biological components and systems and in the process identify existing gaps in knowledge. The Government will also undertake to strengthen already existing efforts such as done in LHDA and Range Management Division to identify biological diversity and expand to areas covering the length and width of Lesotho.

Specifically, the Government, in consultation and collaboration with interested and affected stakeholders, will undertake to:

Action 1.1 Identify Biological Components

Identify biodiversity components: Ecosystems and habitats, populations and species, and genes, important for conservation and sustainable use. The identification will be done using biological, social and economic criteria relevant to Lesotho. The identification process must address these issues:

a) **Ecosystems and Habitats** of importance for high levels of species diversity and those which contain endemic and threatened species; important areas for rare, threatened, and/or migratory species, or areas of some social, economic, cultural, scientific, or more specifically biological importance.

b) **Populations and Species**, whether wild or domesticated, that are rare, threatened, of medicinal importance or of agricultural, economic or social importance. These species may be directly used commercially and/or for subsistence purposes (e.g. fuelwood, building materials, food supplements); they may, as in the case of indicator species, also be important for research into conservation and sustainable use of biodiversity.

c) **Genes** of cultural, social, scientific and economic importance in sustainable development of local communities and the country as a whole.

Action 1.2 Identify Processes that are likely to threaten Lesotho's Biodiversity

Identify threatening processes or activities that are likely to cause deleterious effects to biodiversity and biological components: ecosystems, habitats, populations, communities, species, genes and genomes.

Objective 1.2

Establish and Maintain a system of Protected Areas

Conservation of species is commonly done through establishment of protected areas in the wild (*in situ*) through the preservation, protection and restoration of ecosystems and natural habitats, and the maintenance of viable populations of species in their natural environments. Lesotho seeks to approach the conservation and sustainable use of its biological resources by integrating efforts

and addressing issues of common concern to both conservationists and land users, including livestock owners, traditional healers, educationists, researchers and agriculturalists. This means that conservation efforts will focus both on natural environments and those areas (by far the largest part) which have been modified by human activities. Within these, the efforts will seek to enhance the contribution which biodiversity makes to human welfare.

Commonly, conservation of plants and animals is best done in the wild (*in situ*). However, Protected Areas of different categories can play an important role in conserving Lesotho's biodiversity. Therefore establishment of protected areas, especially vulnerable ecosystems such as the alpine ecosystem of the Maloti-Drakensberg and the associated unique alpine wetlands of that area, is important. Lesotho has only a small number of these protected sites that fall within the definition of the International Union for the Conservation of Nature (IUCN). The table 1 below describes some of these areas in relation to the established criteria. Some of these sites could also be used for protection of nature and for long-term ecological studies, while others may be important for sustainable development. At present about 0.35% of the total land area in Lesotho is under some form of protection. It is envisaged that the number of protected areas will increase in the near future as more important and sensitive areas are identified and designated for protection.

As has been seen (p. 18), at present, there are only two **protected areas** in Lesotho legally established specifically to protect biodiversity *in situ*. The Gazetted protected areas and four other reserves being developed under the auspices of the Lesotho Highlands Water Project together total about 10 602 ha, equivalent to only 0.35 to 0.7 % of Lesotho's total land area, well below the International Union for the Conservation of Nature and Natural Resources (IUCN) recommended figure. The IUCN has, however, a range of different categories ranging from areas of full protection to managed resource areas, and present and planned protected areas are listed in the table on the next page.

To enhance *in situ* conservation of biodiversity in Lesotho, Government in association with interested and affected parties will adopt the following measures:

Action 1.3 Enhance Management of Gazetted Protected Areas

a) Ensure that all currently gazetted areas and sites are protected by wardens or guards.

b) Undertake base line studies and regular monitoring of ecosystem changes in order to take informed management decisions.

c) Involve communities in the planning and management of protected areas and ensure equity sharing with the concerned communities who pay the opportunity cost of not utilising these resources.

PRESENT AND PLANNED PROTECTED AREAS BY IUCN CATEGORIES			
CATEGORY (IUCN)	NAME	AREA (ha)	MANAGEMENT OBJECTIVES
Category II	1) Sehlabathebe Wild Life Sanctuary and National Park	6475	Managed primarily for ecosystem protection and recreation
	2) Masitise Nature Reserve	20	
	3) Tšehlanyane Nature Reserve	5300	
Category III	1) Thaba-Bosiu Mountain	*c.* 150	Managed mainly for conservation of specific natural or cultural features
	2) Liphofung National Monument	4	
	3) NUL Botanical Garden	1.5	
	4) Proposed Qoaling National Botanical Garden	*c.* 30	
	5) Min. of Agriculture Arboretum	0.1	
Category IV	1) Proposed Management Area (in eastern Maloti)	5000	Managed mainly for conservation through management intervention
Category V	1) 'Muela Reserve	45	Managed mainly for land conservation and recreation
Category VI	1) *Maboella* Areas[1]	???	Managed mainly for the sustainable use of natural ecosystems
	2) Sehlabathebe RMA[2]	185684 (total area for these seven RMAs)	
	3) Pelaneng/Bokong RMA		
	4) Malibamatšo/Matsoku RMA		
	5) Qhoali RMA		
	6) Mokhotlong/Sanqebethu RMA		
	7) Liseleng RMA		
	8) Ramatšeliso RMA		
	9) Bokong Nature Reserve (Proposed Biosphere Reserve)	1972	
	10) Forest Reserves	>7000	

[1]Areas set aside to preserve thatching grass for future animal grazing (total area unknown)

[2]Range Management Area

Action 1.4 Strengthen Legal Measures

a) Strengthen and implement existing regulatory measures for protection of species and ecosystems. This should include renewable use strategies for some plants used for medicinal purposes, penalty charges for those who mismanage them, and incentives for those who conserve these species.

b) Revise the Proclamation (Legal Notice no. 36 of 1969) (Lesotho Government, 1969) protecting historical monuments and relics, fauna and flora to eliminate incorrect, inconsistent and outdated names; to add important species such as the Bald Ibis and Maloti Minnow which are omitted; and to harmonise this Proclamation with the Game Preservation Proclamation (Proclamation 33 of 1951) (Basutoland Government, 1960).

c) Provide reserves under development with appropriate legal protection, in particular the four reserves being developed under the auspices of the Lesotho Highlands Water Project. Designate additional protected areas covering representative habitats and ecosystems in order that a minimum of 10% of the area of the country has the status of protected areas.

Action 1.5 Improve Training and Education

a) Implement training programmes for present and future wardens and rangers.

b) Initiate educational programmes to enhance public relations and raise public awareness. Ensure that school curricula contain appropriate components relating to important aspects of Lesotho natural heritage.

Objective 1.3

Promote and maintain sustainable development in areas adjacent to protected areas by establishing and maintaining sustainable use areas such as *maboella* and Range Management Areas and Forest Reserves

Sustainable use areas are managed primarily for the benefit of communities, but in such a way that they indirectly conserve biodiversity. Lesotho has a long history of sustainable use areas. For over a century a system of *maboella* or 'land set aside' has been practised. It is a communal system that governs access to rangeland resources to ensure sustainable use of winter grazing areas, thatching grass, reeds and wood resources for fuel. The system was developed by King Moshoeshoe I and it is administered by local Chiefs and Headmen.

However, with the current political and social developments the system is under stress to the point of collapse. In some areas in the country there is a rapid and uncontrolled decline in traditional authority. Compounding the problem even further, is the rapid increase in population which increases pressure on the finite resources of a small country. In some areas however the scarcity of biological resources such as wood and grass has worked to strengthen the *maboella* system.

To attain the objective set above Government, in collaboration with interested and affected parties, will:

Action 1.6 Improve Traditional Range Management Systems

a) Strengthen the role of local authorities.

b) Promote co-operation between traditional authorities and Village Development Councils, through local government structures (such as the proposed community councils) which provide for each to play an appropriate role.

c) Strengthen the *maboella* system by better institutional mechanisms governing access and enforcement.

Action 1.7 Establish Range Management Areas (RMAs) with fully operational Grazing Associations (GAs)

The rangelands of Lesotho are primarily used for livestock grazing. Degradation has however reached critical levels due to overgrazing and poor range management practices. Basotho have for years been deriving value out of the rangelands, but input into development and maintenance of these areas have not been effective. Consequently, overgrazing has led to progressive replacement of palatable grasses by invader species such as *sehalahala* (*Chrysocoma ciliata*) and others. Annual soil loss from rangelands is put at 23.4 million tons/year. Frequent droughts, often followed by torrential rains have also contributed significantly to rangeland degradation.

Range Management Areas (RMAs) each with an associated Grazing Associations (GA) are specially designated management units designed to promote sustainable use of Lesotho's rangelands. RMAs and GAs were first introduced by the Ministry of Agriculture in 1982, and they are aimed at empowering, training and advising communities on matters relating to the control and management of grasslands in areas nearby. The associations have attracted more than 50% of livestock owners, and to date, seven areas with a total area of 185 684 ha have been designated as RMAs. These are the Sehlabathebe, Ramatšeliso, Pelaneng/Bokong, Malibamatšo/Matsoku, Qhoali, Mokhotlong/Sanqebethu, and Liseleng RMAs. Also, the establishment of five additional RMAs in the country is pending. A biosphere reserve has been proposed at Bokong, an area which includes a wetland of international significance because of its location at the source of one of the main feeder rivers for the Katse Reservoir. Furthermore, an additional area of 5 000 ha is to be investigated to see whether it is feasible to manage it as an IUCN - categorised 'Sustainable Use Area' in the eastern mountain ranges of Lesotho.

Monitoring of the current state and trends of the protected areas has already been conducted in two RMAs, and further monitoring in other areas is planned if resources are available.

Specific components of the action required are:

a) Improve community natural resources management through establishment of further grazing associations (GAs) and village grazing schemes. This involves consultations with chiefs, livestock owners and the general public to make them aware of the need to improve sustainable rangeland conditions suitable for livestock production.

b) Promote community participation in the planning, execution and management of rangeland projects by encouraging communities to take an interest in RMAs/GAs.

c) Improve technical assistance to grazing associations to promote, develop and implement rangelands management plans.

Action 1.8 Carry Out Research and Compile Inventories to Improve Biodiversity Conservation

a) Strengthen rangeland research and facilitate the implementation of research studies relating to rangelands, livestock and sociological aspects.

b) Improve monitoring and evaluation of rangeland conditions, livestock improvement, livestock marketing, animal health, and the organizational development of the grazing associations in the RMAs.

c) Document indigenous knowledge systems in rangelands and factors that may affect the maintenance and application of this knowledge (in particular, ethnobotany).

d) Adopt a systems approach to rangeland management in order to identify the root causes of environmental degradation.

Objective 1.4

Provide communities with fuelwood and construction materials to reduce over harvesting of the indigenous plant materials while at the same time conserving soil and water

The Lesotho Woodlot Project was originally a 12-year scheme (later extended) which began in 1973 and was designed to establish small plantations of quick-growing trees for eventual use as firewood and poles. The Forestry Division of the Ministry of Agriculture was established in 1987, and took over the activities of Woodlot Project.

The goal for forestry sector development in Lesotho is to maximize the contribution of forestry for i) poverty alleviation and livelihood security; ii) environmental protection; and iii) increased national economic development. The strategy aims to reinforce this goal, particularly through the encouragement of community forestry, and at the same time to further increase biodiversity conservation. To achieve the stated objective, the Government, in association with interested and affected parties will:

Action 1.9 Increase Participation of Rural Households in Forestry Activities through *Their Own Initiatives*, for *Their Own Purposes* and under *Their Own Control*

a) Create a policy and legal environment enabling and facilitating local initiatives in forestry development.

b) Develop and disseminate technologies and approaches to forestry development appropriate to people's objectives, local conditions and circumstances.

c) Promote local management of indigenous vegetation resources.

d) Facilitate local people's ability to organize themselves in support of forestry development, and respond to their needs for services in support of tree planting.

e) Increase quality and suitability of forestry development services offered directly to local people through government agencies.

f) Improve the relevance and quality of forestry development services offered directly to local people through government agencies.

Action 1.10 Increase National Self-Reliance in the Supply of Forest Products through Increased National Production

a) Improve the ability of NGOs to deliver forestry extension services to local people.

b) Promote forestry development through widening of information channels.

c) Create a national operational framework for the coordination of forestry activities.

d) Develop local human resources skilled in the practice of forestry and offering of extension services..

e) Transfer management and benefits of estate forest reserves from government to local communities in an orderly and progressive manner.

f) Facilitate the development of private sector wood utilisation industries.

Action 1.11 Conserve Indigenous Flora

a) Improve utilisation of biomass energy resources.

b) Promote afforestation for erosion control and land rehabilitation.

c) Reduce the use of scarce timber and wood resources through the wide-scale use of alternative appropriate sources of energy such as solar power, biogas, hydropower and wind power.

Objective 1.5

Design measures that will protect threatened habitats and ecosystems such as the alpine bogs and mires and the afro-alpine ecosystems of the highest mountains of the subregion

The mires of Lesotho are of great national and regional importance in that they accumulate rain water, filter it and regulate its flow into streams. These habitats contain a high diversity of tiny plants which do not occur on the surrounding slopes. Mires also serve as key grazing areas for livestock in summer. Many of these wetlands are heavily impacted by overgrazing and trampling by livestock to an extent that some have completely lost their hydrological functions.

To protect these threatened habitats and ecosystems, Government will:

Action 1.12 Identify and Enhance Management of Lesotho's Unique Wetlands Systems

a) Make a detailed inventory and assessment of all key mires with the aim of rehabilitating degraded ones and protecting those that are in good condition.

b) Conduct research on the importance, ecological development, maintenance and protection of wetlands, in conjunction with an education programme aimed at informing people of their value.

c) Reduce grazing pressure on wetlands.

d) Incorporate wetland management into the broader watershed management strategy.

The Maloti/Drakensberg 'hot-spot', some 70% of which falls within Lesotho's boundaries, contains unique communities and habitats which do not occur anywhere else in southern Africa. In one sampled area of the 'hot-spot' adjoining Lesotho, approximately 30% of the known 1271 plant species are endemic (Cowling & Hilton-Taylor, 1994), and there are also endemic species or subspecies of birds, mammals, amphibians, reptiles and fish within the 'hot-spot' as a whole. The portion of this 'hot-spot' which falls within Lesotho is mostly within the Afromontane and Afroalpine Grassland Zones, and much of it is primarily used for summer grazing. Both the species diversity and the productivity of the area are deteriorating due to poor range management.

As a party to the Convention on Biological Diversity, Lesotho submitted a project proposal on conservation of this alpine ecosystem to the Global Environment Facility (GEF) as an initial step towards achieving sustainable use of the area. A number of different stakeholders were involved in the development of the proposal. The project was approved by GEF, and was formally initiated in 1999. It is now being implemented in the three districts of Mohale's Hoek, Quthing and Qacha's Nek under the name 'Conserving Mountain Biodiversity in Southern Lesotho'.

