

**Ministério para a Coordenação da Acção
Ambiental
(MICOA)**

2nd Draft

**Strategy and Areas for Action
for the Conservation of
Biological Diversity in Mozambique**

Maputo, September 1997

PREFACE

The compilation of the *Strategy and Areas for Action for the Conservation of Biodiversity in Mozambique* was accomplished through the assistance of several agencies and dedicated individuals.

Financial support was provided by UNEP and DANIDA, Maputo – without this assistance the formulation of the *Strategy* and associated activities would not have been possible.

Several Mozambican scientists from a variety of agencies contributed to the preparation of this document. As such, the contents truly reflect our knowledge regarding the current status and use of Mozambique's biodiversity.

The *Strategy* represents a further commitment of Mozambique to the objectives of the Convention on biodiversity. The Ministry for the Coordination of Environmental Affairs (MICQA) will coordinate the implementation of activities with the full participation, and in collaboration with, all sectors of Mozambique society on adoption of the *Strategy* by the Government of Mozambique.

Through the adoption of the *Strategy*, there will be a unique opportunity for the conservation and sustainable use of Mozambique's biological resources – in essence, a further contribution to the sustainable development of Mozambique for the benefit of the country and her people.

Following the consolidation of peace Mozambican researchers now have the challenging opportunity to carry out detailed biological surveys throughout the country. Through enhancing our knowledge of the status of Mozambique's Biodiversity it will be possible to develop, up-date and improve the *Strategy* and activities for the conservation of Mozambique's biological resources.

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Strategy and Areas for Action for the Conservation of Biodiversity in Mozambique

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PART I – BACKGROUND

1. ABOUT THE STRATEGY

Biological diversity has gained increasing attention throughout the world since the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in 1992. Since UNCED the majority of countries have signed and ratified the Convention on Biological Diversity, including the Government of Mozambique (GOM) which signed the Convention in 1993 and ratified it in 1995.

The convention grew out of a global recognition of the importance of conserving biological diversity, not least because it forms the basis for human existence.

Many controversial issues and concerns have surfaced for countries seeking to promote economic development on the one hand and maintain biological diversity on the other - the challenge of sustainable development. These challenges are particularly significant for the so-called developing countries such as Mozambique.

Purpose and Scope of the Strategy

Article 6 of the Convention on Biological Diversity calls upon all parties to develop national strategies reflecting the measures set out in the Convention. The **first** purpose of this strategy is to meet this requirement of the Convention.

Biological diversity, as defined in the CBD is a very broad concept. The number of issues that need to be addressed in order to be able to conserve biological diversity is immense, and includes both technical, legal, political, cultural and socio-economic aspects. This calls for the active participation of all parts of society, including government ministries, institutions, local communities and the private sector.

Conservation of biodiversity can be said to be the ultimate goal of all activities related to nature and environmental policies. However, there is a need to limit the scope of this strategy to the priority issues that have the most direct influence on biodiversity and therefore most urgently need attention. In this respect the Strategy represents a first attempt to put these important prioritized issues forcefully on the future agenda of our country.

The nature of the task of conserving biodiversity also calls for a well co-ordinated and cross-sectoral approach, given that many of the problems faced are not confined to just one sector, but involves several stakeholders and sectors.

Consequently, the **second** purpose of the strategy is to identify issues for which national action will be taken as a matter of priority and for which there is an immediate need for co-ordination of efforts. For some of the issues covered by the strategy there will be a need to develop more detailed actions plans.

The **third** purpose of the Strategy is to serve as an instrument that will help government agencies and society in general in ensuring that the overall government policy goals related to biodiversity are realised, principally through efforts to co-ordinate relevant sectoral policies, programmes and strategies.

Legal and Institutional Framework and Policy

The newly formed Ministry for the Co-ordination of Environmental Affairs (MICOA) has been tasked to promote and co-ordinate the implementation of sound environmental policies, and for this purpose the ministry has drawn up the National Environment Management Programme (NEMP).

Based on the NEMP the Environmental Law was passed by the Mozambican Government in July 1997. The objective of the Law is to provide a legal framework for the correct use and management of the environment and its components to ensure sustainable development.

The Law recognizes the responsibility of the Government of Mozambique to promote and implement the National Environment Management Programme. In order to ensure the effective co-ordination and integration of policies and activities related to environmental management a National Commission for Sustainable Development (NCSD) is created by way of the Law. The NCSD is a consultative body directly linked to the Council of Ministers (the Cabinet).

The law contains provisions directly related to conservation of biodiversity, prohibiting all activities that adversely affect the conservation, reproduction, quality and quantity of biological resources especially those threatened with extinction. The law also calls for the special protection of plant species threatened with extinction or those botanical components, isolated or in groups, requiring protection due to their genetic potential biological, cultural or scientific value. It also obliges the Government to ensure that adequate measures are taken with regards to the maintenance and regeneration of animal species, rehabilitation of degraded habitats and the creation of new habitats through the control of activities or the use of substances likely to prejudice faunal species and their habitats.

By passing the new Environmental Law, and by drawing up the NEMP the Government of Mozambique clearly shows that it is fully committed to pursuing sustainable development pathways and to promoting the conservation of biological diversity.

This Strategy will serve to strengthen and focus MICOA's efforts in relation to conservation and sustainable use of biodiversity. In order to co-ordinate activities outlined in this strategy it is considered to set up a biodiversity unit.

The Strategy Process

In recognition of its commitment to the Convention the GOM in 1996 tasked the Ministry for the Co-ordination of Environmental Affairs to draw up a National Biodiversity Strategy and Action Plan. Shortly thereafter, the Ministry appointed local consultants to draft National Strategies for four key sectoral areas namely: fauna, flora, marine and coastal resources and genetic resources. These sectoral papers were edited and compiled into a single draft strategy document, the first draft National Strategy.

The first draft document was widely distributed in Mozambique for comment and discussion and, through a consultative process involving Government agencies, non-governmental organisations, community associations and private sector, the National Biodiversity Strategy was agreed upon.

The Strategy document represents, therefore, the culmination of a long process involving sectoral studies, public participation and refinement.

At the same time it should be seen as the starting point for a continued dialogue both within government itself and with all other relevant stakeholders. The strategy should in due time be reviewed and revised taking into account the experiences and developments during the first implementation period and issues.

Where necessary the strategy should be refined and followed up by more detailed action plans.

What is biological diversity

Biological diversity, or biodiversity, is a very broad concept as it incorporates the total variation in nature. In the Convention on Biological Diversity it is defined as:

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

From this definition three levels of diversity can be distinguished:

1. Genetic diversity - which includes the hereditary variation both within a population of species and between populations, including the variation caused by human interference (such as the hundreds of varieties of sorghum and finger millet in Africa)

2. Species diversity - refers to the variety of species - wild or domesticated - within a geographical area. Such diversity is unusually measured as species "richness" - i.e. the number of species within a particular area . The approximate number of mammal, bird and plant species for southern African countries is shown in Box 1.

BOX 1.			
NUMBER OF SPECIES			
Approximate number of species of selected groups of animals and plants for some southern African countries			
COUNTRY	MAMMALS	BIRDS	PLANTS
Angola	275	872	5.000
Botswana	187	630	2.000
Malawi	187	630	3.600
Mozambique	205	581	5.500
Namibia	190	640	3.159
S. Africa	283	774	20.300
Zambia	228	732	4.600

3. Ecosystem (or habitat) diversity - refers to the interacting systems of living and non-living components found in nature, and which form functional units. Such interacting systems are found at many scales, e.g. at the small scale a rotting log on a forest floor and at the larger scale the whole forest. The "boundaries" between ecosystems are not always easy to identify, but as long as a consistent set of criteria is used to define the ecosystems, their distribution can be established.

Besides genetic, species and ecosystem diversity several other expressions related to biodiversity are important. These include the relative abundance of species (rare, common or abundant) their distribution (restricted, cosmopolitan etc.), the age structure of populations, the pattern of communities in a region and changes in community composition and structure over time. This additional information is important in order to meet specific management or policy goals related to biodiversity conservation.

Why is biodiversity important for Mozambique?

Human existence

Biological diversity forms the basis for human survival. People throughout the world rely totally on raw materials from nature for subsistence and industry. Disrupted ecosystems which have suffered loss of species and valuable genetic diversity are less able to support human needs.

In rural Mozambique, the small-scale farming system (comprising cultivated, fallow and grazing subsystems) is but one component of the overall natural resource base that contributes to the livelihood of the local communities. Natural habitats such as forests, edaphic grasslands, mangroves, freshwater lakes and rivers, inter-tidal zones and littoral waters provide many additional services and goods.

Farming activities are dependent on improved varieties of plants and animals. The small-scale farmers have for generations selected the material that were most suited to local conditions as their basis for agriculture.

In addition, crop and livestock species and varieties often suffer from diseases and parasites. The wild relatives to these species can often be used to increase their genetic "strength" and their resistance to disease. Some of the wild crop relatives found in Mozambique are shown in Table 1:

Table 1. Wild crop relatives found in Mozambique

SPECIES NAME	COMMON NAME	LOCAL NAME
Cereals		
<i>Pennisetum</i> sp.		Mexoeira
<i>Sorghum</i> spp.	Sorghum	Mapira Nfawa
<i>Oryza longistaminata</i>	Wild rice	Arroz
<i>O. punctata</i>	Wild rice	Bombo
<i>Leersia hexandra</i>		Lihoca

SPECIES NAME	COMMON NAME	LOCAL NAME
Legumes		
<i>Vigna unguiculata</i>	Cowpea	Feijao Nhemba
<i>V. vexillata</i>		
Oilseeds		
	Wild sunflowers	
Cash crops		
<i>Gossypium</i> spp.	Wild cotton	Algodão Tonge
<i>Coffea</i> spp.	Wild coffee	Café; Kopfi
Root and tubers		
<i>Impomea</i> spp.	Wild yam	Tingwelane

Ecosystem structure and function

The Convention recognises the importance of biodiversity for evolution and for maintaining life sustaining systems. In other words biodiversity is essential for the functioning and structure of ecosystems, and therefore also for providing many essential processes that keep humans and other species alive e.g. erosion control, maintenance of soil fertility, maintenance of aquifers, shade etc.

Medicinal purposes

Most of the important traditional and modern medicines are derived from wild plants, animals, fungi and bacteria. Scientists continue to discover new cures from species previously thought to have little or no value to people. Increasing attention is being given to marine resources as potential medicines.

In Mozambique, medicinal plants are used by an estimated 80% of the population and the important role of traditional healers in Mozambican society is gaining increasing recognition.

Cultural values

Sacred and cultural sites such as sacred forests, sacred pools and streams and montane areas play a central role in the lives of rural communities. The conservation and management of these sites falls usually falls under the responsibility of traditional leaders.

Intrinsic value

The Convention recognises that independent of the value to human beings all components of biodiversity have an inherent right to exist.

The Overall Goal of the Strategy

The Strategy comprises a series of strategic objectives and associated areas for action to conserve and sustainably use Mozambique's biological diversity.

THE OVERALL GOAL OF MOZAMBIQUE'S BIODIVERSITY STRATEGY

THE OVERALL GOAL IS THE CONSERVATION OF BIOLOGICAL DIVERSITY AND THE MAINTENANCE OF THE ECOLOGICAL SYSTEMS AND PROCESSES TAKING INTO ACCOUNT THE NEED FOR SUSTAINABLE DEVELOPMENT AND A FAIR AND EQUITABLE DISTRIBUTION OF THE BENEFITS ARISING FROM THE USE OF BIOLOGICAL DIVERSITY

2. SALIENT BIOPHYSICAL FEATURES OF MOZAMBIQUE

LOCATION AND GEOGRAPHY

Mozambique occupies the southeastern seaboard of Africa from the Rovuma River mouth (10°30'S) to the South African border (26°49'S). It is bounded by Tanzania in the north, by Malawi, Zambia, Zimbabwe, South Africa and Swaziland in the west, and by the Indian Ocean in the east. It has an area of 784 755 km² and an estimated (1994) population of 16,000, 000.

The northern part of the country is a great mountainous block with maximum elevations along the eastern edge of the East African Rift Valley system (Figure 1).

The central region is dominated by the lower Zambezi Valley and its delta plains, but in the interior, in Tete Province, the rims of the valley are mountainous. The Shire River, draining Lake Malawi, enters the Zambezi in the lowlands.

The southern part of the country, south of Beira (19°49'S/34°52'E), comprises a broad coastal plain backed by mountains along the western national border.

CLIMATE

For most of the year the weather is dominated by the high pressure system which prevails over the southern African Plateau, but NE and SE air streams from the Indian Ocean bring rain during the months of October-March.

The entire coastline receives 800-900 mm of rain a year, with four more humid pockets on SW-NE stretches of coast

In southern Mozambique rainfall is relatively high on the coast (c. 750mm per annum), from where it decreases rapidly on passing inland, but rises again on the slopes of the Libombo mountains along the western borders. The interior of Gaza Province on the border with South Africa/Zimbabwe is semi-arid (annual rainfall less than 400 mm per annum) .

The north of the country is generally more humid than the south except for part of the lower Zambezi Valley in Tete Province, which receives less than 600 m/yr. There are a series of very humid pockets along the western border on the upper slopes of the mountains on the border with Zimbabwe. Rainfall also exceeds 1500 mm/yr. on the isolated Gorongosa Massif (18°30'S/34°03'E), standing midway between the western highlands and Beira on the coast. All the higher mountainous areas north of the Zambezi are wet.