Action 1.13 Improve Conservation of the Maloti-Drakensberg Ecosystems and Reduce Overutilization of their Range Resources

a) Create awareness at all levels on the value of alpine biodiversity and the need to conserve it.

b) Create centres of information on rangeland and mountain ecosystems targeted at the public and in particular those living in communities interacting with and living in these ecosystems.

c) Phase out seasonal transhumance movements of livestock.

d) Identify ways in which livestock pressure can be reduced in a culturally acceptable way within the alpine ecosystems.

e) Improve livestock quality to allow income compensation as livestock numbers decrease.

f) Improve the efficiency of livestock marketing channels, so that farmers can readily remove unwanted animals and freely market animals upon need.

g) Encourage commercial intensive livestock production and marketing systems to reduce pressure on the rangelands.

Action 1.14 Improve Management and Conservation of the Alpine Ecosystems

a) Integrate management of the mountain areas through catchment planning and management, incorporating the regulation of livestock densities and human settlements.

b) Create protected areas to conserve wildlife with special attention to rare and endemic species.

Objective 1.6

Improve protection and management of threatened and endangered species

According to Hilton-Taylor (1996), there are 52 threatened plant taxa in Lesotho (1 extinct, 2 endangered, 8 vulnerable, 21 rare, 5 indeterminate, 15 insufficiently known, and 7 for which no information is available). The Lesotho country study (Ambrose, Pomela & Talukdar, 2000) provides similar figures for animal taxa, showing, for example, for mammals that 19 species are already extinct (two of them globally extinct) and 11 species are severely endangered. These losses are attributed to several factors including (i) poor range management and farming practices; (ii) uncontrolled grassland fires; (iii) over-exploitation of fauna and flora; (iv) poor land use planning; and (v) construction activities.

Measures to improve protection and management of threatened and endangered species will include:

Action 1.15 Promote Research to Assess the Importance and Status of Species

a) Identify and map areas of endemism.

b) Develop national lists of threatened species.

c) Develop criteria for assessing the status of rare species.

d) Identify characteristics which make species vulnerable and use these to identify those species which should be monitored.

e) Determine minimum viable populations for threatened species.

f) Establish monitoring programmes that are systematic and comprehensive yet cost-effective.

g) Maintain support for continued biological research on species considered endangered.

Action 1.16 Strengthen Legal Framework for Protection of Species

a) Strengthen measures to prevent the removal of endangered species from their habitat and the use of endangered species as objects of trade.

b) Implement regulations regarding over-harvesting of medicinal plants.

c) Undertake Environmental Impact Assessments for all proposed construction and development activities.

Action 1.17 Minimize Species Loss through Proper Land Use Planning and Implementation

a) Encourage the establishment of protected areas especially those with high scientific value.

b) Establish and implement appropriate planning regulations for the establishment and expansion of human settlements.

Objective 1.7

Strengthen measures for the conservation and sustainable use of biological diversity outside of natural habitats (*ex-situ* conservation)

Ex-situ conservation involves conservation of genetic resources of wild and domesticated animals, plants, and micro-organisms outside their own natural habitats. *Ex-situ* conservation is particularly important for wild species whose numbers are below the minimum viable population. *Ex-situ* preservation by means such as gene banks can serve as a back up to *in-situ* conservation, providing material for reintroduction to the wild. *Ex-situ* conservation measures include zoological and botanical gardens, nurseries, arboreta, herbaria, aquaria, gene banks, tissue and tissue culture collections and captive breeding units. *Ex-situ* conservation of wild and domesticated species can also contribute to public education and to taxonomic, botanical and ecological research.

Ex-situ conservation is underdeveloped in Lesotho especially as there are very few active gene banks and botanical gardens and no zoological gardens. The responsibility for *ex-situ* conservation in Lesotho has been with the Government through the Ministry of Agriculture, whose Agricultural Research Division has for some years kept an inventory of cultivated species. More recently, the Lesotho Highlands Development Authority has joined the Research Division in collecting and storing herbarium specimens of plant taxa collected within the Lesotho Highlands Water Project area. The National University of Lesotho's herbarium has the largest collection of dried specimens of plants from within the country. Also, some institutions and parastatals are involved in *ex-situ* conservation. There are additionally some individuals who cultivate on a sustainable basis some economically important plant species in their home gardens.

Lesotho has one botanical garden managed by the National University of Lesotho and one arboretum established at the Agricultural Research Station (May, 1994). The Lesotho Highlands Development Authority is endeavouring to establish a botanical garden at Katse to conserve and rescue high altitude species, while the National Environment Secretariat, in association with the Maseru City Council, has been allocated a site in Maseru to establish a National Botanical Garden in the area of the old Race Course. In addition, the Ministry of Agriculture in Lesotho has embarked on conservation of germplasm as a part of a regional strategy by the Southern African Development Community (SADC) for Conservation and Sustainable Use of Plant Genetic Resources.

Some small scale *ex-situ conservation* initiatives by individuals include propagation of the endangered endemic, *Aloe polyphylla*, in Maseru and nurseries of medicinal plants in Maseru, Quthing and Leribe Districts. Home gardens are also important. Many horticultural crop varieties

are conserved by traditional farmers who depend entirely on recycled seed from crops grown for home consumption.

To enhance *ex-situ* conservation in Lesotho, the Government in collaboration with interested and affected parties and individuals will:

Action 1.18 Establish, Strengthen and Maintain *Ex-situ* Conservation Measures to Supplement *In-situ* Conservation Activities

a) Ensure proper coordination of efforts in Lesotho by all those involved in *ex-situ* conservation.

b) Encourage propagation of species of economic importance.

c) Promote conservation of land races through establishment of additional gene banks.

d) Strengthen regional and international cooperation in gene bank programmes.

e) Establish botanical gardens in representative ecological zones.

f) Establish a national herbarium.

Objective 1.8

Control the introduction and spread of harmful alien species and regulate the risks associated with their presence

The *Weeds Eradication Act* (Lesotho Government, 1969) lists 7 species of noxious weeds and penalties for those who do not eradicate them from lands allocated to them. The legislation provides for the destruction of these alien species wherever they occur because they have a negative impact on agriculture or are poisonous to livestock. However, these species are just a few of a large number of problem plants, most of them alien which have become unwelcome members of the Lesotho flora, at times competing with or completely replacing the indigenous vegetation.

To control alien species which may have adverse impacts on the natural environment, human health or agriculture, the Government in collaboration with affected and interested parties will:

a) Identify all harmful species and their habitats within the country.

b) Assess the impact of alien species on habitats and ecosystems.

c) Strengthen existing national quarantine programmes and other legal measures.

d) Develop early warning systems.

e) Develop new approaches to education about invaders.

f) Build and enhance national capacity on management of alien species.

Objective 1.9

Manage biotechnology on an environmentally sound basis

Although Lesotho is presently inactive in biotechnology, the country imports biotechnology products and as a consequence is an active user of biotechnology. There is therefore a need to develop precautionary measures regarding production and use of biotechnology products whose possible harmful side effects are unknown, but which may have undesirable side effects impacting on humans and biodiversity more generally.

To contain the yet unknown side effects of biotechnology and its products, the Government, in collaboration with interested and affected parties, will:

Action 1.19 Establish and Strengthen Biotechnology Management Institutions

a) Improve national capacity, manage and reduce risks associated with biotechnology.

b) Improve coordination of national and regional policies on biosafety.

c) Expand international information exchange and networks on Living Modified Organisms (LMOs) and their products.

d) Strengthen research, education, awareness and institute training on biosafety.

e) Establish a National Focal Point and Competent Authority for the management of biotechnology.

f) Set up a national tracking system for movement of LMOs.

Action 1.20 Strengthen the Management of Living Modified Organisms and their Products

a) Control trans-boundary movement of Living Modified Organisms (LMOs).

b) Improve coordination of national and regional policies on biosafety.

c) Improve national capacity to monitor the effects of LMOs.

d) Prevent the illegal trafficking of LMOs by setting up information and alert systems; monitoring and assessing the illegal movement of LMOs at the national level; and strengthening national capacity to detect illegal trafficking.

e) Develop national biosafety guidelines, regulations and legal measures to manage LMOs effectively.

f) Strengthen national capacity to manage LMOs by participating in international negotiations for the development and management of LMOs together with their respective biosafety protocols.

GOAL 2

ATTAIN SUSTAINABLE USE OF LESOTHO'S BIOLOGICAL RESOURCES AND MINIMIZE ADVERSE IMPACTS

Although in the twentieth century, Lesotho became essentially a labour-reserve economy, subsistence agriculture remained an important component especially for those without family members who were able to find formal salaried employment within or outside the country's borders. As a result (and increasingly again with the decline of migrant labour) most Basotho depend completely or partly for their livelihoods on biological resources or services provided by ecosystems, and these are resources and services which make significant contributions to the national economy. It is a corollary that the Basotho as a nation should ensure that biological resources are maintained in stable conditions through sustainable management and utilization of biological diversity.

Past benefits from biological resources have not been without direct and indirect costs to the environment as a whole. Activities which provide socio-economic gains derived from use of biological resources at the same time often result in the loss of biodiversity. In Lesotho, loss of biological resources has been significant with rangelands having become severely degraded; alpine and wetland ecosystems destroyed; agricultural biodiversity seriously depleted; and wild and domestic species diversity significantly reduced. It is difficult, however, to quantify the value of these resources and the cost of the losses to them in a manner comparable that used to calculate other national parameters such as the Gross Domestic Product (GDP) and Gross National Product (GNP).

To help conserve Lesotho's biodiversity and use it sustainably, it is necessary to bring the matter of these losses to the forefront and ensure that decision making is based on the real costs and benefits of conserving biodiversity; that biodiversity is used sustainably; and that the adverse impacts on biodiversity are minimized and managed. As a result four main objectives can be identified:

- Attainment of a conservative natural resource use to counteract decreasing land carrying capacity and poor land use, which together variable and adverse climatic conditions are leading to desertification and land degradation, major underlying causes of loss of biodiversity (2.1);
- Promotion of suitable land husbandry practices in livestock and crop farming, forestry, fisheries, and in soil and water conservation programmes, it being understood that these are mostly unsustainable when participation by local communities is secondary or nominal (2.2);
- Implementation of research and extension programmes which are coordinated enterprises, so that unnecessary duplication of roles and responsibilities between Ministries and non-governmental organizations is eliminated (2.3);

- Minimizing environmental degradation and biodiversity loss through development activities through the use of formal Environmental Impact Assessments (EIAs) prior to implementation of programmes that have an effect on biological diversity, it being noted that the Lesotho Highlands Water Project and the Range Management Division of the Ministry of Agriculture have already conducted comprehensive assessments (although not always sufficiently ahead of project implementation) and have plans for periodic reviews of biological diversity (2.4).

Objective 2.1

Attain a conservative natural resource use

The transformation of Lesotho's landscape is perhaps the most visibly dramatic evidence of the loss of biodiversity in the country. In the Lowlands, there has been first a change from natural grassland to agricultural use, but inappropriate agricultural practices have led to serious gully erosion and uncontrolled settlements have also taken much of the agricultural land. Rangeland degradation through overgrazing with consequent loss of soil and plant cover and destruction through trampling of bogs and mires has also been a concern of government for some time. As has been seen, one of the main interventions has been the establishment of community based grazing associations.

This section deals with managing biodiversity through the human environment and details the ways and means that Government, in association and collaboration with interested and affected parties, will ensure the sustainable use of biodiversity. The initial steps are to promote greater self reliance and increased incomes while still conserving and regenerating natural environment and the resource base; promoting increased participation of communities in the formulation and implementation of communal resource managed areas; and promoting establishment of community managed outdoor recreation and tourist reserves for sustainable exploitation by communities.

Action 2.1 Empower Communities in Building and Managing Biological Resources in their Respective Areas

a) Assist communities in identification of natural or potential recreation areas and provide advice on suitable recreation and tourism projects so that they can develop optimal sustainable utilization of their natural resources.

b) Reduce the impact of public recreation through public education and awareness campaigns on the effects of pollution.

c) Train and assist communities in formulating regulations that control the use of natural resources.

Action 2.2 Conduct Consciousness-Raising among Communities about the Value of Biodiversity

a) Assess and collect information on the status of resources and the feasible uses of these resources.

b) Create awareness of the benefits of managing natural resources effectively.

c) Assist communities to implement activities that ensure that harvesting and collection of medicinal and edible plants, and hunting and fishing for recreation or for food are implemented sustainably.

Objective 2.2

Eliminate unsustainable land husbandry practices in rangelands, fisheries, forestry and agriculture to minimize adverse impacts

Rangelands

There is a wide scale serious loss of biological diversity in Lesotho as evidenced by the loss of vegetative cover and the depletion of palatable grass species and their replacement by less palatable shrubs. The livestock sector is directly dependent on indigenous biological resources for natural grazing for livestock and is the major activity impacting on rangelands.

Overstocking of rangelands results in consumption of crop residues and plants necessary for maintenance and improvement of soil fertility and soil structure. The system of freehold range utilisation lead to a situation where stockholders' individual welfare is increased at the expense of society which bears the cost of loss of biodiversity.

Rangeland areas are only minimally represented in areas set aside for protection in Lesotho (the one example is Sehlabathebe National Park). To enable continued use of biodiversity in rangelands, the Government needs to ensure decision making that takes into consideration all the benefits and associated costs of conserving and using biodiversity and to minimise the adverse impacts on biological diversity.

Action 2.3 Promote and Ensure Sustainable Rangeland Management for Maintenance of Optimum Range Production

a) Support incorporation of environmental management principles in all policies, plans and programmes in all sectors impacting on rangelands.

b) Promote sustainable management of rangelands and discourage unsustainable range utilization activities, especially on marginal and poor land.

c) Promote the development and implementation of community managed plans for sustainable range use.

Fisheries

Fisheries development in Lesotho has been mainly through the promotion and implementation of aquaculture, with a smaller portion of the industry geared towards recreational fishing. Due to the absence of large lakes and reservoirs, only limited fisheries development can be implemented in reservoirs and rivers. The contribution of fisheries to the overall economy is negligible, although there is potential for expansion in existing water bodies. Although knowledge on the status of fish resources in Lesotho is limited and poor, it is known that unsustainable harvesting

of fish and destruction of fish habitat (for example by pollution of dams and introduction of alien water weeds) continue to cause loss of fish resources.