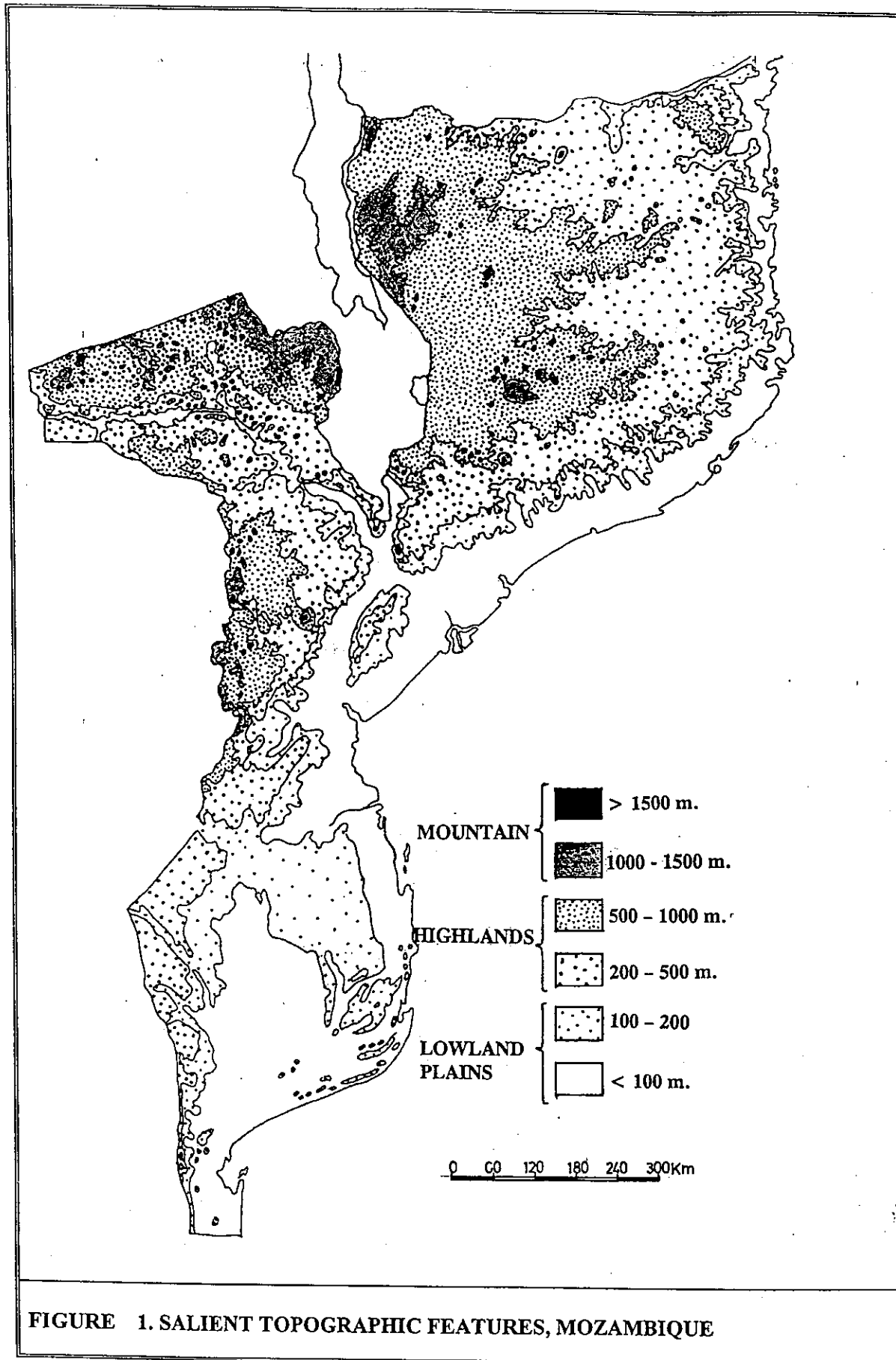


FIGURE 1. SALIENT TOPOGRAPHIC FEATURES, MOZAMBIQUE

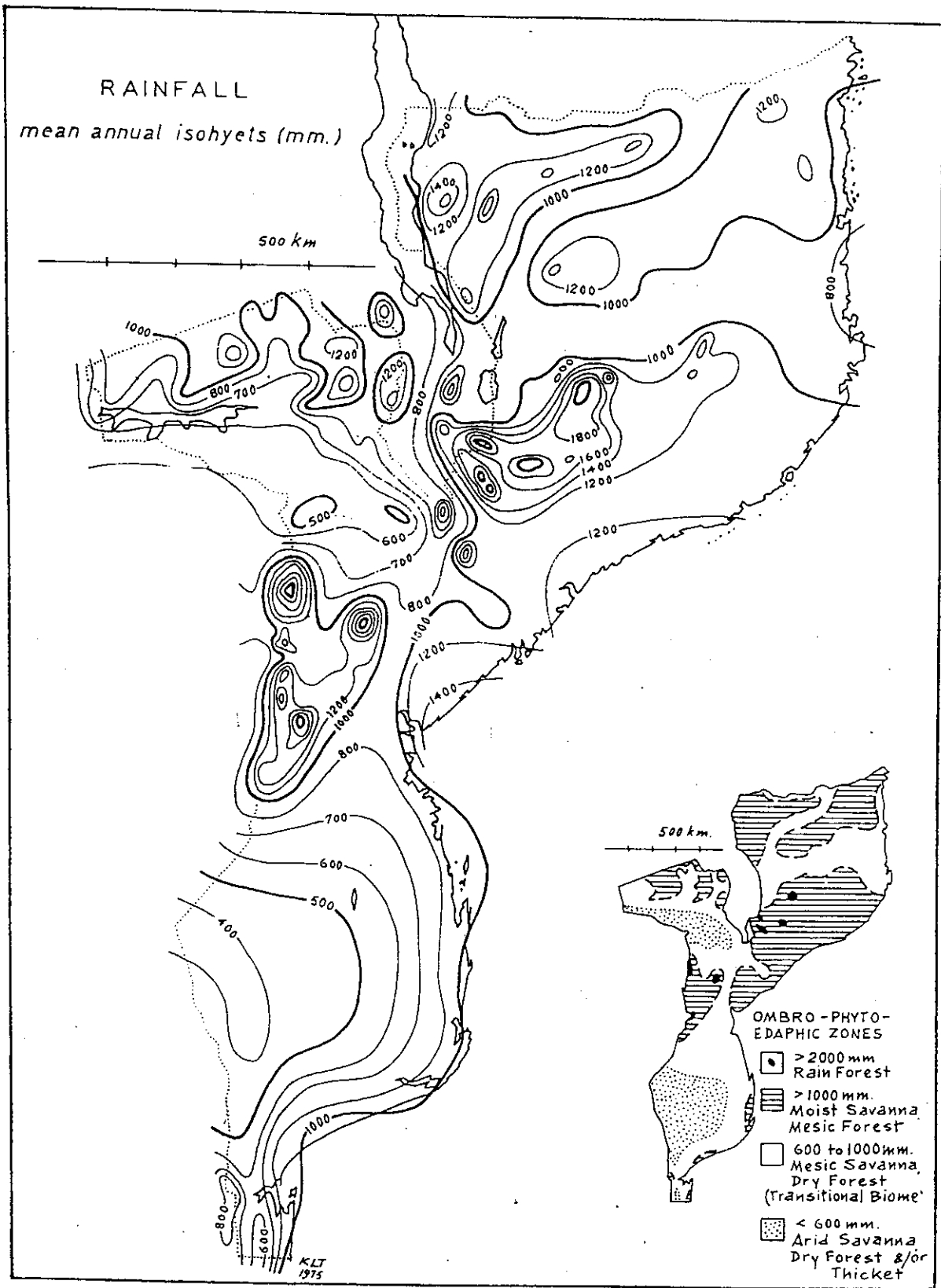


FIGURE 2. MEAN ANNUAL RAINFALL ISOHYETS AND (LOWER MAP) ASSOCIATED ECOZONES

There is a close relationship between broad "ecozones" and precipitation. Areas receiving >2000mm per annum are characterized by rain forest - with decreasing rainfall there is a gradation from moist to arid savanna (Figure 2).

FLORA AND VEGETATION

Flora

More than 5500 plants species have been recorded for Mozambique although the actual number of species is undoubtedly much higher (Table 1). It is estimated that 250 plant species may be endemic.

Table 1. Summary of plant biodiversity in Mozambique

	Families	Genera	Species	Endangered
Higher vascular plants	173	1375	4810	7
Pteridophytes	20	37	103	3
Bryophytes	-	-	-	-
Marine Algae	59	165	338	-
Fresh Water Algae	32	76	207	-
Fungus	5	59	183	-
Total	289	1712	5.641	10

Vegetation

Miombo Woodland is the most extensive vegetation type and dominates in the north and centre of the country. Dominant tree species are *Brachystegia* spp. often mixed with *Julbernardia globiflora*. Several types of miombo occur in Mozambique.

The second most extensive vegetation type is Mopane Woodland occurring in the Limpopo-Save area and upper Zambezi Valley dominated by the tree species *Colophospermum mopane*. Other commonly occurring tree species include *Adansonia digitata* ("imbondeiro" or "baobab"), *Azelia quanzensis* ("chamfuta") and *Sterculia rogersii*.

Small "islands" of Afromontane habitats comprising moist forests and montane grasslands occur along the eastern border with Zimbabwe and Malawi where the Mozambican plains rise up sharply to the western rim of the great southern African plateau. These areas are recognized for their high levels of biodiversity and endemism.

Inland halophytic communities are widespread in the valley of the Changane, a tributary of the Limpopo comprising succulent plants such as *Arthrocnemum* sp., *Chenolea* and *Salicornia* and scattered bushes of *Atriplex*, *Suaeda*, etc.

Vegetation formations on alluvial plains are predominant in the Zambezi, Limpopo and Nkomati valleys. Fringing forest comprising woody species *Ficus* spp., *Syzygium cordatum* and *Kigelia africana* occur along the immediate banks of the Rivers. Behind this zone the plains are periodically flooded and badly drained with extensive grasslands..

The coastal zone comprises a complex mosaic of several different vegetation types including dune forest, forest, woodland, grassland, deltaic floodplains and mangroves. Mangrove forests are floristically well developed in the northern and central sectors of the coast and less so along the southern sector.

Twenty two broad vegetation types that can be recognized (see Figure 3) although at more detailed scale it is possible to distinguish many more subtypes:

1. Libombos Woodland & Shrubland (*Combretum* spp, *Pterocarpus rotundifolius*, *Bauhinia galpinii*, *Peltophorum africanum*, *Ziziphus mucronata*, *Pavetta delagoensis*, *Strychnos innocua* subsp. *dysophylla*, *Dichrostachys cinerea*, *Acacia nigrescens*, and *A. swazica*, *A. caffra*, *Erythroxylum*)
2. Acacia Woodland
3. Sublittoral Forest & woodland, southern Mozambique. *Albizia-Afzelia-Sclerocarya*
4. Mopane woodland (*Colophospermum mopane*)
5. Palm Savanna (*Phoenix reclinata*, *Hyphaene crinita*)
6. Deciduous Miombo woodland (*Berlinia orientalis*, *Brachystegia spiciformis*, *Julbernardia*, *Pteleopsis myrtifolia*.)
7. Dry Deciduous Miombo (*Brachystegia spiciformis* - *Julbernardia globiflora* - *Afzelia* - *Sideroxylon* - *Balanites*)

8. Tardily Deciduous Miombo (Lowland Type) (*Brachystegia spiciformis*, *B. boehmii*, *Julbernardia globiflora*)
9. Tardily Deciduous Miombo, North–Eastern Median Altitude (*Brachystegia utilis*, *B. boehmii*, *B. spiciformis* and *Brachystegia* spp)
10. Semi-Moist Deciduous Miombo – Median Altitude (*Brachystegia spiciformis*-*Julbernardia globiflora*)
11. High Rainfall Moist Miombo (*Brachystegia spiciformis* *Pteleopsis*, *Erythrophleum* and *Newtonia*)
12. Deciduous (Basement complex) Woodland (*Pterocarpus*-*Combretum*-*Pericopsis*-*Acacia*).
13. Mixed Boabab Woodland (*Adansonia digitata*, *Sterculia africana*, *Kirkia acuminata*, *Cordyla africana*, *Sterculia appendiculata*, *Millettia stuhlmanni*)
14. Forest Woodland Mosaic (*Pteleopsis*-*Erythrophleum*-*Brachystegia*)
15. Moist Semi Deciduous Forests Eastern Mozambique (*Pteleopsis myrtifolia*, *Erythrophleum*, *Newtonia* or *Millettia*)
16. Littoral Thicket and Forest of Recent Dunes (*Diospyros rotundifolia*, *Euclea natalensis* and *Mimusops caffra*).
17. Dry Conifer Forests (Montane) (*Widdringtonia*, *Podocarpus* or *Juniperus*)
18. Moist Evergreen Forest (*Maranthes polyandra*, *Khaya*, *Aphloia*, *Macaranga*)
19. Swamp/Sudd (*Cyperus papyrus*, *Cyperus* spp. and *Phragmites*)
20. Vegetation on Alluviums (*A. xanthophloea*, *Ficus* spp., (often dominant), *Trichilia emetica*, *Kigelia africana*, and *Xanthocerra zambeziaca*).
21. Vegetation on Saline Soils (*Arthrocnemum* sp. *Chenolea*, *Salicornia*, *Atriplex*, *Suaeda*, etc)
22. Mangroves. *Sonneratia alba* (which occurs north of Xai-Xai) is a seaward pioneer. Other tree species include *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Ceripos tagal*, *Avicennia marina* and *Xylocarpus granatum*.