In order to conserve and use fisheries resources sustainably the Government in collaboration with interested parties will embark on the following actions:

Action 2.4 Promote and Implement Protection and Management Strategies in Rivers and Reservoirs for the Maintenance of Species Diversity, Retention of Fisheries Productivity and Suitable Utilization of Fisheries

a) Document the biology, distribution and habitats of fish species as a basis for the development of appropriate management programmes.

b) Develop and introduce appropriate sustainable and environmentally sensitive methods of harvesting fish resources.

c) Develop sustainable management practices in areas adjacent to water bodies in order to minimise adverse impacts of development programmes, such as siltation and pollution.

Forestry

Forests are vital providers of biological resources such as wood for fuel and other domestic uses. They also play a role in the conservation of water resources and in the absorption and storage of carbon. In view of the scarcity of domestic fuel sources, forests resources are over-utilised in Lesotho, and interventions are needed to ensure that forests are guaranteed a stable existence so that their diverse roles and functions are not lost.

Well-coordinated production activities utilising forestry resources would be able to partly sustain the economy. In an effort to conserve and sustainably use forestry resources, it is essential to promote forestry production activities in line with the community requirements.

To achieve stable conservation and maintenance of forests and their sustainable use, Government in collaboration with affected parties will:

Action 2.5 Develop Ecological Forestry, the Management Practices of which Preserve the Ecological Functions and Sustainability of Forests

a) Review and document existing local knowledge of propagation and management of indigenous forests, using this as a basis for formulation of comprehensive utilization plans.

b) Strengthen and introduce new policies, legislation, incentives and disincentives to minimize adverse impacts of human activity of forest resources.

c) Develop well-coordinated forest management policies, plans and programmes in community forests.

d) Promote conservation of forest biodiversity and its sustainable use in all habitats especially in development areas.

e) Promote sustainable use of forest resources by establishing alternative wood supply systems in order to alleviate over exploitation pressure on indigenous forests.

Agriculture

An adjustment of long accepted practices within agriculture has to be done in order to slow down and check its destruction of biodiversity. For example, the use of pesticides on crops and chemical dips for livestock create situations which impact adversely on biodiversity. The destruction of wildlife habitats within farming areas is also a source of concern. These factors have to be discussed openly so as to find wide ranging and appropriate solutions. The consequent policies should make sustainable use systems possible within agriculture, incorporating features so that biological diversity in agricultural areas is enhanced rather than diminished.

Current policies advocating monoculture are efficient in achieving short term solution to production problems, but the graduai long term effects are increases in pests, exhaustion of soils, increased use of chemical fertilizers and pesticides, and consequent deterioration of the environment. These practices also eventually result in reduction of beneficial soil compaction and increased soil erosion.

To address the problem of unsustainable agricultural practices urgent action is required from diverse sectors within government and non-governmental organisations at all levels. The objective of agriculture initiatives should therefore be to encourage, develop and apply ecologically less destructive methods of farming.

Action 2.6 Reform Agricultural Practices in Lesotho and Manage and Constrain Human Activities that are Responsible for the Destruction of Biodiversity

a) Promote development that is sensitive to the preservation and sustainable use of natural landscapes and habitats.

b) Promote and encourage incorporation of biodiversity considerations in agricultural practices and plans.

c) Promote sustainable agricultural management techniques that maximize the use of on farm inputs and minimise use of agricultural chemicals such as fertilisers and pesticides.

d) Support and encourage collection, conservation and use of indigenous plant species and breeds of livestock which are better adapted to local conditions.

e) Promote irrigation activities that minimize waterlogging, salination and other effects detrimental to soil biota.

Objective 2.3

Implement research programmes that will enable the sustainable use of biological diversity whilst minimizing adverse impacts on biodiversity

Most biological research being undertaken is mainly designed to exploit biological diversity for human health, convenience, utility or profit. Biodiversity related research should include, amongst others, research into the genetics and reproductive biology of wild populations, including

taxonomy, ecological processes, conservation biology and landscape biology. Information on such facets of biological diversity will provide a base for the development of more enlightened policies on the conservation of biodiversity, and on the restoration and ecologically sustainable use of biological resources.

In order for research and extension programmes to be sensitive to sustainable use of Lesotho's biodiversity, the Government and interested stakeholders will:

Action 2.7 Establish Coordinated Research and Extension Programmes for Conservation and Sustainable Use of Biological Diversity

a) Ensure that research and extension policies, plans and programmes incorporate sustainable biodiversity use.

b) Ensure that research and extension activities contain appropriate components which address the problems of sustainable use.

Objective 2.4

Minimize environmental degradation and loss of biodiversity caused by developmental activities.

Substantial loss and decrease in biological diversity occurs as a result of the impact of development activities. These activities include industrial sector developments in areas such as mining and energy; the establishment of manufacturing industry; and the provision of housing and road infrastructure. Such developmental activities frequently result in habitat degradation and loss or pollution of soil, and pollution of air and water.

In collaboration with the stakeholders the government should undertake the following actions:

Action 2.8 Perform Environmental Impact Assessment Studies Prior to Implementation of Activities that are likely to Affect Biological Diversity Adversely

a) Require Environmental Impact Assessments before the approval of plans for all major development projects.

b) Ensure that Lesotho's policies, plans and programmes are sensitive to conservation and sustainable use of biological resources and that provisions for minimizing adverse impacts are implemented.

c) Incorporate a requirement for all government departments and sectors responsible for activities affecting biodiversity to develop specific plans sensitive to sustainable use of biological components.

d) Strengthen (and where necessary establish) the organisational framework to oversee, coordinate and integrate government policies that directly or indirectly affect biological diversity.

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of 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, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

Article 1 of the Convention on Biological Diversity

GOAL 3

ATTAIN A FAIR AND EQUITABLE SHARING OF BENEFITS ARISING FROM THE USE OF GENETIC RESOURCES

Following *conservation of biological diversity* and its *sustainable use*, the third objective of the United Nations Convention on Biological Diversity (see Article 1 reproduced above), is *the fair and equitable sharing of the benefits arising from the use of genetic resources*. In ratifying the Convention, Lesotho committed itself to implementing and achieving this objective, although it is at variance with traditional practice in Lesotho. As with the actual conservation of biodiversity, the mechanisms for sharing of benefits from indigenous genetic resources are different from those in respect of exotic (introduced) species of cultivated plants and domesticated animals. Taking the words 'genetic resources' to mean 'biological resources' deriving from all species of Lesotho's *indigenous* plants and animals, these are by the Lesotho Constitution (Lesotho Government, 1993, §107) vested in the Basotho Nation as part of the land. The resources are primarily – and by tradition – used within Lesotho by individual Basotho for personal and family benefits, but amongst these, medicinal plants, wild vegetables and berries, reeds, grasses for making brooms, and Lesotho's endemic Spiral Aloe (*Aloe polyphylla, kharatsa*) are exploited commercially (in this last case illegally) by individuals as part of internal trade, and also in some cases as trade with dealers in South Africa. Only in particular cases are the resources used for the benefit of entire communities, or through the Government, for the benefit of the nation as a whole.

The position in relation to the genetic resources of imported cultivated plants and domesticated animals in Lesotho is similar to that in most countries. In general, and unless already provided by Government or an NGO as an incentive, every Mosotho has the right to buy these and to breed them. Individual Basotho may experience financial and physical difficulties in acquiring such exotic genetic resources but, once acquired, it is accepted that they have total and exclusive rights to the benefits arising from their use. This is the case in most, if not all, free market economies, and no change in this regard is proposed in this Action Plan.

However, due to the disparities in land ownership, where almost half of Basotho do not have access to arable land (and do not own livestock to make use of grazing lands), many do not share in the benefits derived from the use of Lesotho's land resources.

There is also the case of long-introduced plants and animals or of genetic material from such introductions where the original genetic material has been retained in Lesotho although lost elsewhere through selective breeding programmes. It can be argued that such material should be made easily accessible to any individual farmer, but that in such cases, the particular farmer or farmers from whom the material was collected should receive some benefits.

To share benefits arising from the use of land resources and in particular from genetic resources, a method of distribution must be devised. In May 1997, participants in a multi-sectoral workshop representing many role players recommend that the *National Environment Policy for Lesotho* should be modified slightly to adopt a 'User Pays Principle' with respect to its natural resources as a means to balance the odds against persons who have little or no wealth in the form of livestock or fields, and yet may have allocations of land (Lesotho Government, 1998). This recommendation arose from the recognition that one of the main reasons why individuals and communities do not protect and manage the communal natural resources is because they are not aware of their true value. Consequently, it was concluded that the value of resources would be better appreciated if users had to pay for their use, providing an incentive to those holding the land to ensure it maintains its sustainable resources. If mechanisms to share the payments within the entire community can be implemented successfully, the 'User Pays Principle' would be a major strategy by which the objective of a fair and equitable sharing of benefits arising from the use of genetic resources could be attained.

Objective 3.1

Establish a system that ensures that biological resources are used sustainably and the benefits arising from their use shared equally amongst Basotho

In pursuing this objective, the Government is guided by a number of factors:

- Land tenure in Lesotho is communal as stated in the Constitution of Lesotho (§107).
- The population of Lesotho is rapidly growing and putting a greater pressure on land resources, especially biodiversity.
- Landlessness among Basotho is growing at the rate of population growth if not greater.
- Every Mosotho (and especially the 50% who are landless) must be provided with the means to live a comfortable and fruitful life by being provided with appropriate indirect benefits of the land.

However, the Government recognises a number of 'Problems' when identifying the most appropriate Actions for fair and equitable sharing of Lesotho's biological resources among Basotho through the use of the 'User Pay Principle':

- The indigenous genetic resources of Lesotho belong to all Basotho, village by village, Ward by Ward, but all Basotho in the village or Ward do not share in the benefits of the use of the resources by any individual.

- Although the indigenous genetic resources of Lesotho belong to all Basotho, the interests of livestock owners generally override those of other users and potential users of genetic resources.
- Indigenous genetic resources which have a high value outside Lesotho are exported – but the individual Basotho who harvest the resources obtain very little benefit from their collecting, and all the Basotho in the communities owning the resource obtain no value at all from the exports.
- Parks and Reserves have been established to preserve genetic resources in the national or international interest but the members of the communities owning those resources at the time of establishment were not paid for them, the present and future members are not being compensated for their lost access to the renewable resources of the areas, and they are not being paid any part of the accrued benefits from the respective Parks and Reserves.
- There may be attempts by national authorities or persons from abroad to use commercially, and without fair sharing with its owner, privately-owned genetic material of long-introduced plants and animals from Lesotho land races or those with properties which have been retained in Lesotho but lost outside the country through selective breeding programmes.

Action 3.1 Enact Legislation Guaranteeing Property Rights to Livestock and Land Owners and Control Access to Communally Owned Land Resources

(a) Establish links with and reach agreement with concerned and affected parties on benefit sharing from communally-owned resources, identifying appropriate roles for local authorities in the process.

(b) Pass enabling legislation so that local authorities can pass regulations, bye-laws, etc. to apply the 'user-pays' principle to their communally-owned resources; moreover train local law enforcement agents in how to apply the regulations.

Objective 3.2

Control access to Lesotho's genetic resources through the establishment of appropriate legislation and institutional structures

In ratifying the Convention on Biological Diversity, Lesotho has, in effect, committed itself to attaining both local and international access rights to genetic resources. However, and as provided for in the Convention, ownership of genetic resources remains with the country of "origin" and access to those resources can be obtained only on mutually agreed terms. In this regard the rights of biologically rich but economically poor countries can be protected, whilst providing for the means of economically rich but biodiversity poor countries to access such genetic resources. In essence, the Convention prevents uncontrolled biodiversity prospecting by the rich countries at the expense of the biodiversity of the poor countries.

Lesotho is not a country known to be an origin of any economically important food crop; however there are other plant resources whose genetics have been taken and used elsewhere in the world with no benefits derived by Lesotho nor its local communities from where such resources were derived. An outstanding example here are 'Basotho potatoes' (*Litapole tsa Sesotho*). The genes that this variety contain which provide resistance to potato blight have been used to improve the resistance of many world potato varieties at the potato centre in Lima, Peru, and they have also been used at the Institute for Tuberiferous Plants in St Petersburg in Russia. The benefits of such undertakings were not realized in Lesotho. Another example is the use of the world renowned, rare and endangered Lesotho endemic, the Spiral Aloe (*Aloe polypylla*) which is being cultivated commercially and sold in California in the United States of America. Although appropriate and enforceable mechanisms are difficult to establish, such biodiversity prospecting from Lesotho must be controlled so that the benefits of such undertakings can be passed to the Basotho nation.

In pursuit of this objective, the Government is guided by the following:

- While being prepared to cooperate with other nations of the world in the use of its genetic resources, Government recognizes that the genetic resources of Lesotho provide valuable opportunities for the nation to enhance the benefits from its biological wealth and it is concerned that foreign individuals and organizations have enjoyed free access to Lesotho's genetic resources with little or no gain to the country or the people from whom knowledge or genetic resource material has been obtained.
- It is clearly in the country's interest to control access to its genetic resources so as to ensure that benefits arising from the use of its genetic resources are used to develop Lesotho.

To achieve this objective, the Government in collaboration with affected and interested parties will:

Action 3.2 Enact Legislation for Controlling Access to Lesotho's Genetic Resources

a) Enact legislation requiring nationals or organizations of foreign countries to declare in advance the purposes for which they need access to Lesotho biological resources and to ensure that once obtained they make regular reports about their use and whereabouts, paying an appropriate royalty for commercial exploitation of the material.

b) Provide mechanisms and agreements with foreign countries to ensure that the Lesotho Government can still exercise some control over exported biological resources.

c) Develop and implement a more efficient 'Permit' system whereby authorization for collection of genetic material for research, trade or commercial purposes will be required.

d) Establish within the National Environment Secretariat a governing institution to develop guidelines and conditions for biodiversity harvesting; to examine applicability of such guidelines; to investigate further controls; and to advise on appropriate measures for protecting Lesotho's genetic resources.

Action 3.3 Strengthen Research Organizations in the Country so that they can carry out Appropriate Biodiversity Research and Delineate Means for Benefit Sharing

a) Increase the ability of research organizations to carry out research to determine the benefits which can be derived from the use of the genetic resources of the country.

b) Improve the ability of research organizations to monitor the activities of foreign individuals and organizations dealing with Lesotho genetic resources.

c) Investigate the possibility of integrating development activities into benefit-sharing arrangements, so that poverty is reduced amongst disadvantaged sectors of the Lesotho population.

d) Encourage the development of individual and institutional policies and professional codes of conduct to guide the collection, research, trade and commercialization of genetic material.

Action 3.4 Establish Measures for Benefit Sharing

a) Establish a system of allowing funds generated from biodiversity harvesting (whether for research, trade or commercial purposes) to be disbursed equitably.

b) Support the development of a system to provide legal protection for collective intellectual property rights and in particular the protection of indigenous knowledge.

c) Ensure that the collection of biological resources and indeed the genetic resources for development and research purposes does not endanger attempts made to conserve genes, species and ecosystems.

GOAL 4

EXPAND LESOTHO'S CAPACITY TO CONSERVE AND MANAGE BIODIVERSITY

Lesotho can only conserve its biodiversity by increasing the human capacity to care, protect, and manage its biological resources. In particular it needs to undertake local community capacity building, for protection, conservation, and sustainable use of biodiversity so that biological resources may yield the greatest sustainable benefits to the present generation while maintaining its potential to meet the needs and aspirations of future generation.

Lesotho is a poor country which cannot be overlooked when dealing with issues of international concern such as biodiversity. Poverty in Lesotho, in terms of its widespread prevalence and varied

intensity, transcends all rural problems associated with human capacity to conserve biodiversity. Poor people cannot afford to take proper care of the environment whilst their basic needs for food, shelter and health are not met, and as a consequence, rural people put more pressure on their natural resource base than would otherwise be the case. The result has been a degraded environment and biodiversity loss leading to a cycle in which the same people become even poorer. As a consequence, peoples' capacity to protect, conserve, and sustainably use biodiversity is diminished considerably.

Objective 4.1

Review existing and develop additional policies to achieve compatibility between biodiversity conservation, resource use and national development.

For some years, the government has embarked on development activities which impact positively on biodiversity. These include crop and livestock diversification and intensification programmes; Production through Conservation; Range Management Areas developed in association with Grazing Association; and the establishment of an Environmental Agency (the National Environment Secretariat).

However, although there is formulation capacity, there is a serious problem of inadequate technical capacity for implementation of policies. Consequently the full potential impact of these activities is not realized. In purely economic development terms, positive aspects have included the introduction of more breeds of cattle (both dairy and draught), poultry, and horses and as well as varieties of maize, wheat, beans, and sorghum. In terms of biodiversity there has been a gain in exotic genetic material, although in some cases at the expense of indigenous domestic animal varieties. The activities have been positive for soil conservation and enhancing crop biodiversity, as well as improving range quality, conservation and sustainability. However, the detailed impact of policies may have been positive or negative depending on the capacity of implementing agencies.

Although fragmented and uncoordinated, institutional structures for nature and biodiversity conservation do exist in Lesotho. They can be found at Central, District and Community levels (within sectoral ministries, the private sector, the chieftainship, and as non-governmental and community based organizations).

There are in fact a number of central environmental agencies dealing with natural resource management and with biodiversity. Coordination among these agencies is a problem at national level, but is even more difficult at local level. The resultant outcome of such disorganization is that biodiversity conservation and management are adversely affected due to unnecessary institutional overlaps. There is often confusion about responsibilities and job delineations. The long awaited empowerment of local institutions through decentralisation will result in closer involvement of biodiversity users. At the centre, the role of coordinating sectoral environment units is a matter for the National Environment Secretariat.

To achieve this objective, the Government, collaborating with interested and affected parties, will:

Action 4.1 Review Existing and Draft Additional Policies for Increasing Human and Institutional Capacity to Conserve Biodiversity

(a) Review existing policies, giving priority to those adopted before the Convention had come into force and amend them as necessary.

(b) Strengthen the implementation of policies which support biodiversity conservation and promote the sustainable use of biological resources.

With Government's commitment and political will, and in association with interested and affected parties, it will:

Action 4.2 Develop and Enhance the Capacity of Existing Institutions to Administer Biodiversity Management Policies and Biodiversity Use in a Coherent and Coordinated Framework

(a) Provide adequate financial and human resources to support policies and programmes of implementing sectoral ministries.

(b) Strengthen institutional coordination through provision of adequate resources.

(c) Establish a biodiversity focal point which would appropriately be the National Environment Secretariat, which would seek appropriate external assistance toward capacity building, it being noted that biodiversity degradation transcends ministerial and national boundaries.

(d) Improve communication between and across the different levels of government and non-governmental institutions in order to minimize conflicts of interest between institutions. Existing Environmental Units already established within the Ministries would be important focal points for communication.

(e) Promote strong partnerships and cooperation between government and NGOs, community-based organisations, women's groups, holders of traditional knowledge, the private sector, the scientific community, and private individuals.

Objective 4.2

Evolve and review appropriate legislative tools to support biodiversity conservation and sustainable use

The Lesotho Government, particularly since 1989, has been concerned about environmental issues and has initiated the process of drafting appropriate legislation to minimize damage to the environment and to enhance positive environmental initiatives. Although the Environment Bill 2000 is not yet enacted, the country has in the meantime ratified International Conventions as an initiative to help protect biodiversity.

The Government in collaboration with interested and affected parties should undertake to:

Action 4.3 Review Existing and Enact New Laws, and Strengthen Enforcement Agencies so as to include Opportunities for Popular Participation in the Process of Formulating Laws for Biodiversity Conservation and Sustainable Use

(a) Review the existing legislation, determining present overlaps, inconsistencies and gaps, and strengthen capacity to reformulate and draft relevant biodiversity laws.

(b) Select and translate into Sesotho laws which have the greatest impact on biodiversity conservation in order to ensure community cooperation in their implementation.

(c) Strengthen law enforcement agencies by direct involvement of communities and through their local institutions.

Objective 4.3

Manage biodiversity through the human environment

Awareness of environmental and biodiversity issues is lacking in Lesotho. Research, training and information management all help to conserve genes, species, and ecosystems, but biodiversity conservation can succeed only if ordinary people understand biodiversity's distribution and value, appreciate how it affects their own lives and aspirations, and know how to manage ecosystems to meet their own needs without damage. The capacity to transfer this message is however limited in Lesotho as there are not enough trained personnel (taxonomists, ecologists, biologists, and environmentally trained schoolteachers) to present biodiversity issues on a large scale. There is also inadequate research and training capacity to handle biodiversity issues. These deficiencies result from chronic past underinvestment in human capacity-building, when Government failed to appreciate biodiversity's potential contribution to national and human development.

The Government, in association with interested and affected parties will:

Action 4.4 Focus on Presenting Biodiversity in the Broader Development Context, Emphasizing its Relevance to all Members of Lesotho Society

(a) Promote awareness of biodiversity to politicians (as decision-makers), rural and urban communities, industry, non-governmental and community-based organizations.

(b) Design and implement appropriate curricula relevant to biodiversity conservation and sustainable use for both formal and non-formal educational use.

(c) Support and encourage improved training of teachers in formal and traditional schools, extension officers, and church leaders to effectively convey biodiversity education and to undertake biodiversity interpretative programmes.

(d) Use a variety of delivery media such as radio, television, newspapers, artists (traditional and modern – song, drama, painting, craftwork) to disseminate information about biological diversity.

(e) Encourage organisations and individuals engaged in researching, managing and conserving biodiversity to popularise their work to the public.

Action 4.5 Develop Human Resource Education and Improve the Skills Required for Biodiversity Management

(a) Support and strengthen existing institutions (Government and NGOs) that provide formal, informal and non-formal training for biodiversity management.

(b) Encourage reorientation of curricula in schools and training centres to acquire knowledge of biota and their management and conservation.

(c) Arrange and support in-service training programmes for extension staff on biodiversity management, and training workshops for senior decision-makers, industrialists and local communities.

(d) Enhance the skills of those with expertise in biodiversity management through training incentives for higher qualifications, ensuring that a corresponding career path is available.

(e) Facilitate and support the development of taxonomic training programmes for professional taxonomists and parataxonomists (including traditional biologists).

Objective 4.4

Recognize and protect the value of indigenous knowledge of flora and fauna and its patterns of use for sustainable development, facilitating participation of all relevant parties

Indigenous knowledge of flora and fauna is extensive but uncoordinated. Its value is unappreciated and its income generating capacity is largely undocumented. Biodiversity values provide motivation for human utilisation of biodiversity, motivation which could be related to conservation and management interventions. However, the capacity of communities to use biodiversity judiciously is constrained by poverty and individual non-accountability, and results in a negative impact when natural resources are over-used. Loss of biodiversity resulting from ecosystem degradation is not only a loss to present biodiversity national users and future generations, but also to the international community. Thus implementation capacity for policies and strategies to conserve and manage biodiversity use is crucial, and this includes implementation of the *National Environmental Policy* (Lesotho Government, 1998), which includes also the present objective.

Action 4.6 Increase Awareness-Raising Programmes about Biodiversity Values

(a) Encourage, with the consent and involvement of traditional knowledge holders, the recording of customary knowledge, practices and culture concerning the conservation and sustainable use of biodiversity.

(b) Explore mechanisms to protect traditional and customary knowledge, practices and culture.

(c) Promote the development of a code of ethics for researchers engaged in work concerning traditional and customary knowledge, practices and culture.

(d) Prepare a usable and practical system for the collecting of data on the economic value of biological resources.

Objective 4.5

Improve existing patchy biological resource knowledge through relevant research and promote its transfer and adoption to biodiversity users

Biotechnology in the country has tended to emphasize plant and crop production research and relatively less attention has been paid to livestock, range, forestry and indigenous flora and fauna research. Adoption of new technologies is limited by ineffective extension. Technological impact has been moderate on crop biodiversity but detrimental to other sub-sectors. Technological impact on biodiversity could be positive depending on human and financial resources but could be totally devastating if no protection is afforded to sensitive systems and vulnerable species.

Except for protected and catchments falling within water schemes, little work has been done on compiling reliable inventories of existing biological resources. This lack of inventories limits monitoring and contributes to degradation by militating against effective intervention.

To achieve this objective, the Government, collaborating with interested and affected parties, will:

Action 4.7 Implement Biodiversity Research and Monitoring Programmes and Improve Inventory Taking

(a) Identify, in collaboration with local, regional and international research institutes, gaps in knowledge and technology with a view to developing a practical research plan.

(b) Give priority to research on biological and social interactions. since these interactions are poorly understood and are the causes of underlying decline in biodiversity.

(c) Ensure Environment Impact Assessment technology is included in programmes to improve the chances of making better decisions in support of the sustainable use of biodiversity.

(d) Accelerate translation of biodiversity research results into applied technological action, and so promote the conservation and sustainable use of biodiversity.

(e) Encourage involvement of traditional knowledge holders in research programmes.

(f) Support the establishment or strengthening of local resource centres to make information on biodiversity more accessible, usable, and locally relevant, and in particular improve and standardize existing biodiversity databases and develop information networks to enhance collection, sharing and analysis of data.

(g) Maintain and strengthen the capacities of institutions engaged in monitoring the components of biodiversity and improve coordination among such bodies.

(h) Develop and implement cost-effective approaches such as the use of biodiversity indicator groups and other early warning stress indicators.

(i) Promote the integration of traditional and customary knowledge, practices and culture into biodiversity inventory and monitoring systems.

(k) Review and update Red Data Lists as applicable to Lesotho biodiversity, based upon the revised IUCN Red List, in particular by tracking changes in management responses to the conservation of threatened species.

GOAL 5

CREATE CONDITIONS AND INCENTIVES FOR BIODIVERSITY CONSERVATION AND SUSTAINABLE USE

This section describes measures that the nation can undertake to create conditions and incentives to conserve and use Lesotho's biodiversity sustainably for individual, community and general public use.

Objective 5.1.

Define private title on much of the land, define community ownership on lands with currently strong common pool management regimes, and define state ownership on residual lands for existing state purposes

The main premise of this part of the strategy document is that all people are economic beings such that all decisions are based on economic choices where benefits of actions are weighed against their costs. Most of the losses in Lesotho's biodiversity are due to overutilisation of the land resources, land conversion to residential use, and habitat disturbances due to a relatively large population occupying, without much control, a small land area. Behind these causes are more fundamental causes which relate to the environment in which decisions about biodiversity are taken. A strategy for biodiversity conservation and sustainable use must address first and foremost these basic causes. It must also provide incentives for decision makers to act and use biodiversity sustainably. In this way it must reverse overutilisation of land, reduce uncontrolled human habitation, or reach and curtail activities that disturb habitats. Such a strategy must however recognise that activities hostile to biodiversity will continue and its objective should not be to eliminate the use of biodiversity but to use it sustainably where possible, and to minimize the negative impacts of economic activities in such a way that incentives and conditions for conservation are introduced into the day-to-day management of natural resources in general, and biodiversity in particular.

Lesotho's current land tenure system is a key fundamental cause of biodiversity loss, this being related to the weakness of a system which allows open access to cropland, village grazing, forest lands, and rangelands. The land tenure system has two definitions depending on use area. On rangelands, it defines access rights rather than exclusive ownership. On cropland, it defines a form of land holding within a family. While associated with a particular household, the system lacks the exclusivity and security[1] required because the chief can still theoretically recall the holding rights

[1]Although the issue of insecurity of tenure in Lesotho has been a contentious issue, recent analysis suggests that in practice land holding is secure since it is rare for chiefs to recall holding

and again community members (although the practice is changing with residues also being harvested by landholders) still have access to crop residue. Because in effect no one, including communities, can *exclusively own* the land, the tragedy of deleterious common land exploitation persists because no one can ever want to conserve any part of the land and forego the benefits of conservation that thereby accrue to the community at large, although the costs of such conservation are borne by an individual decision maker. A corollary is that the market fails to provide a price and value for such a land as well as for conservation on such a land. Conservation will also not emerge for another important reason: all the lands, particularly community lands, have the character of public goods.[2] An individual will not normally choose to conserve simply because benefits of conservation will accrue even if he or she has not contributed to the conservation effort. This is a problem of *free-riding* in which if all individuals think that everyone else would pay for the provision of conservation then it will not materialise. The market fails in the sense that it is unable to deliver conservation although to do so is clearly a positive economic value.

Conservation and use decisions relating to biodiversity are made by people at individual, household, firm, or state levels. Faced with the decision to conserve and use sustainably or to consume now, each decision maker must weigh the benefits of a choice made against its costs. If one consumes now the benefits are the derived consumption benefits, while the costs are the foregone future biodiversity values. Conversely, if one chooses to conserve, the benefits are the future biodiversity values, while the costs are the foregone current consumption benefits. A decision maker will normally go through this process mentally. Consider then that a decision maker is consciously evaluating the two choices of current consumption versus conservation. The conservation benefits which accrue in the future are of course positive, but cannot be captured and enjoyed by the decision maker who chooses conservation simply because our land tenure system does not provide exclusivity of ownership of land.

Being able to secure and capture the benefits of conservation does not in itself ensure that conservation or sustainable use will be chosen by the decision maker. For that to happen, the perceived benefits of conservation when captured must exceed the costs of conservation. The aim

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rights. The issue of whether a land holder makes soil building or conservation investments on the land held requires more than security of ownership: in addition, the holding rights must be exclusive and enforceable. These features are lacking under the current tenure system. Farmers fear that others could counteract the effects of any investments they undertake.