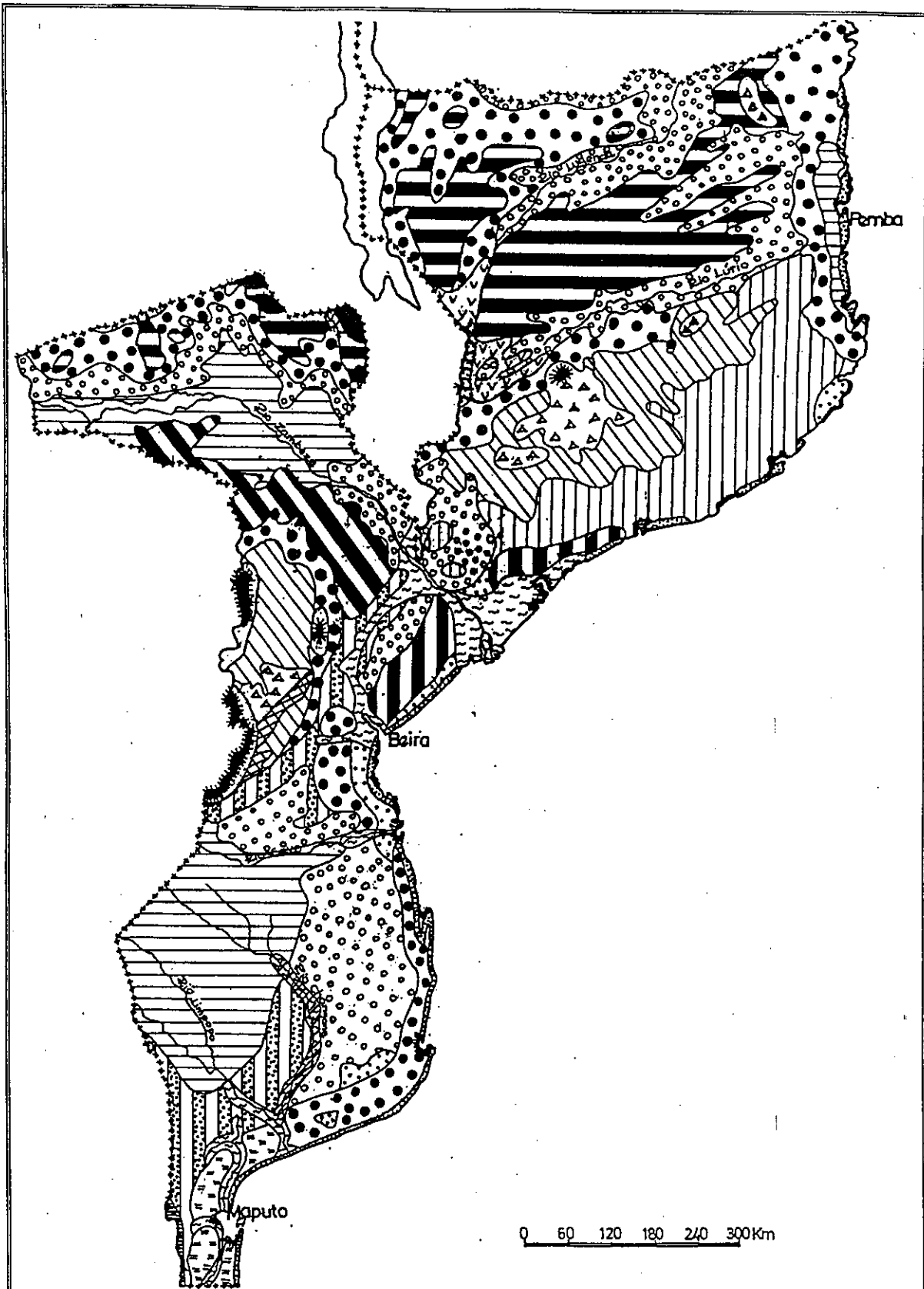


FIGURE 3 . VEGETATION TYPES OF MOZAMBIQUE (ADAPTED FROM WILD & BARBOSA, 1967)

TERRESTRIAL ANIMAL BIODIVERSITY

The terrestrial fauna of Mozambique are drawn from the broad Ethiopian Realm, and the species are, therefore, shared with many of the neighbouring countries (Table 2.)

Table 2 Summary of terrestrial animal species in Mozambique

Group	Species
Mammals	222
Birds	581
Reptiles	167
Amphibia	39
Total	4083

Terrestrial Mammals

According to Smithers and Tello (1970) there are 222 mammal species in Mozambique. Several endemic mammal subspecies occur including the Blue Niassa Wildebeest (*Connochaetes taurinus johnstoni*) is characterized by a white band across the muzzle (believed to be endangered) and a sub-species of Burchell's Zebra (*Equus burchelli* subsp. *bohmi*) both of which occur in northern Mozambique

Birds

The avifauna of Mozambique is generally shared with neighbouring countries. Five hundred and eighty-one species have been recorded for Mozambique.

There are a number of near endemic species and restricted range species, mostly associated with isolated montane habitats such as the Gorongosa Massif, the Chipirone and Namuli Mountains and the Njesi plateau.

Herpetofauna (Reptiles and Amphibians)

The herpetofauna of Mozambique are not well documented, especially the amphibians.

Reptiles

One hundred and sixty seven (167) reptile species have been recorded for Mozambique

The conservation status of reptiles, with the exception of sea turtles, is largely unknown. Sixty reptile species (including 34 species of snake) have been recorded for the Chimanimani Massif of which one is endemic (*Platysaurus ocellatus* - the flat rock lizard). One snake species, the African Rock Python, is believed to be endangered.

Amphibia

The exact number of species of amphibia in Mozambique is unclear, due to taxonomic uncertainty. Seventy-nine species are recorded in the literature as present in Mozambique, although the Natural History Museum has records of only 39.

About 28 species, mostly located in the highlands, are believed to be endemic. Thirty-five amphibian species were recorded for the Chimanimani Massif of which two are endemic: *Bufo vertebralis grindleyi* (Grindley's toad) and *Anthroleptis troglodytes* (the cave squeaker).

The conservation status of the amphibia is unknown.

MARINE AND COASTAL BIODIVERSITY

Mozambique lies on the coast of Africa between latitudes 10°20'S to 26°50'S with a coastline of c. 2700 km in length. The warm southward flowing branch of this current, known as the Mozambique Current, has far-reaching influences on the climate and life of Southern Africa.

The Mozambique coast is a compound shoreline and can be divided into three main natural regions with one additional type of limited occurrence (Figure 4).

i) Coral Coast

The northernmost section of the coast extending about 770 km from the Rovuma River in the north to the Primeiro/Segundo Archipelago in the south (17°20') is essentially a coral coast.

These reef-forming corals are classified as hermatypic corals which require a mean annual sea temperature of about 21°C. Corals occur at intervals offshore from Bazaruto Island southward to South Africa but these occur in relatively

deeper waters than the reef corals and play little part in modifying the direct action of the sea and storms. The southern limit for shallow water fringing coral is reported from Inhaca Island at latitude 26°S.

ii) Swamp Coast

The central section of Mozambique of c. 978 km between Angoche (16°14'S) and Bazaruto Island (21°10'S), is classified as a swamp coast with simple linear to arcuate beaches, swamps and estuaries.

Twenty four rivers discharge into the Indian Ocean along this central section of the coast, each with an estuary supporting well established mangrove swamps.

The beaches between Pebane and Zambezi River mouth are of black sand and consequently fairly rich in the minerals ilmenite and rutile. The shore does not have high dunes but rather low dunes known as cheniers which run parallel to the coast.

iii) Parabolic Dune Coast

The third coastal region stretches from Bazaruto Island southward to Ponta de Ouro and beyond to Natal at Mlalazi River (28°57'S) and is classified as a parabolic dune coast. This section of coast is about 850 km long and is characterized by high parabolic dunes and north-trending capes and barrier lakes.

These dunes are Pleistocene formations and reach considerable heights such as 114 metres at Inhaca Island and are considered to be the tallest vegetated dunes in the world.

iv) Delta Coasts

There are only two sections of the Mozambique coast that can be classified as Delta Coasts viz. the Zambezi and Save River deltas.

Marine Mammals

Dugongs

Dugongs (*Dugong dugon*) are tropical marine mammals occurring in shallow waters with seagrass beds. Dugongs are considered highly endangered in Mozambique. It is believed that one of the largest populations of dugong along the East African coast inhabits the littoral waters of the Bazaruto Archipelago (estimated at c. 300 individuals, Guissamulo, 1993) whilst a smaller population occurs in Inhambane Bay. It is believed that a few individuals still inhabit Maputo Bay although this population is believed to be on the verge of extinction.

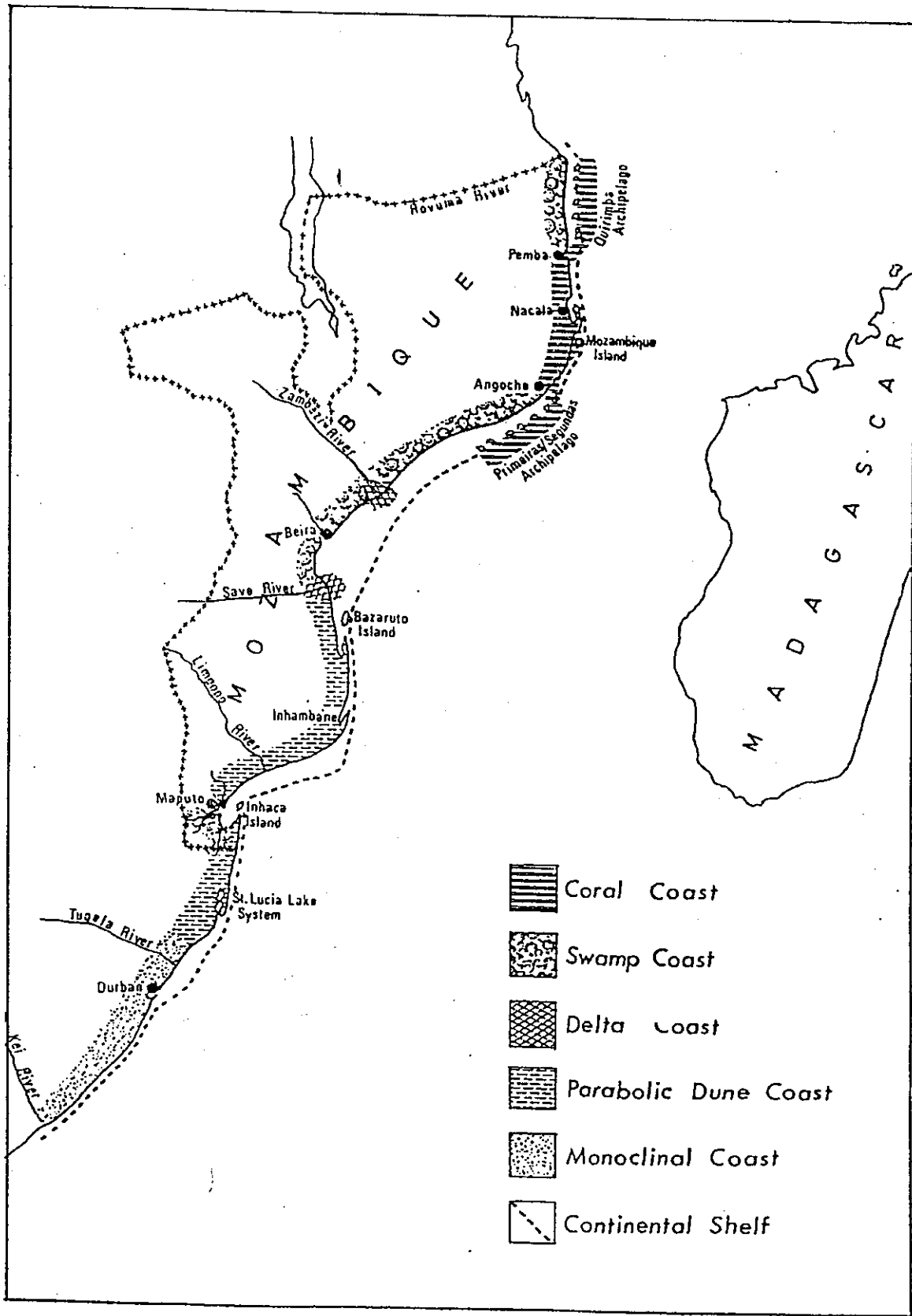


FIGURE 4 . THE MAIN COASTAL REGIONS OF MOZAMBIQUE

Dolphins and Whales

Seven species of dolphins inhabit the littoral waters off Mozambique, the humpback dolphin (*Sousa chinensis*), bottlenose dolphin (*Tursiops truncatus*), Spinner dolphin (*Stenella longirostris*), Spotted dolphin (*Stenella attenuata*), Common dolphin (*Delphinus delphis*), Rough-toothed dolphin (*Steno bredanensis*) and the False-killer whale (*Pseudorca crassidens*).

Humpback whales (*Megaptera novaeangliae*) and Minke whales (*Balanoptera acutorostrata*) occur in littoral waters between Ponta do Ouro and Inhambane. However, they do not enter Maputo or Inhambane Bays.

Corals

The coral reefs of Mozambique are a southern continuation of the well-developed fringing reefs that occur along major sections of the fairly narrow continental shelf of the East African coast.

About 77 hermatypic genera occur on reefs of the Indian Ocean. This number is very similar to the 79 recorded from Australia and the 78 from the Philippines.

Reefs of the Indian Ocean, like most others, may be dominated by *Acropora* or *Porites*, with members of the Pocilloporidae and Faviidae also being common, the former particularly in the shallow and the latter at mid depths.

Turtles

All five species of Indian Ocean sea turtles nest on beaches along the Mozambique coast: the Loggerhead turtle (*Caretta caretta*), the Leatherback (*Dermochelys coriacea*), the Green Turtle (*Chelonia mydas*), the Hawksbill turtle (*Eretmochelys imbricata*) and the Olive Ridley turtle (*Lepidochelys olivacea*).

The Loggerhead (*Caretta caretta*) and Leatherback turtles (*Dermochelys coriacea*) nest along the coast from Ponta do Ouro to Bazaruto Archipelago.

The Green Turtle (*Chelonia mydas*) nests from Qewene Peninsula to Quirimbas Archipelago. The biggest concentration appears to be in the Primeiras e Segundas Islands (Hughes, 1971). Nests of this species were found recently on the Bazaruto Archipelago (Gove and Magane, 1996).

The Hawksbill turtle (*Eretmochelys imbricata*) and Olive Ridley turtle (*Lepidochelys olivacea*) occur on the northern coast (Hughes, 1971) but their nesting areas are unknown.

Mangroves

Mangrove forests are floristically well developed in the northern and central sectors of the coast and less so along the southern sector.

Based on satellite imagery, estimates (1992) indicate that the mangroves cover 396,080 ha in Mozambique. This represents a reduction of 3.9% since 1972 (Saket and Matusse, 1994). Changes in mangrove cover per Province (in ha) is shown in Table 3.

Table 3. Mangrove cover (ha per province) in Mozambique

Province	Mangrove area (ha)		Area degraded (ha)	New mangrove area (ha)	% Change
	1972	1990			
Maputo	14,605	12,599	2,217	211	15.2
Gaza	387	387	0	0	0
Inhambane	20,094	19,848	246	0	1.2
Sofala	129,997	125,317	6,334	1,654	4.9
Zambezia	159,417	155,757	3,766	106	2.4
Nampula	55,849	54,336	2,006	493	3.6
C.Delgado	27,730	27,836	0	106	0
TOTAL	408,079	396,080	14,569	2,570	3.9

Source: Saket and Matusse, 1994.

At the present, although the total degraded mangrove area appears to be small overall there is uncontrolled cutting of mangrove in localized areas close to urban centres.

Coastal Barrier Lakes

A characteristic feature of the Ponta do Ouro - Bazaruto stretch of coast are the extensive coastal lakes, swamps and temporary rain-filled pans which occur behind the parabolic dune systems. The most important coastal lakes from north to south are: Lagos Dongane, Poelela, Maiene, Quissico, Nhamabvale, Nhamzume, Uembje (Bilene) (3200 ha), Muandje (2250 ha), Pati (1850 ha), Piti (2.700 ha), Xingute (1150 ha), Satine (500 ha) (Figure 5). These lakes are located on a plain of low elevation and most are separated from the sea by a well developed longshore dune system.

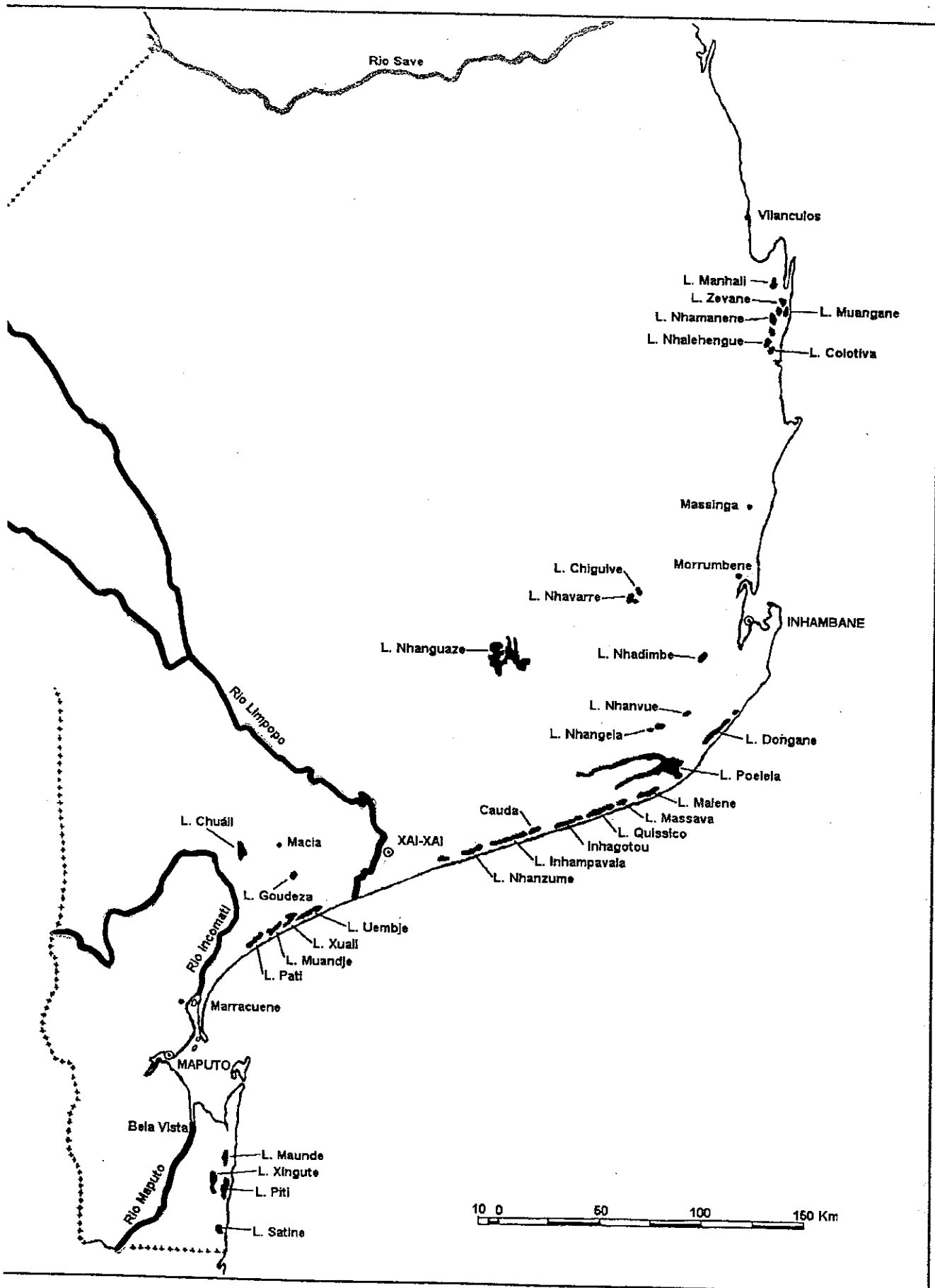


FIGURE 5. COASTAL BARRIER LAKES

Tello's (1973) lists 30 different freshwater and estuarine species occurring in the coastal lake of southern Mozambique of which three are endemic/near-endemic for the Maputaland region:

Aplocheilichthys myaposae (endemic)
Croilia mossambica (rare, near endemic).
Serranochromis meridianus (rare, near endemic)

Besides their importance biologically these coastal systems have the highest scenic value. There are plans to declare the Mozambican portion of the Maputaland wetlands a Natural Heritage Site. The South African component (St. Lucia Estuary/Kosi Bay) of this unique wetland system has been declared a Natural Heritage Site under the Ramsar-Convention.