[2]Public good is a good whose consumption by one individual does not reduce quantities available for others, and for which one individual cannot prevent others from consuming. A classic example is street lighting. One individual would not normally want to pay for the provision of this lighting since once it is provided it serves all people within the reach of the light even though they may not have paid for its provision. A common characteristic of public goods is 'free-riding' where individuals shy away from paying for the good hoping that others would pay for its provision which can then be freely available to the free rider.

is then to create a system with exclusive of ownership on land and thereby modify the decision making so that the individual decision maker is capable of enjoying the fruits of their conservation effort if conservation is chosen. In this way the decision maker, be it individual, community or State will have clear and well advised choices to make.

Ownership rights or private title must be defined over most of Lesotho's arable and grazing lands.[3] Titling will immediately ensure that conservation benefits can be enjoyed by land holders in the future. It also means that individual holders are likely to opt for land conservation practices only if the perceived benefits exceed those of not conserving land. The clarified definition of ownership rights will give rise to land markets as well as to interest in its conservation. These will in return put definite monetary values on land and its conservation.

Lesotho's rangelands have been traditionally managed as a common pool resource (CPR). Access rather than ownership to land has governed the way through which communities have accessed land. On the other hand the chieftainship responsible for the management of the land has been weakened by various political structural changes to the point that it cannot now be expected to recover adequately to discharge its traditional role effectively. It is for this reason that a new community structure must be developed to manage a land resource owned by the community. Although the common pool resource principle has worked for number of years, it is still beset by problems. For it to continue to work effectively and efficiently, the following conditions must be met:

- clearly defined land use boundaries;
- clear appropriation and access rules;
- collective bargaining on rules;
- strong monitoring;
- clearly graduated sanctions for aggressors;
- strong conflict resolutions mechanisms;
- recognised self governance; and
- enforceability.

[3]The process of private titling is occurring anyway on arable and grazing lands through the transfer of these lands to residential purposes. It is clear that the management approach on residential lands is superior to that on open arable and grazing lands. This occurs because security and exclusivity of tenure is assured in residential lands as compared with open arable and grazing lands.

Finally, there are some lands which should be owned by the State.[4] Among these lands should be those earmarked for special activities such as *in-situ* and *ex-situ* conservation and special development areas. It must be clear that on lands held by Government, the Government has an exclusive right on those land. The management of such lands should not be left to communities, but to state appointed functionaries.

In summary the required action to meet the objective is:

Action 5.1 Review the Land Allocation Law and the Extent of its Implication in the Degradation of Common Land

(a) Put a land policy in place through a consultative process.

(b) Begin a land law reform process accompanied by highly conspicuous awareness programmes as part of that process.

(c) Determine the extent of landlessness and the current costs of non-reform, consult widely but with proper information, remove myths and fears, and establish safety nets for dispossessions.

(d) Reform existing land management institutions at the community level with the primary objectives of empowering them to manage resources at their disposal effectively. The reform process should put in place conditions that would allow community management systems to functions effectively.

(e) Initiate a strong reappraisal of existing management institutions, including the recently enacted Local Government structures and Chieftainship reforms, before taking final action.

Objective 5.2

Eliminate policy failures in land use, meanwhile creating a socio-economic climate with developmental aspects so that biodiversity issues can be clearly defined

There are several dimensions that normally emerge when analysing policy in Lesotho. These include inappropriate approaches, exclusion of stakeholders, lack of capacity for proper policy intervention, poor translation of policy choices into actions, lack of commitment by government to policy recommendations, and lack of policy action when it is required. Most of these problems arise out of policy intervention which is subsequently found out to be inappropriate with the consequences that unforeseen results occur or the intended results fail to emerge. The last dimension constitutes a failure by government to take action when such action is justified by the

[4]The state is defined here as the Government rather than the plurality of the Basotho Nation.

costs and if taken would improve the management of biodiversity. These problems in total are examples of policy failures. The management of the environment in general and biodiversity in particular requires policies aimed at changing behaviour that is dangerous to the environment, and promoting behaviour that promotes conservation and sustainable use of environmental components such as biodiversity. Economy-wide policies such as growth, balance of payments, exchange rate, and interest rates can also affect conservation and sustainable use of biodiversity even if not predicated on such. A policy failure when that policy results in unforeseen biodiversity losses.

To achieve this objective, the Government, collaborating with interested and affected parties, will:

Action 5.2 Eliminate policy failures

(a) Decentralise, as much as possible, the decision making process that affects biodiversity.

(b) Require all decision making processes to indicate their impact on biodiversity and to formulate their plans and activities with the aim of reducing negative impacts on biodiversity.

(c) Monitor impacts on biodiversity, and act speedily when action is required.

(d) Integrate key ministries (Ministries of Agriculture, Home Affairs, Education, Tourism, etc), other developmental institutions (LHDA, Machobane Agricultural Development Foundation etc) and educational institutions (NUL, NTTC, Lerotholi Polytechnic Institute etc) into the policy process.

(d) Develop capacity for environmental policy formulation and implementation within all policy making bodies.

(e) Measure all values of existing stocks as well as flows in biodiversity. Adopt the newer measurement techniques in environmental valuation, but also integrate indigenous knowledge systems, where possible, within this valuation.

Objective 5.3

Develop a material incentive programme to ascertain the value of biodiversity components and to change people's behaviour at the local and national levels

The changes in land law outlined above will provide to the user the following incentive: because benefits of conservation can be captured by the person who invests in conservation, development activities or habitat destruction will occur only if the benefits from such actions exceed the future benefits of conservation. Development or unsustainable-use benefits are evident. However conservation benefits are not clearly recognisable since no widespread conservation or sustainable use projects are available. In other words if a decision agent considers conservation what, exactly, would be the benefits of such conservation and accrued in what time frame? If land is rehabilitated or harvesting terminated for say a few years what regeneration would occur and what value would this be to the decision maker? In the light of no widespread demonstrative

effects, uncertainty would become an inherent part of the decision making process. It must be the role of the State therefore to remove the uncertainty and ensure that decision makers are fully aware of the benefits of conservation. Material incentives will have to be provided to persuade people to experiment with conservation and sustainable use.

Entrenched behaviour changes with a time lag. It has taken nearly two decades for people, educated ones at that, to realise to the full extent what is allowed under the 1979 Land Act. It is plausible that landowners, be it individuals or communities will be slow in reducing biodiversity degradation even after land titling had changed. Some material incentives would have to be provided by the Government in order to persuade people to change behaviour.

It will also happen that for specific species which are treasured at the national and global levels, the costs of conservation at the local level will not be justified by the benefits of conservation. In such cases conservation will normally not occur at the local level. In order for conservation to occur, national government and global institutions would have to provide material incentives, equal in value, to the difference between costs and benefits of conservation at the local level.

The broad aims of an incentive programmes will also enable decision makers to experiment with conservation both *in-situ* and *ex-situ* and therefore to begin to appreciate the programme benefits; i.e. for agriculture and livestock to maintain as many as possible indigenous and traditional crops and breeds; for private decision makers to integrate biodiversity considerations into their decisions; and for more organised residential areas, to experiment with larger population densities than at present (this would reduce habitat disturbances).

To achieve this objective, the Government, collaborating with interested and affected parties, will:

Action 5.3 Develop a Material Incentive Programme to Change People's Behaviour so that Future Land Title Holders Make Appropriate Conservation Decisions

(a) Develop an incentive programme and fund for funding conservation projects whose aim would be the creation of a knowledge bank in conservation and sustainable use activities.

(b) Develop an incentive programme and fund for funding a speedy transition from the current behaviour of 'consume now' to one that incorporates the positive value of biodiversity.

(c) Develop an incentive programmes and fund for specific conservation programmes where the costs of conservation at the local level do not justify conservation. This is done in those cases where national and global biodiversity values exceed local values such that it may be sensible to conserve certain species at the national and global levels, but not so at the local level. The incentive fund should also benefit from global funds when global values exist.

GOAL 6

MANAGE BIODIVERSITY THROUGH INTERNATIONAL LINKAGES

Ratification of international conventions by individual governments implies the joint efforts by the international community to tackle issues of global concern collectively. Lesotho is a signatory of a number of international agreements that may directly or indirectly affect biodiversity and these agreements place certain obligations on her activities. in Particular, the signing and ratification of the Convention on Biological Diversity demonstrate Lesotho's commitment to conserve those biological resources that are within her own boundaries and are of both national and international value; as well as Lesotho's willingness to collaborate in the conservation of those that are found in areas where Lesotho does not have absolute authority. By virtue of this declared commitment, Lesotho has obligations towards biodiversity conservation and sustainable use efforts worldwide. To fulfil these commitments, and to implement successfully the various policies that will help in the conservation and sustainable use of biodiversity, there is need for well-thought out strategies at the international level.

Biodiversity conservation requires global cooperative action and sharing of knowledge, costs and benefits. However, as yet Lesotho is relatively deficient in the necessary policies and linkages especially at international level, and is consequently not using available international resources to best advantage. Therefore, the main aim is to create and maintain linkages of various forms that go beyond national boundaries for the protection, conservation and sustainable use as well as equitable sharing of benefits accrued from the biological resources. The following are the objectives and specific actions that Lesotho should adopt to conserve and ensure sustainable use of her biological resources.

Objective 6.1

Develop and adopt a principle and policy of 'national ecological security' to ensure that international trade policies do not intensify Lesotho's biodiversity loss.

It is imperative that Lesotho incorporates in her international economic policies principles and measures that will prevent biodiversity loss, and that the demands of the global market do not force Lesotho to compromise her biodiversity.

Adoption of this policy will ensure that firstly, the integrity and diversity of Lesotho's biological systems are not compromised by the rules and practices of international trade; secondly, that the livelihoods of rural communities in particular are protected; and thirdly, that the government will be able to distribute the costs and benefits of trade in biological resources equitably within the country. The policy will ensure that Lesotho does not lose her biological resources in order to meet the demands of the international market system, especially those of the developed world.

Lesotho is signatory to a number of conventions that compel her to protect most forms of organisms, for example, the International Plant Protection Convention. This and other consideration make it imperative that all forms of disease that threaten biodiversity in Lesotho are rigorously controlled. Amongst appropriate controls are quarantine procedures, and to ensure that these are carried out the Ministry of Agriculture will have to release experts who can meticulously examine both plant material and animals that move in and out of the country through the official border posts.

Action 6.1 Include Biodiversity Conservation in Lesotho's International Economic Policy

(a) Adopt strict biodiversity protection standards and impose them on imports.

(b) Inspect all animals and plants brought into the country and require valid health or phytosanitary certificates before they are allowed entry.

Objective 6.2

Ensure that national interests are incorporated before signing and ratifying international agreements and conventions relevant to the conservation of biodiversity to ensure that Basotho national interests are not jeopardized by global interests.

To achieve this policy objective, Government, in collaboration with affected and interested parties, will undertake to:

Action 6.2 Consult Locally before Entering into International Obligations

(a) Make available the texts of international agreements prior to ratification and consult the nation before ratifying a convention, using appropriate approaches, such as surveys of public opinion, or in matters of major importance a referendum.

(b) Sign and ratify only those agreements and conventions that are of benefit to Basotho as their success depends on the commitment of the nation to observing their principles.

(c) Ratify as soon as possible the 1973 Convention on International Trade in Endangered Species (CITES) and the Ramsar Convention relating to the Protection of Wetlands of International Importance, taking into account the major requirements for meeting the obligations under these conventions (see, for example, Ambrose, Pomela & Talukdar (2000), p. 114).

Objective 6.3

Establish inter-state and regional cooperation for the prevention of biodiversity loss through illegal exportation of endangered and threatened species from Lesotho to other countries.

Regional organizations have an important role to play in the conservation and sustainable use of biodiversity which in turn is considered an essential component of sustainable development.

Amongst relevant regional organizations of which Lesotho is a part are the Southern African Customs Union (SACU) and the Southern African Development Community (SADC). The illegal exportation of endangered and threatened species such as the Lesotho endemic plant, Spiral Aloe, which is currently covertly exported through the South African/Lesotho border, poses a serious threat to biodiversity conservation in Lesotho. It is in this regard that the SACU is considered as relevant. The protection of biodiversity of member states can be done by enforcing the laws that protect these resources and establishing guidelines on fair trade in these biological resources.

While the Spiral Aloe, *Aloe polyphylla*, is a high value plant prized by tourists, who are mostly unaware when they buy it that it is protected, a great many other plant resources which are harvested and in some cases exported are not protected. These include the medicinal plant *Alepidea amatymbica* (Kalmoes, *lesoko*), which grows only in the Maloti. One estimate (Letsie, 1993) is that as many as 100 000 medicinal plants of this and other species are lifted every week by 20 000 diggers, an average of 5 plants per week, making a total of 5 million plants a year. A consequence is that plants like *Alepedia amatymbica* and *Dicoma anomala* (Hairy Thistle, *hloenya*) have now become very rare near villages and roads. Controls over harvesting and export of these plants will obviously be necessary if they are to survive and continue to play their useful roles as medicinal plants. Along with these controls, the National Environment Secretariat, in collaboration with relevant government departments will need to familiarize relevant officials about resources that should not be extracted from their original habitats or be taken out of the country without proper permits. Posters can play a role in this process, as they have done in alerting people to the plight of the Spiral Aloe. Government departments which have a role to play include Trade and Industry, Tourism, and Customs and Excise, as well as the Police.

What is stated in relation to plant resources, needs parallel action in relation to protected animals. For example, skins of protected birds (Cape Vulture, Bearded Vulture) are known to be exported and both species are endangered and declining in numbers in Lesotho. In one recorded case, a person was caught through the vigilance of the South African police after he had already passed through the Lesotho border post (Ambrose, 1983).

Biodiversity is indispensable for sustainable development. It is therefore vital that it becomes a priority on the agenda of regional development organizations such as SADC and that regional efforts should be made to attract the developed world to assist regional activities meant to conserve biodiversity of both regional and international value.

Action 6.3 Cooperate Regionally to Reduce Trafficking in Endangered and Controlled Animals and Plants

(a) Propose that the issue of biodiversity conservation forms an integral part of the on-going Southern African Customs Union (SACU) renegotiations, so that it becomes included in the new agreement.

(b) Prevent the exportation of the Spiral Aloe (*Aloe polyphylla, kharatsa*).

(c) Investigate the need to protect resources of Kalmoes (*Alepidea amatymbica, lesoko*) by declaring it to be a protected plant or a plant requiring an export permit.

declaring it to be a protected plant or a plant requiring an export permit.

(c) Create awareness among the Lesotho and South African Customs and police officers on matters concerning the current illegal trafficking of biological resources and their role in preventing this trade.