BIOLOGICAL "HOTSPOTS" IN MOZAMBIQUE

The biodiversity of Mozambique is relatively poorly known. However, studies to date have identified several areas that are considered highly important from a biological perspective. The most notable areas are the following:

- GORONGOSA MOUNTAIN - RIFT VALLEY - MARROMEU COMPLEX
- THE GREAT INSELBERG ARCHIPELAGO OF NORTHERN MOZAMBIQUE
- CHIMANIMANI MASSIF (MAWENDJE) - of the Mozambique - Zimbabwe Frontier Escarpment Region, Central Mozambique
- THE MAPUTALAND CENTRE OF ENDEMISM

The location of these sites is shown in Figure 6.

GORONGOSA MOUNTAIN - RIFT VALLEY - MARROMEU COMPLEX.

This area encompasses the isolated massif of Gorongosa Mountain which rises to 1863m, the southern-most, Mozambican sector, of the African Rift Cheringoma Plateau (300m above sea level) and the mangrove coast and great Zambezi Delta grasslands and swamps.

Gorongosa Mountain is 160km inland from the sea and as the only eminence in the entire region which forces the ascent of moist trade wind air resulting in heavy orographic rains to its confines of over 2000mm per year. The mountain supports tropical to montane rainforests and heath grasslands with a number of near-endemic plants and animals e.g. the Greenheaded Oriole (*Oriolus*

chlorocephalus) sub-species *O.c. specularis*, characterized by a white wing patch is found on Gorongosa Mountain, the Dappled-mountain Robin (*Modulatrix orostruthus*), the Chirinda Apalis (*Apalis chirindensis*) a restricted range species, Swynnerton's Forest Robin (*Swynnertonia swynnertonii*) and separate subspecies of the Whitebreasted Alethe (*Alethe fuelleborni*).

THE GREAT INSELBERG ARCHIPELAGO OF NORTHERN MOZAMBIQUE

This series of habitats occurs south of the Lurio River occupying a rectangular area of approximately 500km by 160km wide lying in a SW to NE direction (approximately between 14° to 17°S; 35°40'E to 38° E thence NE-wards to 39°40'E). This inselberg archipelago presents a truly remarkable landscape of tall granite core remnants in a savanna plainland.

The Inselberg Region has highest scenic value as well as high biological value characterized by unique flora and fauna (endemics and biogeographical outliers) contained in the isolated rainforest, patches of which form aprons around the flanks and base of the inselbergs.

Many of the areas are unknown biologically and it is highly likely undescribed species remain to be discovered. Like Gorongosa Mountain these inselbergs are high enough to result in the largest continuous belt of high rainfall - an orographic perennial aquifer.

CHIMANIMANI MASSIF (MAWENDJE) - of the Mozambique -Zimbabwe Frontier Escarpment Region, Central Mozambique.

The Chimanimani Massif forms part of the eastern escarpment of the Interior Continental Plateau of South Central Africa, along the Mozambique-Zimbabwe frontier.

The whole massif area is some 40km from north to south and 20km wide, contained within coordinates 19°24' to 20°5' South latitude, and between 32°50' and 33°25' East longitude, standing mostly above the 800m contour. The Chimanimani Massif although relatively small in area is characterized by an exceptionally high diversity of habitats and species.

Nearly 1000 vascular plant species have been recorded for the area of which 45 are endemic (Dutton and Dutton, 1975). No less than five *Aloe* species are endemic in the Chimanimani mountains (*A. munchii*, *A. hazeliana*, *A. howmanii*, *A. plawsii* and *A. wildii*) whilst three species of *Erica* (*E. lanceolifera*, *E. pleiotricha* and *E. wildii*) and two species of *Protea* (*P. crinita* and *P. enervis*) are considered endemic.

Over 160 bird species have been recorded for the Chimanimani (Dutton & Dutton, 1975) some of which are considered endemic to the Afro-montane regions of eastern Africa.

Swynnerton's Robin (*Swynnertonia swynnertonia*) is reported to inhabit the moister elements of the montane forests (Collar & Stuart, 1985) highlighting of the faunal connections that exist with other dysjunct montane areas (eg. the Eastern Arc Mountains of Tanzania). Other rare avifaunal species occurring in the moist forests of the Chimanimani Massif include *Circaetis fasciolatus* (Southern Banded Snake Eagle), *Cercococcyx montanus* (Barred Cuckoo), *Andropadus importunis* (Sombre Bulbul), *Prinonops scopifrens* (Chestnutfronted Helmetshrike) and *Batis fratum* (Woodwards' Batis). Neither the rare Dappled Mountain-Robin (*Arcanator arostruthus*) described in 1933 from Mount Namuli nor the White-winged Apalis (*Apalis chariessa*) indentified in a remnant forest on Mount Chiperone (Collar & Stuart, 1985), have been reported for the Chimanimani forests although their presence may yet be confirmed.

THE MAPUTALAND CENTRE OF ENDEMISM

Recently, van Wyk (1994) has proposed an Indian Ocean coastal centre of plant diversity (CPD) *viz.* the Maputaland-Pondoland Region (MPR).

The MPR is clearly floristically very diverse and complex. However, there are two clear foci of high endemism in the Region: the Maputaland Centre (MC) and the Pondoland Centre. The MC (c. 26.734 km²) is defined as that part of southern Mozambique and north-eastern Natal bounded in the north by the Inkomati-Limpopo River, in the west by the western foothills of the Libombos, in the south by the St. Lucia estuary and in the east by the Indian Ocean. The MC contains extensive wetland notably Lake St. Lucia (c. 350 km²), Lake Sibaya (c. 65 km²) and the Kosi Lake System in South Africa and Lakes Piti, Xingute and Satine in Southern Mozambique.

At least 1100 species of vascular plants occur in the MC. However, this figure may be as high as 2000 to 3000 species. Of these at least 168 species/infraspecific taxa (this is probably also an underestimate) and 4 genera (*Brachychloa*, *Ephippiocarpa*, *Helichrysopsis*, *Inhambanella*) are endemic/near-endemic to the centre. Several of the endemics are rare and known only from a few collections.

The associated fauna of the MPR, and particularly of the MC, is interesting and rich. Of the more than 472 species of birds in the MC (57% of South Africa's total), 47 subspecies are endemic/near-endemic to the centre.

Other endemic/near-endemic species and infraspecific taxa (total indigenous to the centre in brackets) include 14 mammals (102 species, about 4 locally extinct) 23 reptiles (about 112 species/subspecies), 3 frogs (45 species/subspecies) and 7 freshwater fishes (67 species) – see Table4; (van Wyk, 1994).

Table 4. Endemism Among Selected Groups Of Plant And Animals In The Maputaland-Pondoland Region, Maputaland Centre And Pondoland Centre (From Van Wyk, 1994)

	MAPUTALAND- PONDOLAND REGION	MAPUTAL AND CENTRE	PONDOLAND CENTRE
Total number of vascular plant & infraspecific taxa	6000-7000	1100	1500
Endemic/near-endemic vascular plant (genera)	58	4	6
Endemic/near-endemic vascular plants (specific & infraspecific taxa)	1222	168	118
Endemic/near-endemic mammals (subspecies)	41	14	1
Endemic/near-endemic birds (subspecies)	148	47	6
Endemic/near-endemic reptiles (specific & infraspecific taxa)	38	23	1
Endemic/near-endemic frogs (specific & infraspecific taxa)	17	3	0

PART II – STRATEGY AND AREAS FOR ACTION

1. CONSERVATION OF MOZAMBIQUE'S BIODIVERSITY

In the Convention there are provisions for two different kinds of conservation measures, i.e. *in-situ* within natural surroundings whilst *ex-situ* applies to outside of natural surroundings. The primary approach is *in-situ* conservation, and *ex-situ* conservation should be regarded as being complementary to this.

Protected areas are the corner-stones of conservation efforts in Mozambique, but one should never consider conservation as merely a matter of establishing protected areas. The Convention contains several other provisions relevant to the conservation of biodiversity, including outside of and adjacent to protected areas.

1.1 IDENTIFICATION OF IMPORTANT COMPONENTS OF MOZAMBIQUE'S BIODIVERSITY

OBJECTIVE 1.1.

Identify and monitor components of biological diversity important for its conservation and sustainable use and of processes and activities with an adverse impact on it.

In order to be able to implement appropriate measures for conservation and sustainable use of biodiversity there is, as reflected in Article 7 of the Convention on Biological Diversity, a need for basic information on:

- a) components of biological diversity important for conservation and sustainable use;
- b) processes and activities which have, are or likely to have, significant adverse impacts on biological diversity

Current state of knowledge

No coordinated, comprehensive surveys of Mozambique's biological resources have been carried out. This is partially due to a long period of civil unrest that affected much of the country and consequently there is a profound lack of information regarding the conservation status of Mozambique's biological diversity, and no Red Data Books for Mozambique's fauna and flora exist.

Several surveys and assessments of selected components of Mozambique's biological diversity have been carried by variety relevant agencies and university researchers but these have been carried out in an uncoordinated fashion.

The Government of Mozambique will promote activities to acquire information important for the identification and monitoring of important parts of biodiversity as a matter of highest priority, recognizing that conservation and sustainable use depends entirely on such information.

Important biodiversity components

The Convention on Biological Diversity identifies the nature of components important to conservation and sustainable use. The components are characterized by their distinctiveness, richness and representativeness, by their economic and cultural importance, and by the extent to which they are threatened.

Examples of such important components in Mozambique, containing large numbers of endemic or threatened species, so called "hotspots", are described in Part I.

Important processes and activities adversely affecting biodiversity

No attempt has been made to identify all processes and activities that have an impact or potential impact on biodiversity in Mozambique.

However, for some processes it is well known, that they have an adverse impact on biodiversity, including over-harvesting of forests and woodlands, use of fires, inappropriate use of pesticides and commercial fertilizers, and non-sustainable use of wildlife.

In addition some development projects are known to have adverse impacts including some projects related to tourism, industry, re- and afforestation using exotic species, aquaculture, hydroelectric schemes and the marine fisheries industry.

Consequently, in accordance with the new Environmental Law (1997) new development projects are required to carry out an Environment Impact Assessment which includes the identification of impacts on biodiversity (see Section 3) In addition, the National Forestry and Wildlife Strategy has adapted a suite of policies, interventions and activities to ensure the sustainable use of forestry and wildlife resources.

The identification and monitoring of important biological components and threatening processes and activities is closely linked to the issue of enhancing knowledge of biodiversity (see Section 4).

Institutions and capacity

The challenges facing Mozambique in order to identify and monitor the most important components of biodiversity are daunting, and the capacity to carry out the necessary research and assessment activities is limited. Many institutions are currently involved in identification and monitoring activities, but there is an urgent need to identify which institutions should be responsible for carrying out which activities and for strengthening these institutions and their capacity to fulfill their obligations.

Actions

1. Identify institutions responsible for identification and monitoring of important components of biological diversity, and strengthen the capacity of these institutions to carry out their tasks.
2. Promote the identification and monitoring of important components of biodiversity, based on a systematic and co-ordinated approach.
3. Identify policies, activities or processes which may adversely affect faunal, floral, plant genetic (crop), marine and coastal and other aquatic components of biological diversity, and seek to mitigate these where appropriate.

1.2 SPECIES PROTECTION OF SPECIES

OBJECTIVE 1.2.

To determine the conservation status of species in Mozambique and to identify and implement appropriate conservation measures for threatened species

Mozambique is characterised by a high diversity of terrestrial and aquatic ecosystems and habitats ranging from deepwater marine systems to Afromontane habitats. Consequently, the associated species diversity is considered to be high. However, many taxa are poorly known and the number of species is undoubtedly much higher than the number currently recorded for the country; this is especially so for reptiles, amphibians, insects and "lower" plants.

Most of Mozambique's plant and animal species occur in other areas of the southern and east African sub-region.

Flora

More than 5500 plants species have been recorded for Mozambique (see Part I) although the actual number of species is undoubtedly much higher. It is estimated that 250 plant species may be endemic.

Seagrasses are marine flowering plants and constitute a prominent feature in sheltered bays and lagoons. Eleven species of seagrasses have been identified in Mozambique: *Enhalus acoroides*, *Cymodocea serrulata*, *Cymodocea rotundata*, *Halodule wrightii*, *Halodule uninervis*, *Halophyla ovalis*, *Halophyla stipulacea*, *Thalassia hemprichii*, *Thalassodendron ciliatum*, *Syringodium isoetifolium* and *Zostera capensis*) Sea grass species diversity is moderately high: they constitute 19% of the 58 species known in the world.

The precise conservation status of plant species is not known and no Red Data Books exist for the country although it has been suggested that approximately 60 plant species may be threatened.

Mammals

Of the 338 mammal species recorded for southern Africa 222 species have been recorded for Mozambique. At the national level several species are believed to be extinct or on the verge of extinction including the black and white rhino, giraffe, roan antelope, tsessebe, eland and the mountain reedbuck. Several mammals subspecies are believed to be endemic to Mozambique e.g. Burchell's Zebra (*Equus burchelli* subsp. *bohmi*), the Blue Niassa Wildbeest (*Connochaetes*

taurus johnstonii) and Johnston's Impala (*Aepiyeros melampus* subsp. *johnstoni*) all occurring in Niassa Province, northern Mozambique..

Eighteen species of marine mammals have been identified in Mozambique waters. The marine mammal dugong (*Dugong dugon*) is threatened throughout most of its range. The largest remaining viable population is believed to occur in Bazaruto Bay.

Birds

Of the 900 bird species recorded for southern Africa 580 species have been identified in Mozambique. Several species are near endemic and/or occur in a restricted number of isolated habitats (see Box 1).

BOX 1

RARE AND RESTRICTED RANGE BIRD SPECIES OCCURRING IN MOZAMBIQUE

The Dappled-mountain Robin (*Modulatrix orostruthus*) is a rare and restricted range species which was first described from Mount Namuli in the 1930's. Small populations were subsequently discovered in the Eastern Arc Mountains in Tanzania.

The Chirinda Apalis (*Apalis chirindensis*) a restricted range species believed to be endemic to the Chimanimani/Nyanga Mountains on the Mozambique - Zimbabwe border and Gorongosa Mountain.

Swynnerton's Forest Robin (*Swynnertonia swynnertoni*) has only been recorded for Chimanimani Mountains (Mozambique and Zimbabwe) and Mount Gorongosa in southern African. Besides these areas this species has been recorded for two sites in Tanzania viz. the Udzungwa and Usambara Mountains.

A separate subspecies of the Whitebreasted Alethe (*Alethe fuelleborni*) has been recorded for Gorongosa Mountain and lowland forests near Dondo (Sofala Province). It is widespread in the Eastern Arc Mountains of Tanzania. The species must be considered rare and very susceptible to habitat destruction.

The Oliveheaded Weaver (*Ploceus olivaceps*) is a miombo species found in southern Tanzania, in Malawi and in the Inhambane Province, Mozambique. The Inhambane population has been described as a separate subspecies.

Reptiles

This taxon is poorly documented and only 167 species reptiles have been recorded for Mozambique. The conservation status of reptiles with the exception of sea turtles is unknown.

The African rock python (*Python sebae natalensis* A. Smith) may be vulnerable. This is large snake but which, due to its great size, is easily exterminated. Threats include collecting for food, skin, medicinal purposes and the pet trade, and destruction due to its perceived danger to man his livestock. Habitat destruction may also cause local extinction.

Five species of marine turtles occur in Mozambican waters. Turtles are facing threats due to beach traffic (off-road vehicles), interaction with artisanal and industrial fisheries and the harvesting of eggs. Current conservation efforts target only two species (the leatherback and loggerhead turtles) on the Bazaruto Archipelago and Inhaca Island.

Amphibians

Remarkably only 69 amphibian species have been recorded for Mozambique highlighting the paucity of knowledge related to this taxonomy group. Two species are believed to be endemic to the Chimanimani mountains viz. *Anthroleptis troglodytes* (the Cave squeaker) and *Bufo vertebralis gridleayi* (Grindley's toad).

Fish

Approximately 800 marine fish species have been recorded for Mozambique based on studies focussing mainly on commercial fish species rather than biodiversity *per se*. However more than 2200 species are known to occur in the seas of southern Africa grouped into 270 families. These numbers represent 15% of marine world's fish species. The high species diversity is attributed to the variety of habitats and to the confluence of several great oceans.

About 13% of the species in the southern African region are endemic and belong to the families Clinidae, Gobiidae, Sparidae, Scyliorhinidae and Batrachoididae. Little is known about the endemism of marine fish in Mozambique.

Freshwater fish fauna are poorly documented in Mozambique. Lake Niassa/Malawi (20% of which occurs in Mozambique) is recognized as having one of the highest levels of fish species diversity (320 species) and endemism in the world. The Lake is especially well known for its spectacular diversity of its endemic cichlid fish fauna. The majority of these are haplochromine cichlids, currently assigned to 22 genera containing a total of 191 described species.

However, the biodiversity of Lake Niassa may be much higher and many species still have to be identified.

Legislation and Institutional Competence for Species Protection

Only a few species are afforded full protection according to Mozambican law. Turtles and dugongs are protected according to decree Decree No, 46/71 of 25 May 1971 as well as by the Hunting Law (Decree 117/78 of 16 May 1978). The Hunting Law further protects 28 mammal taxa, 12 bird taxa and three reptile taxa (Table 5).