(d) Introduce measures through which nationals and visitors passing at border gates could be made aware of species which are legally protected species in Lesotho and the Republic of South Africa.

(e) Ensure that biodiversity conservation is a priority on the agenda at meetings of the Southern African Development Community (SADC).

(f) Form with other member states a regional body to address and give advice on issues and activities that may directly or indirectly affect biodiversity in the member states.

(g) Actively support regional efforts to conserve and manage biodiversity, for example, the SADC Regional Plant Genetic Centre in Lusaka.

(h) Participate in the mobilization of multilateral funds to support biodiversity conservation at regional level.

Objective 6.4

Create transfrontier linkages in protected areas to ensure that biodiversity rich ecosystems and habitats are not neglected or over-exploited.

Biodiversity rich ecosystems and habitats that are found adjoining frontiers are likely to suffer from negligence and controversies over who is responsible for their protection and who should benefit. As a result they are often overexploited. Given that geographically Lesotho is entirely enclosed within the Republic of South Africa, cordial working relations are of both practical and strategic importance in the conservation and sustainable use of biodiversity. It is important that the two neighbours establish a common understanding on matters of biodiversity conservation that require their cooperation.

Both biodiversity loss and conservation have transnational implications. However, various elements of biodiversity have varying values to different nations and societies. It is in this regard that Lesotho should prioritize which ecosystems, habitats and species need to be conserved in its national interest.

Lesotho should share with South Africa the costs of managing and monitoring these border areas.

Action 6.4 Cooperate to Create a Transfrontier Conservation Area or Peace Park

(a) Actively participate in the identification of areas adjoining international borders and which need international cooperation for their conservation, sustainable use and a fair and equitable sharing of the biological resources that are found within such areas.

(c) Where transfrontier protected areas have already been established, make efforts to harmonize relations and to ensure equitable sharing of benefits accrued from the resources; also provide adequate resources to sustain such endeavours, including, for example, the Maloti/Drakensberg Catchment Conservation Programmes.

(d) Where appropriate, establish peace parks in line with the concept which originated from an initiative of the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1988 (Douglas, 1997).

Objective 6.5

Incorporate biodiversity issues into developmental strategies and activities to ensure that the international development assistance process becomes a force for biodiversity conservation

International development assistance has tended to be silent on issues of biodiversity conservation, and indeed there are examples where, because of this omission, destruction has been caused to biological resources and biodiversity. Under its obligations to the Convention on Biological Diversity, biodiversity conservation must be considered as an integral part of sustainable development and a criterion for selecting and evaluating development assistance projects.

It is also true that while external interventions such as Structural Adjustment Programmes have been perceived as successful in Lesotho, they have brought about imbalances which have led to chronic poverty in some sectors of society. Communities become overly dependent on resources that are freely available and in this way biological resources come under stress. It is a corollary that developmental strategies must contain sustainable options for rural communities affected by these strategies.

To realize these objectives the Government, collaborating with interested and affected parties, will:

Action 6.5 Make the Development Assistance Process a Force for Biodiversity Conservation

(a) Make biodiversity conservation a priority when seeking international assistance for developmental activities.

(b) Incorporate biodiversity values into the criteria for judging/selecting, designing and evaluation of development assistance projects.

(c) Minimize the negative impact on biodiversity and biological resource values of economic reform strategies such as structural adjustment programmes by providing suitable alternatives to local communities, and to women in particular.

(d) Maximize efforts to attract multilateral and bilateral financial resources for implementation and sustainment of biodiversity conservation programmes and projects in the country.

Objective 6.6

Enhance international collaboration in scientific and technological research related to biodiversity, while safeguarding the interests of the Basotho, by ensuring that Lesotho participates in a two-way process of sharing information and technologies relating to biodiversity conservation and sustainable use

There are inequalities between the developed world and the developing countries when it comes to issues of technologies for conserving biodiversity and exploiting its potential wealth. By way of contrast, genetic resources have tended to move relatively freely from developing countries to the developed world. However, to ensure the equity emphasized in the Convention on Biological Diversity, Lesotho should have access to the genetic wealth, information and technologies of other countries, as well as develop her own and protect that which already exists. The National Environment Secretariat and the National University of Lesotho should collaborate in endeavours to develop the necessary institutional ability and to establish appropriate linkages.

One of the problems that have made conservation of biological resources and protection of the environment relatively difficult in Lesotho is lack of motivation among civil servants. It is viewed as necessary that the government of Lesotho establishes an institution that will employ experts to conduct research on biodiversity issues and also collaborate with other institutions internationally.

Similarly, independent research by professional bodies such as the Lesotho Mountain Research Group should be encouraged and supported. Also, for a long time indigenous knowledge has been undervalued and sometimes exploited without appropriately rewarding those who provide such information. It is necessary that NES in collaboration with the National University of Lesotho document all those people who can provide valuable information on the flora and fauna of Lesotho, as well as on their uses. Since local communities are particularly involved in the utilization of these biological resources, NES should ensure that they are recognised as playing a key role.

Action 6.6 Increase Scientific Cooperation in Biodiversity Research and Technology Transfer in Matters Concerning Biodiversity

(a) Establish an independent research institution that will address biodiversity and policy related issues; such institution having the mandate to establish linkages and exchange programmes with other institutions of a similar nature in other countries.

(b) Protect the indigenous knowledge and intellectual property rights of the Basotho and ensure that Basotho benefit from knowledge and materials that originate from Lesotho.

(c) Compile a register of local ethnozoologists and ethnobotanists so that such persons can be consulted and used for international research activities for the benefit of the country.

(d) Include members of local communities in international tours so that they can learn how other nations live and use their biological resources.

(e) Encourage and support initiatives by institutions, non-governmental organizations and professional research groups to undertake cross-border research in biodiversity.

Chapter 3 Lesotho's Unmet Needs

The *National environmental policy for Lesotho* (Lesotho Government National Environment Secretariat, 1998) contains little specific mention of biodiversity, nor of the preservation of biodiversity components through conservation and sustainable use. This present plan and the information on which it is based show, however, that there are biodiversity needs that require further consideration and funding. While neither exhaustive nor costed, this information indicates particular areas where more effort is required by the nation at all levels: national and regional, government, non-governmental and community-based organizations, and private individuals. Since the time so far available for the compilation of biodiversity information in Lesotho has been very limited, more discussion and consultation need to be carried out before a representative and realistic complete list of unmet biodiversity needs is created.

Based on information gathered for the country study, Lesotho's unmet needs can be grouped into two categories: 1) Expanding existing programmes and activities; and 2) New programmes and activities.

Expanding Existing Programmes and Activities

Three areas requiring expansion are 1) Public awareness, education, and training; 2) Research and monitoring of biodiversity and 3) Application of knowledge.

1. Public Awareness, Education, and Training

Biodiversity issues are not in the forefront in Lesotho and they need to be brought out of the closet and into the public domain. To achieve this, biodiversity education at the primary, post-primary and the university must be carried out and also as part of non-formal and adult education programmes, including public awareness programmes at traditional Basotho gatherings (*lipitso*). Electronic and print media also have a role to play in spreading the message about biodiversity conservation and sustainable use. In relation to training, relevant programmes would be directed at 1) providing training in the basic principles of biodiversity conservation and sustainable development of a wide variety of professionals including ecologists, taxonomists, geneticists, physiologists, resource managers in agriculture, fisheries officers, forestry and parks staff, biotechnologists, plant breeders, organic chemists, environmental economists, environmental lawyers, environmental engineers, and environmental politicians; 2) creating public awareness through lectures and workshops in both industry and government; and 3) providing specific courses on the concepts of renewable resource management.

2. Research and Monitoring of Biodiversity

The Government through the Agricultural Research Division and in collaboration with Lesotho Highlands Development Authority is involved in the collection of the country's plant germplasm within the Water Project Area. Strengthening and expanding this research programmes to include animal genetic material is necessary. Specific areas for strengthening are biosystematics research, ecology research, conservation biology and sustainable resource management. Research and monitoring of biodiversity threatening processes also need to be strengthened. These needs could be achieved through augmenting and expanding existing University and Government staff and providing appropriate research budgets.

3. Application of Knowledge

Existing and acquired knowledge should not be simply kept in data banks, but should be used in a wide range of applications to the problems of biodiversity conservation and sustainable development. In particular it can be used in the development of new conservation areas; in applications of biotechnology in agriculture, fisheries and forestry; in broadening the scope of environmental impact assessment to include biodiversity considerations such as ecosystem functions and values and species and genetic diversity; in increasing support for gene and species banks; and in providing justification for increased funding to accelerate implementation of programmes aimed at biodiversity conservation and sustainable use.

New Programmes and Activities

This portion is largely left open for a wide range of interested persons to provide an input. New programmes and activities could emerge in areas such as clean and adequate water supply; sustainable use of land resources; creation of reserves and parks; and mechanisms to ensure environmentally responsive decision-making, impact assessments and audits, and emergency preparedness.

Appendix

UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY

Preamble

The Contracting Parties,

Conscious of the intrinsic value of biological diversity and other ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components,

Conscious also of the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere,

Affirming that the conservation of biological diversity is a common concern on humankind,

Reaffirming that States have Sovereign rights over their own biological resources,

Reaffirming also that States are responsible for conserving their biological diversity and for using their biological resources in a sustainable manner,

Concerned that biological diversity is being significantly reduced by certain human activities,

Aware of the general lack of information and knowledge regarding biological diversity and of the urgent need to develop scientific, technical and institutional capacities to provide the basic understanding upon which to plan and implement appropriate measures,

Noting that it is vital to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at source,

Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat,

Noting further that the fundamental requirement for the conservation of biological diversity is the *in-situ* conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings,

Noting further that *ex-situ* measures, preferably in the country of origin, also have an important role to play,

Recognizing the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components,

Recognizing also the vital role that women play in the conservation and sustainable use of biological diversity and affirming the need for the full participation of women at all levels of policy-making and implementation for biological diversity conservation,

Stressing the importance of, and the need to promote, international, regional and global cooperation among States and intergovernmental organizations and the non-governmental sector for the conservation of biological diversity and the sustainable use of its components,

Acknowledging that the provision of new and additional financial resources and appropriate access to relevant technologies can be expected to make a substantial difference in the world's ability to address the loss of biological diversity,

Acknowledging further that special provision is required to meet the needs of developing countries, including the provisions of new and additional financial resources and appropriate access to relevant technologies,

Noting in this regard the special condition of the least developed countries and small island States,

Acknowledging that substantial investments are required to conserve biological diversity and that there is the expectation of a broad range of environmental, economic and social benefits from those investments,

Recognizing that economic and social development and poverty eradication are the first and overriding priorities of developing countries,

Aware that conservation and sustainable use of biological diversity is of critical importance for meeting the food, health and other needs of the growing world population, for which purpose access to and sharing of both genetic resources and technologies are essential,

Noting that, ultimately, the conservation and sustainable use of biological diversity will strengthen friendly relations among States and contribute to peace for humankind,

Desiring to enhance and complement existing international arrangements for the conservation of biological diversity and sustainable use of its components, and

Determined to conserve and sustainably use biological diversity for the benefit of present and future generations,

Have agreed as follows:

Article 1
OBJECTIVES

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of 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, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

Article 2
USE OF TERMS

For the purposes of this Convention:

'*Biological diversity*' means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

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

'*Biotechnology*' means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

'*Country of origin of genetic resources*' means the country which possesses those genetic resources in *in-situ* conditions.

'*Country providing genetic resources*' means the country supplying genetic resources collected from *in-situ* sources, including populations of both wild and domesticated species, or taken from *ex-situ* sources, which may or may not have originated in that country.

'*Domesticated or cultivated species*' means species in which the evolutionary process has been influenced by humans to meet their needs.

'*Ecosystem*' means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

'*Ex-situ conservation*' means the conservation of components of biological diversity outside their natural habitats.

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

'*Genetic resources*' means genetic material of actual or potential value.

'*Habitat*' means the place or type of site where an organism or population naturally occurs.

'*In-situ conditions*' means conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

'*In-situ conservation*' means the conservation of ecosystems and natural habits and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

'*Protected area*' means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

'*Regional economic integration organization*' means an organization constituted by sovereign States of a given region, to which its member States have transferred competence in respect of matters governed by this Convention and which has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to it.

'*Sustainable use*' means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

'*Technology*' includes biotechnology.

Article 3
PRINCIPLE

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Article 4
JURISDICTIONAL SCOPE

Subject to the rights of other States, and except as otherwise expressly provided in this Convention, the provisions of this Convention apply, in relation to each Contracting Party:

(a) In the case of components of biological diversity, in areas within the limits of its national jurisdiction; and

(b) In the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.

Article 5
COOPERATION

Each Contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties, directly or, where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity.

Article 6
GENERAL MEASURES FOR CONSERVATION AND SUSTAINABLE USE

Each Contracting Party shall, in accordance with its particular conditions and capabilities:

(a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned; and

(b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

Article 7
IDENTIFICATION AND MONITORING

Each Contracting Party shall, as far as possible and as appropriate, in particular for the purposes of Articles 8 to 10:

(a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I;

(b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;

(c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and

(d) Maintain and organize, by any mechanism, data derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above.

Article 8
IN-SITU CONSERVATION

Each Contracting Party shall, as far as possible and as appropriate:

(a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;

(b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;

(c) Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;

(d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;

(e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas;

(f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, *inter alia*, through the development and implementation of plans or other management strategies;

(g) Establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts and could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health;

(h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species;

(i) Endeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components;

(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovation and practices;

(k) Develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations;

(l) Where a significant adverse effect on biological diversity has been determined pursuant to Article 7, regulate or manage the relevant processes and categories of activities; and

(m) Cooperate in providing financial and other support for *in-situ* conservation outlined in subparagraphs (a) to (l) above, particularly to developing countries.

Article 9
EX-SITU CONSERVATION

Each Contracting Party shall, as far as possible and as appropriate, and predominantly for the purpose of complementing *in-situ* measures:

(a) Adopt measures for the *ex-situ* conservation of components of biological diversity, preferably in the country of origin of such components;

(b) Establish and maintain facilities for *ex-situ* conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources;

(c) Adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions;

(d) Regulate and manage collection of biological resources from natural habitats for *ex-situ* conservation purposes so as not to threaten ecosystems and *in-situ* populations of species, except where special temporary *ex-situ* measures are required under subparagraph (c) above; and

(e) Cooperate in providing financial and other support for *ex-situ* conservation outlined in subparagraphs (a) to (d) above in the establishment and maintenance of *ex-situ* conservation facilities in developing countries.

Article 10
SUSTAINABLE USE OF ELEMENTS OF BIOLOGICAL DIVERSITY

Each Contracting party shall, as far as possible and as appropriate:

(a) Integrate consideration of the conservation and sustainable use of biological resources into national decision-making;

(b) Adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity;

(c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements;

(d) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced; and

(e) Encourage cooperation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.

Article 11
INCENTIVE MEASURES

Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.

Article 12
RESEARCH AND TRAINING

The Contracting Parties, taking into account the special needs of developing countries, shall:

(a) Establish and maintain programmes for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries;

(b) Promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, *inter alia*, in accordance with decisions of the Conference of the Parties taken in consequence of recommendations of the Subsidiary Body on Scientific, Technical and Technological Advice; and

(c) In keeping with the provisions of Articles 16, 18 and 20, promote and cooperate in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources.

Article 13
PUBLIC EDUCATION AND AWARENESS

The Contracting Parties shall:

(a) Promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes; and

(b) Cooperate, as appropriate, with other States and international organizations in developing educational and public awareness programmes, with respect to conservation and sustainable use of biological diversity.

Article 14
IMPACT ASSESSMENT AND MINIMIZING ADVERSE IMPACTS

1. Each Contracting party, as far as possible and as appropriate, shall:

(a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures;

(b) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account;

(c) Promote, on the basis of reciprocity, notification, exchange of information and consultation on activities under their jurisdiction or control which are likely to significantly affect adversely the biological diversity of other States or areas beyond the limits of national jurisdiction, by encouraging the conclusion of bilateral, regional or multilateral arrangements, as appropriate;

(d) In the case of imminent or grave danger or damage, originating under its jurisdiction or control, to biological diversity within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction, notify immediately the potentially affected States of such danger or damage, as well as initiate action to prevent or minimize such danger or damage; and

(e) Promote national arrangements for emergency responses to activities or events, whether caused naturally or otherwise, which present a grave imminent danger to biological diversity and encourage international cooperation to supplement such national efforts and, where appropriate and agreed by the States or regional economic integration organizations concerned, to establish joint contingency plans.

2. The Conference of the Parties shall examine, on the basis of studies to be carried out, the issue of liability and redress, including restoration and compensation, for damage to biological diversity, except where such liability is a purely internal matter.

Article 15
ACCESS TO GENETIC RESOURCES

1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.

2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.

3. For the purposes of this Convention, the genetic resources being provided by a Contracting Party, as referred to in this Article and Articles 16 and 19, are only those that are provided by Contracting Parties that are countries of origin of such resources or by the Parties that have acquired the genetic resources in accordance with this Convention.

4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.

5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.

6. Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.

7. Each Contracting party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanisms established by Articles 20 to 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resource. Such sharing shall be upon mutually agreed terms.

Article 16
ACCESS TO AND TRANSFER OF TECHNOLOGY

1. Each Contracting Party, recognizing that technology includes biotechnology, and that both access to and transfer of technology among Contracting Parties are essential elements for the attainment of the objectives of this Convention, undertakes subject to the provisions of this Article to provide and/or facilitate access for the transfer to other Contracting Parties of technologies that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment.

2. Access to and transfer of technology referred to in paragraph 1 above to developing countries shall be provided and/or facilitated under fair and most favourable terms, including on concessional and preferential terms where mutually agreed, and where necessary, in accordance with the financial mechanism established by Article 20 and 21. In the case of technology subject to patents and other intellectual property rights, such access and transfer shall be provided on terms which recognize and are consistent with the adequate and effective protection of intellectual property rights. The application of this paragraph shall be consistent with paragraphs 3, 4 and 5 below.

3. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, with the aim that Contracting Parties, in particular those that are developing countries, which provide genetic resources are provided access to and transfer of technology which makes use of those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights, where necessary, through the provisions of Articles 20 and 21 and in accordance with international law and consistent with paragraphs 4 and 5 below.

4. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, with the aim that the private sector facilitates access to, joint development and transfer of technology referred to in paragraph 1 above for the benefit of both governmental institutions and the private sector of developing countries and in this regard shall abide by the obligations included in paragraphs 1, 2 and 3 above.

5. The Contracting Parties, recognizing that patents and other intellectual property right may have an influence on the implementation of this Convention, shall cooperate in this regard subject to national legislation and internal law in order to ensure that such rights are supportive of and do not run counter to its objectives.

Article 17
EXCHANGE OF INFORMATION

1. The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.

2. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and survey in programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

Article 18
TECHNICAL AND SCIENTIFIC INFORMATION

1. The Contracting Parties shall promote international technical and scientific cooperation in the field of conservation and sustainable use of biological diversity, where necessary, through the appropriate international and national institutions.

2. Each Contracting Party shall promote technical and scientific cooperation with other Contracting Parties, in particular developing countries, in implementing this Convention, *inter alia*, through the development and implementation of national policies. In promoting such cooperation, special attention should be given to the development and strengthening of national capabilities, by means of human resources development and institution building.

3. The Conference of the Parties, at its first meeting, shall determine how to establish a clearing-house mechanism to promote and facilitate technical and scientific cooperation.

4. The Contracting Parties shall, in accordance with national legislation and policies, encourage and develop methods of cooperation for the development and use of technologies, in pursuance of the objectives of this Convention. For this purpose, the Contracting Parties shall also promote cooperation in the training of personnel and exchange of experts.

5. The Contracting Parties shall, subject to mutual agreement, promote the establishment of joint research programmes and joint ventures for the development of technologies relevant to the objectives of this Convention.

Article 19
HANDLING OF BIOTECHNOLOGY AND DISTRIBUTION OF ITS BENEFITS

1. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, to provide for the effective participation in biotechnological research activities by those Contracting Parties, especially developing countries, which provide the genetic resources for such research, and where feasible in such Contracting Parties.

2. Each Contracting Party shall take all practicable measures to promote and advance priority access on a fair and equitable basis by Contracting Parties, especially developing countries, to the results and benefits arising from biotechnologies based upon genetic resources provided by those Contracting Parties. Such access shall be on mutually agreed terms.

3. The Parties shall consider the need for the modalities of a protocol setting out appropriate procedures, including, in particular, advance informed agreement, in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity.

4. Each Contracting Party shall, directly or by requiring any natural or legal person under its jurisdiction providing the organisms referred to in paragraph 3 above, provide any available information about the use and safety regulations required by that Contracting Party in handling such organisms, as well as any available information on the potential adverse impact of the specific organisms concerned to the Contracting Party into which those organisms are to be introduced.

Article 20
FINANCIAL RESOURCES

1. Each Contracting Party undertakes to provide, in accordance with its capabilities, financial support and incentives in respect of those national activities which are intended to achieve the objectives of this Convention, in accordance with its national plans, priorities and programmes.

2. The developed country Parties shall provide new and additional financial resources to enable developing country Parties to meet the agreed full incremental costs to them of implementing measures which fulfil the obligations of this Convention and to benefit from its provisions and which costs are agreed between a developing country Party and the institutional structure referred to in Article 21, in accordance with policy, strategy, programme priorities and eligibility criteria and an indicative list of incremental costs established by the Conference of the Parties. Other Parties, including countries undergoing the process of transition to a market economy, may voluntarily assume the obligations of the developed country Parties. For the purpose of this Article, the Conference of the Parties, shall at its first meeting establish a list of developed country Parties and other Parties which voluntarily assume the obligations of the developed country Parties. The Conference of the Parties shall periodically review and if necessary amend the list. Contributions from other countries and sources on a voluntary basis would also be encouraged. The implementation of these commitments shall take into account the need for adequacy, predictability and timely flow of funds and the importance of burden-sharing among the contributing Parties included in the list.

3. The developed country Parties may also provide, and developing country Parties avail themselves of, financial resources related to the implementation of this Convention through bilateral, regional and other multilateral channels.

4. The extent to which developing country Parties will effectively implement their commitments under this Convention will depend on the effective implementation by developed country Parties of their commitments under this Convention related to financial resources and transfer of technology and will take fully into account the fact that economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties.

5. The Parties shall take full account of the specific needs and special situation of least developed countries in their actions with regard to funding and transfer of technology.

6. The Contracting Parties shall also take into consideration the special conditions resulting from the dependence on, distribution and location of, biological diversity within developing country Parties, in particular small island States.

7. Consideration shall also be given to the special situation of developing countries, including those that are most environmentally vulnerable, such as those with arid and semi-arid zones, coastal and mountainous areas.

Article 21
FINANCIAL MECHANISM

1. There shall be a mechanism for the provision of financial resources to developing country Parties for purposes of this Convention on a grant or concessional basis the essential elements of which are described in this Article. The mechanism shall function under the authority and guidance of, and be accountable to, the Conference of the parties for purposes of this Convention. The operations of the mechanism shall be carried out by such institutional structure as may be decided upon by the Conference of the parties at its first meeting. For purposes of this Convention, the Conference of the Parties shall determine the policy, strategy, programme priorities and eligibility criteria relating to the access to and utilization of such resources. The contributions shall be such as to take into account the need for predictability, adequacy and timely flow of funds referred to in Article 20 in accordance with the amount of resources needed to be decided periodically by the Conference of the Parties and the importance of burden-sharing among the contributing Parties included in the list referred to in Article 20, paragraph 2. Voluntary contributions may also be made by the developed country Parties and by other countries and sources. The mechanism shall operate within a democratic and transparent system of governance.

2. Pursuant to the objectives of this Convention, the Conference of the Parties shall at its first meeting determine the policy, strategy and programme priorities, as well as detailed criteria and guidelines for eligibility for access to and utilization of the financial resources including monitoring and evaluation on a regular basis of such utilization. The Conference of the Parties shall decide on the arrangements to give effect to paragraph 1 above after consultation with the institutional structure entrusted with the operation of the financial mechanism.

3. The Conference of the Parties shall review the effectiveness of the mechanism established under this Article, including the criteria and guidelines referred to in paragraph 2 above, not less than two years after the entry into force of this Convention and thereafter on a regular basis. Based on such review, it shall take appropriate action to improve the effectiveness of the mechanism if necessary.

4. The Contracting Parties shall consider strengthening existing financial institutions to provide financial resources for the conservation and sustainable use of biological diversity.

Article 22
RELATIONSHIP WITH OTHER INTERNATIONAL CONVENTIONS

1. The provisions of this Convention shall not affect the rights and obligations of any Contracting Party deriving from any existing international agreement, except where the exercise of those rights and obligations would cause serious damage or threat to biological diversity.

2. Contracting Parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of States under the law of the sea.

Article 23
CONFERENCE OF THE PARTIES

1. A Conference of the Parties is hereby established. The first meeting of the Conference of the Parties shall be convened by the Executive Director of the United Nations Environment Programme not later than one year after the entry into force of this Convention. Thereafter, ordinary meetings of the Conference of the Parties shall be held at regular intervals to be determined by the Conference at its first meeting.

2. Extraordinary meetings of the Conference of the Parties shall be held at such other times as may be deemed necessary by the Conference, or at the written request of any Party, provided that, within six months of the request being communicated to them by the Secretariat, it is supported by at least one third of the Parties.

3. The Conference of the Parties shall by consensus agree upon and adopt rules of procedure for itself and for any subsidiary body it may establish, as well as financial rules governing the funding of the Secretariat. At each ordinary meeting, it shall adopt a budget for the financial period until the next ordinary meeting.

4. The Conference of the Parties shall keep under review the implementation of this Convention, and, for this purpose, shall:

(a) Establish the form and the intervals for transmitting the information to be submitted in accordance with Article 26 and consider such information as well as reports submitted by any subsidiary body;

(b) Review scientific, technical and technological advice of biological diversity provided in accordance with Article 25;

(c) Consider and adopt, as required, protocols in accordance with Article 28;

(d) Consider and adopt, as required, in accordance with Articles 29 and 30, amendments to this Convention and its annexes;

(e) Consider amendments to any protocol, as well as to any annexes thereto, and, if so decided, recommend their adoption to the parties to the protocol concerned;

(f) Consider and adopt, as required, in accordance with Article 30, additional annexes to this Convention;

(g) Establish such subsidiary bodies, particularly to provide scientific and technical advice, as are deemed necessary for the implementation of this Convention;

(h) Contract, through the Secretariat, the executive bodies of conventions dealing with matters covered by this Convention with a view to establishing appropriate forms of cooperation with them; and

(i) Consider and undertake any additional actions that may be required for the achievement of the purposes of this Convention in the light of experience gained in its operation.

5. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State not Party to this Convention, may be represented as observers at meeting of the Conference of the Parties. Any other body or agency, whether governmental or non-governmental, qualified in fields relating to conservation and sustainable use of biological diversity, which has informed the Secretariat of its wish to be represented as an observer at a meeting of the Conference of the Parties, may be admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure adopted by the Conference of the Parties.

Article 24
SECRETARIAT

1. A Secretariat is hereby established. Its functions shall be:

(a) To arrange for and service meetings of the Conference of the Parties provided for in Article 23;

(b) To perform the functions assigned to it by any protocol;

(c) To prepare reports on the execution of its functions under this Convention and present them to the Conference of the Parties;

(d) To coordinate with other relevant international bodies and, in particular to enter into such administrative and contractual arrangements as may be required for the effective discharge of its functions; and

(e) To perform such other functions as may be determined by the Conference of the Parties.

2. At its first ordinary meeting, the Conference of the Parties shall designate the secretariat from amongst those existing competent international organizations which have signified their willingness to carry out the secretariat functions under this Convention.

Article 25
SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE

1. A subsidiary body for the provision of scientific, technical and technological advice is hereby established to provide the Conference of the Parties and, as appropriate, its other subsidiary bodies with timely advice relating to the implementation of this Convention. This body shall be open to participation by all Parties and shall be multidisciplinary. It shall comprise government representatives competent in the relevant field of expertise. It shall report to the Conference of the Parties on all aspects of its work.

2. Under the authority of and in accordance with guidelines laid down by the Conference of the Parties, and upon its request, this body shall:

(a) Provide scientific and technical assessment of the status of biological diversity;

(b) Prepare scientific and technical assessments of the effects of types of measures taken in accordance with the provisions of this Convention;

(c) Identify innovative, efficient and state-of-the-art technologies and know-how relating to the conservation and sustainable use of biological diversity and advise on the ways and means of promoting development and/or transferring such technologies;

(d) Provide advice on scientific programmes and international cooperation in research and development related to conservation and sustainable use of biological diversity; and

(e) Respond to scientific, technical, technological and methodological questions that the Conference of the Parties and its subsidiary bodies may put to the body.

3. The functions, terms of reference, organization and operation of this body may be further elaborated by the Conference of the Parties.

Article 26
REPORTS

Each Contracting party shall, at intervals to be determined by the Conference of the Parties, present to the Conference of the Parties, reports on measures which it has taken for the implementation of the provisions of this Convention and their effectiveness in meeting the objectives of this Convention.

Article 27
SETTLEMENT OF DISPUTES

1. In the event of a dispute between Contracting Parties concerning the interpretation or application of this Convention, the parties concerned shall seek solution by negotiation.

2. If the parties concerned cannot reach agreement by negotiation, they may jointly seek the good offices of, or request mediation by, a third party.

3. When ratifying, accepting, approving or acceding to this Convention, or at any time thereafter, a State or regional economic integration organization may declare in writing to the Depositary that for a dispute not resolved in accordance with paragraph 1 or paragraph 2 above, it accepts one or both of the following means of dispute as compulsory:

(a) Arbitration in accordance with the procedure laid down in Part 1 of Annex II;

(b) Submission of the dispute to the International Court of Justice.

4. If the parties to the dispute have not, in accordance with paragraph 3 above, accepted the same or any procedure, the dispute shall be submitted to conciliation in accordance with Part 2 of Annex II unless the parties otherwise agree.

5. The provisions of this Article shall apply with respect to any protocol except as otherwise provided in the protocol concerned.

Article 28
ADOPTION OF PROTOCOLS

1. The Contracting Parties shall cooperate in the formulation and adoption of protocols to this Convention.

2. Protocols shall be adopted at a meeting of the Conference of Parties.

3. The text of any proposed protocol shall be communicated to the Contracting Parties by the Secretariat at least six months before such a meeting.

Article 29
AMENDMENT TO THE CONVENTION OR PROTOCOLS

1. Amendments to this Convention may be proposed by any Contracting Party. Amendments to any protocol may be proposed by any Party to that protocol.

2. Amendments to this Convention shall be adopted at a meeting of the Conference of the Parties. Amendments to any protocol shall be adopted at a meeting of the Parties to the Protocol in question. The text of any proposed amendment to this Convention or to any protocol, except as may otherwise be provided in such protocol, shall be communicated to the Parties to the instrument in question by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate proposed amendments to the signatories to this Convention for information.

3. The Parties shall make every effort to reach agreement on any proposed amendment to this Convention or to any protocol by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a two-third majority vote of the parties to the instrument in question present and voting at the meeting, and shall be submitted by the Depositary to all Parties for ratification, acceptance or approval.

4. Ratification, acceptance or approval of amendments shall be notified to the Depositary in writing. Amendments adopted in accordance with paragraph 3 above shall enter into force among Parties having accepted them on the ninetieth day after the deposit of instrument of ratification, acceptance or approval by at least two-thirds of the Contracting Parties to this Convention or of the Parties to the protocol concerned, except as may otherwise be provided in such protocol. Thereafter the amendments shall enter into force for any other Party on the ninetieth day after that Party deposits its instrument of ratification, acceptance or approval of the amendments.

5. For the purposes of this Article, 'Parties present and voting' means Parties present and casting an affirmative or negative vote.

Article 30
ADOPTION AND AMENDMENT OF ANNEXES

1. The annexes to this Convention or to any protocol shall form an integral part of the Convention or of such protocol, as the case may be, and, unless expressly provided otherwise, a reference to this Convention or its protocols constitutes at the same time a reference to any annexes thereto. Such annexes shall be restricted to procedural, scientific, technical and administrative matters.

2. Except as may be otherwise provided in any protocol with respect to its annexes, the following procedure shall apply to the proposal, adoption and entry into force of additional annexes to this Convention or of annexes to any protocol:

(a) Annexes to this Convention or to any protocol shall be proposed and adopted according to the procedure laid down in Article 29;

(b) Any Party that is unable to approve an additional annex to this Convention or an annex to any protocol to which it is a Party shall so notify the Depositary, in writing, within one year from the date of the communication of the adoption by the Depositary. The Depositary shall without delay notify all Parties of any such notification received. A party may at any time withdraw a previous declaration of objection and the annexes shall thereupon enter into force for that party subject to subparagraph (c) below;

(c) On the expiry of one year from the date of the communication of the adoption by the Depositary, the annex shall enter into force for all Parties to this Convention or to any protocol concerned which have not submitted a notification in accordance with the provisions of subparagraph (b) above.

3. The proposal, adoption and entry into force of amendments to annexes to this Convention or to any protocol shall be subject to the same procedure as for the proposal, adoption and entry into force of annexes to the Convention or annexes to any protocol.

4. If an additional annex or an amendment to an annex is related to an amendment to this Convention or to any protocol, the additional annex or amendment shall not enter into force until such time as the amendment to the Convention or to the protocol concerned enters into force.

Article 31
RIGHT TO VOTE

1. Except as provided for in paragraph 2 below, each Contracting Party to this Convention or to any protocol shall have one vote.

2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States which are Contracting Parties to this Convention or the relevant protocol. Such organizations shall not exercise their right to vote if their member States exercise theirs, and vice versa.

Article 32
RELATIONSHIP BETWEEN THIS CONVENTION AND ITS PROTOCOLS

1. A State or a regional economic integration organization may not become a party to a protocol unless it is, or becomes at the same time, a Contracting party to this Convention.

2. Decisions under any protocol shall be taken only by the Parties to the protocol concerned. Any Contracting Party that has not ratified, accepted or approved a protocol may participate as an observer in any meeting of the parties to that protocol.

Article 33
SIGNATURE

This Convention shall be open for signature at Rio de Janeiro by all States and any regional economic integration organization from 5 June 1992 until 14 June 1992, and at the United Nations Headquarters in New York from 15 June 1992 to 4 June 1993.

Article
34
RATIFICATION, ACCEPTANCE OR APPROVAL

1. This Convention and any protocol shall be subject to ratification, acceptance or approval by States and by regional economic integration organizations. Instruments of ratification, acceptance or approval shall be deposited with the Depositary.

2. Any organization referred to in paragraph 1 above which becomes a Contracting Party to this Convention or any protocol without any of its member States being a Contracting Party shall be bound by all the obligations under the Convention or the protocol, as the case may be. In the case of such organizations, one or more of whose member States is a Contracting Party to this Convention or relevant protocol, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under the Convention or protocol, as the case may be. In such cases, the organization and the member States shall not be entitled to exercise rights under the Convention or relevant protocol concurrently.

3. In their instruments of ratification, acceptance or approval, the organizations referred to in paragraph 1 above shall declare the extent of their competence with respect to the matters governed by the Convention or the relevant protocol. These organizations shall also inform the Depositary of any relevant modification in the extent of their competence.

Article
35
ACCESSION

1. This Convention and any protocol shall be open for accession by States and by regional economic integration organizations from the date on which the Convention or the protocol concerned is closed for signature. The instruments of accession shall be deposited with the Depositary.

2. In their instruments of accession, the organizations referred to in paragraph 1 above shall declare the extent of their competence with respect to the matters governed by the Convention or the relevant protocol. These organizations shall also inform the Depositary of any relevant modification in the extent of their competence.

3. The provisions of Article 34, paragraph 2, shall apply to regional economic integration organizations which accede to this Convention or any protocol.

Article
36
ENTRY INTO FORCE

1. This Convention shall enter into force on the ninetieth day after the date of deposit of the thirtieth instrument of ratification, acceptance, approval or accession.

2. Any protocol shall enter into force on the ninetieth day after the date of deposit of the number of instruments of ratification, acceptance, approval or accession, specified in that protocol, has been deposited.

3. For each Contracting Party which ratifies, accepts or approves this Convention or accedes thereto after the deposit of the thirtieth instrument of ratification, acceptance, approval or accession, it shall enter into force on the ninetieth day after the date of deposit by such Contracting party of its instrument of ratification, acceptance, approval or accession.

4. Any protocol, except as otherwise provided in such protocol, shall enter into force for a Contracting party that ratifies, accepts or approves that protocol or accedes thereto after its entry into force pursuant to paragraph 2 above, on the ninetieth day after the date on which that Contracting Party deposits its instrument of ratification, acceptance, approval or accession, or on the date on which this Convention enters into force for that Contracting Party, whichever shall be the later.

5. For the purposes of paragraph 1 and 2 above, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by member States of such organization.

Article 37
RESERVATIONS

No reservations may be made to this Convention.

Article 38
WITHDRAWALS

1. At any time after two years from the date on which this Convention has entered into force for a Contracting party, that Contracting Party may withdraw from the Convention by giving written notification to the Depositary.

2. Any such withdrawal shall take place upon expiry of one year after the date of its receipt by the Depositary, or on such later date as may be specified in the notification of the withdrawal.

3. Any Contracting Party which withdraws from this Convention shall be considered as also having withdrawn from any protocol to which it is party.

Article 39
FINANCIAL INTERIM ARRANGEMENTS

Provided that it has been fully restructured in accordance with the requirements of Article 21, the Global Environmental Facility of the United Nations Development Programme, the United Nations Environment Programme and the International Bank for Reconstruction and Development shall be the institutional structure referred to in Article 21 on the interim basis, for the period between the entry into force of this Convention and the first meeting of the Conference of the Parties or until the Conference of the Parties decides which institutional structure will be designated in accordance with Article 21.

Article 40
SECRETARIAT INTERIM ARRANGEMENTS

The Secretariat to be provided by the Executive Director of the United Nations Environment Programme shall be the secretariat referred to in Article 24, paragraph 2, on an interim basis for the period between the entry into force of this Convention and the first meeting of the Conference of the Parties.

Article 41
DEPOSITARY

The Secretary-General of the United Nations shall assume the functions of Depositary of this Convention and any protocols.

Article 42
AUTHENTIC TEXTS

The original of this Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

IN WITNESS WHEREOF the undersigned, being duty authorized to that effect, have signed this Convention.

Done at Rio de Janeiro on this fifth day of June, one thousand nine hundred and ninety-two.

ANNEX I

IDENTIFICATION AND MONITORING

1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species, of social, economic, cultural or scientific importance; or which are representative, unique or associated with key evolutional or other biological processes;

2. Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and

3. Described genomes and genes of social, scientific or economic importance.

ANNEX II

Part 1
ARBITRATION

Article 1

The claimant party shall notify the secretariat that the parties are referring a dispute to arbitration pursuant to Article 27. The notification shall state the subject-matter of arbitration and include, in particular, the articles of the Convention or the protocol, the interpretation or application of which are at issue. If the parties do not agree on the subject matter of the dispute before the President of the tribunal is designated, the arbitral tribunal shall determine the subject matter. The secretariat shall forward the information thus received to all Contracting Parties to this Convention or to the protocol concerned.

Article 2

1. In disputes between two parties, the arbitral tribunal shall consist of three members. Each of the parties to the dispute shall appoint an arbitrator and the two arbitrators so appointed shall designate by common agreement the third arbitrator who shall be the President of the tribunal. The latter shall not be a national of one of the parties to the dispute, nor have his or her usual place of residence in the territory of one of these parties, nor be employed by any of them, nor have dealt with the case in any other capacity.

2. In disputes between more than two parties, parties in the same interest shall appoint one arbitrator jointly by agreement.

3. Any vacancy shall be filled in the manner prescribed for the initial appointment.

Article 3

1. If the President of the arbitral tribunal has not been designated within two months of the appointment of the second arbitrator, the Secretary-General of the United Nations shall, at the request of a party, designate the President within a further two-month period.

2. If one of the parties to the dispute does not appoint an arbitrator within two months of receipt of the request, the other party may inform the Secretary-General who shall make the designation within a further two-month period.

Article 4

The arbitral tribunal shall render its decisions in accordance with the provisions of this Convention, any protocols concerned, and international law.

Article 5

Unless the parties to the dispute otherwise agree, the arbitral tribunal shall determine its own rules of procedure.

Article 6

The arbitral tribunal may, at the request of one of the parties, recommend essential interim measures of protection.

Article 7

The parties to the dispute shall facilitate the work of the arbitral tribunal and, in particular, using all means at their disposal, shall:

(a) Provide it with all relevant documents, information and facilities; and

(b) Enable it, when necessary, to call witnesses or experts and receive their evidence.

Article 8

The parties and the arbitrators are under an obligation to protect the confidentiality of any information they receive in confidence during the proceedings of the arbitral tribunal.

Article 9

Unless the arbitral tribunal determines otherwise because of the particular circumstances of the case, the costs of the tribunal shall be borne by the parties to the dispute in equal shares. The tribunal shall keep a record of all its costs, and shall furnish a final statement thereof to the parties.

Article 10

Any Contracting Party that has an interest of a legal nature in the subject-matter of the dispute which may be affected by the decision in the case, may intervene in the proceedings with the consent of the tribunal.

Article 11

The tribunal may hear and determine counterclaims arising directly out of the subject-matter of the dispute.

Article 12

Decisions both on procedure and substance of the arbitral tribunal shall be taken by a majority vote of its members.

Article 13

If one of the parties to the dispute does not appear before the arbitral tribunal or fails to defend its case, the other party may request the tribunal to continue the proceedings and to make its award. Absence of a party or a failure of a party to defend its case shall not constitute a bar to the proceedings. Before rendering its final decision, the arbitral tribunal must satisfy itself that the claim is well founded in fact and law.

Article 14

The tribunal shall render its final decision within five months of the date on which it is fully constituted unless it finds it necessary to extend the time-limit for a period which should not exceed five more months.

Article 15

The final decision of the arbitral tribunal shall be confined to the subject-matter of the dispute and shall state the reasons on which it is based. It shall contain the names of the members who have participated and the date of the final decision. Any member of the tribunal may attach a separate or dissenting opinion to the final decision.

Article 16

The award shall be binding on the parties to the dispute. It shall be without appeal unless the parties to the dispute have agreed in advance to an appellate procedure.

Article 17

Any controversy which may arise between the parties to the dispute as regards the interpretation or manner of implementation of the final decision may be submitted by either party for decision to the arbitral tribunal which rendered it.

Part 2
CONCILIATION

Article 1

A conciliation commission shall be created upon the request of one of the parties to the dispute. The commission shall, unless the parties otherwise agree, be composed of five members, two appointed by each Party concerned and a President chosen jointly by those members.

Article 2

In disputes between more than two parties, parties in the same interest shall appoint their members of the commission jointly by agreement. Where two or more parties have separate interests or there is a disagreement as to whether they are of the same interest, they shall appoint their members separately.

Article 3

If any appointment by the parties is not made within two months of the date of the request to create a conciliation commission, the Secretary-General of the United Nations shall, if asked to do so by a party, designate a President within a further two-month period.

Article 4

If the President of the conciliation commission has not be chosen within two months of the last of the members of the commission being appointed, the Secretary-General of the United Nations shall, if asked to do so by a party, designate a President within a further two-month period.

Article 5

The conciliation commission shall take its decisions by majority vote of its members. It shall, unless the parties to the dispute otherwise agree, determine its own procedure. It shall render a proposal for resolution of the dispute, which the parties shall consider in good faith.

Article 6

A disagreement as to whether the conciliation commission has competence shall be decided by the commission.

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