Table 5. Species protected according to the Hunting Law:

1. Mammals	
<i>Oreotragus oreotragus</i>	Klipspringer
<i>Felis caracal</i>	Caracal
<i>Canis mesomelis</i>	Black-backed jackal
<i>Canis adustus</i>	Side-striped jackal
<i>Redunca fulvoflora</i>	Mountain reed – buck
<i>Acinonix jubatus</i>	Cheetal
<i>Viverra civetta</i>	Civet
<i>Dugong dugon</i>	Dugong
<i>Poecilogal albinucha</i>	Striped weasel
<i>Felis lybica</i>	Wild cat
<i>Felis cerval</i>	Cerval
All genet species	
<i>Girafa camelo pardalis</i>	Giraffe
<i>Hyaena brunea</i>	Brown hyaena
<i>Crocuta crocuta</i>	Spotted Hyaena
All otter species	
<i>Lycaon pictus</i>	African wild dog
<i>Cercopithecus pygerythrus</i>	Black faced monkey
<i>Cercopithecus mitis</i>	Simango monkey
All mongoose species	
<i>Ictonyx stristus</i>	Striped polecat
<i>Hipotragus equinus</i>	Sable antelop
<i>Damaliscus lunatus</i>	Tsessebe
<i>Manis temintcki</i>	Pangolin
<i>Proteles cristatus</i>	Aardwolf
<i>Otocyon megalotis</i>	Bat-eared fox
<i>Mellivora capensis</i>	Ratel
<i>Dicerus bicornis</i>	Black rhino
<i>Dicerus sinus</i>	White rhino
<i>Limnotrague spekii</i>	Sitatunga
2. Birds	
All raptor species	
<i>Chorlotis kori</i>	Greater Bustard
<i>Struthia australis</i>	Ostrich
<i>Bucoryus leadbetteri</i>	Ground Hornbill
All Flamingo species	
All Seagull species	
<i>Leptotilis crumeniferis</i>	Marabu stork
All Pelican species	
All heron species	
<i>Sagittarius serpentarius</i>	Secretary Bird
3. Reptiles	
Marine turtles (all species)	
Monitor Lizards	
Pythons(all species)	

The National Directorate of Forestry and Wildlife (DNFFB) through its Provincial and District services is responsible for Law Enforcement. However, there are several constraints for the enforcement of protection of species the most important being weak operational capacity for surveillance, lack of infrastructures and funding.

Mozambique has signed but not ratified the Convention on the Trade of Endangered Species (CITES). A CITES Administrative Authority to deal with administrative matters has been established within the National Directorate of Forestry and Wildlife. However, a CITES scientific authority still needs to be established, the composition and location of which is at present undecided.

Additional laws such as the Law on Sport and Game Fishery (518/73 of 12 October 1973) provide partial protection to certain species.

ACTIONS

1. Review existing policies, legislation and programmes to ensure that these include, where necessary, provisions for the conservation and recovery of threatened species and/or the rehabilitation of degraded ecosystems.
2. Ensure that guidelines for conducting Environmental Impact Assessments (see Section 3) include provisions for the protection of threatened species and populations
3. Review and if necessary strengthen institutions related to the implementation of the CITES convention, as well as to other conventions or regional agreements ratified by Mozambique relevant to the protection of endangered species, populations and habitats.
4. Promote the ratification by Mozambique to relevant agreements and conventions related to species protection and recovery most notably the Convention on the Conservation of Migratory Species of Wild Animals (Bonn-Convention) and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar-Convention)
5. Promote research to determine the conservation status of plant, animal and fungal species and where possible draw up Red Data lists of threatened species according to internationally recognized categories.

1.3. PROTECTION OF HABITATS

OBJECTIVE 1.3.

To establish and manage a representative system of areas for the protection of natural habitats and maintenance of viable populations of species in natural surroundings

The Convention on Biological Diversity calls upon nations to establish within their boundaries a system of protected areas, where special measures are taken to conserve biodiversity. A protected area is defined by the Convention as "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives". It is important to note, that according to this definition protected areas do not necessarily exclude some degree of sustainable use within their boundaries.

In addition the Convention calls for the protection of natural habitats and the maintenance of viable populations of species in natural surroundings. This is particularly important for habitats that are sensitive or threatened, and which are not covered by other protection measures. In Mozambique especially the inland water ecosystems (e.g. some wetlands, rivers and lakes) often fall outside of the existing protection measures, and there is a need to assess the need for legislation or other measures for the protection of such habitats.

The recently passed Land Law has some provisions on protected and partially protected areas, including the strip along the maritime coast and along islands, bays and estuaries to a mark 100 metres inland, the strip surrounding a source of water, and the land strip of up to 250 metres along the edge of dams and reservoirs. These provisions create opportunities for conservation of biodiversity, if implementation includes biodiversity considerations.

Status for Protected Areas

Mozambique has a remarkable network of gazetted protected areas. Successive legislative instruments have established 39 wildlife conservation areas (numbers in parentheses): national parks (4), game reserves (5), controlled hunting areas (13) and forest reserves (17) covering a total area of about 72,500 km² or approximately 11.4% of the national territory (Figures 7 and 8). However, the present boundaries of the protected areas do not always correspond to the ecological boundaries example in the case of Gorongosa National Park where the Gorongosa Mountain, a perennial aquifer vital for the ecological integrity of the Park falls outside it's limits.

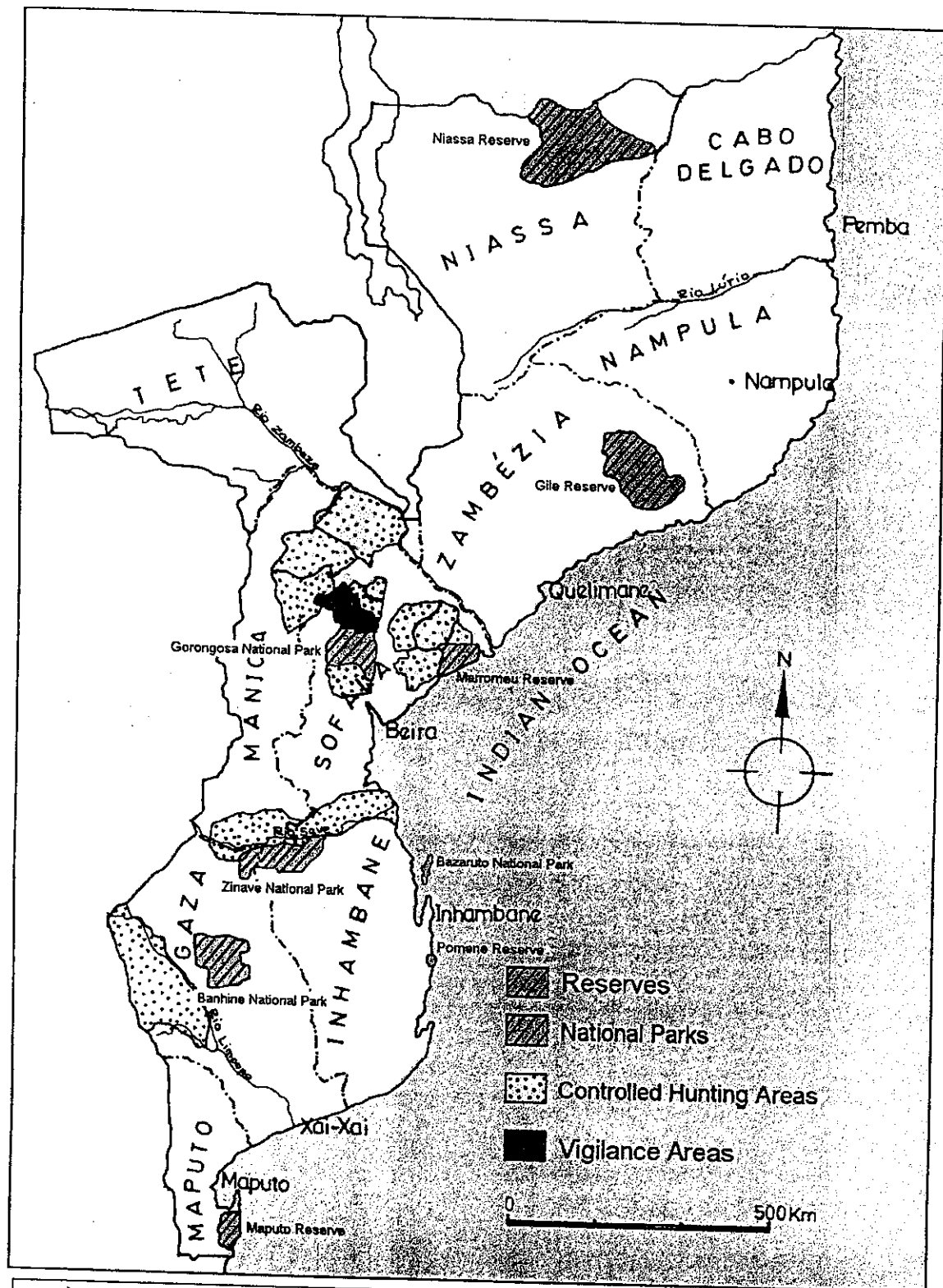


FIGURE 7. LOCATION OF NATIONAL PARKS, RESERVES, COUTADAS AND VIGILANCE AREAS IN MOZAMBIQUE

Because of the absence of effective management over a long period of time, the conservation areas need to be rehabilitated and re-evaluated in terms of their present boundaries, objectives and category. In addition, there are certain ecosystems are not included in the existing network of protected areas.

Despite logistical difficulties, the National Parks and Game Reserves are in a phase of recuperation and they serve as important habitats for the conservation of wildlife. Some protected areas have been or are being reoccupied by local people and equitable solutions will need to be identified to prevent social conflicts.

Institutional Framework for Protected Areas

The National Directorate of Forestry and Wildlife (DNFFB) is the government institution for the administration and management of protected areas in Mozambique as well developing and implementing policy related to forestry and wildlife resources. Its basic mandate is to protect, develop, and promote the sustainable use of the resource.

At provincial level, DNFFB is represented by Provincial Forestry and Wildlife Services (SPFFB), integrated within the Provincial Directorate of Agriculture and Fisheries (DPAP) under a system of dual subordination.

The DNFFB has drawn up a Forestry and Wildlife Policy and Strategy which was approved by The Government in April 1997.

The overall goal of the DNFFB strategy is to realise the full potential of the forest and wildlife resources of Mozambique through sustainable use and the conservation of biological diversity.

This will be achieved through a series of interventions, including the rehabilitation and management of the State Protected Areas for Forestry and Wildlife, aiming at the conservation of biodiversity.

One particularly important project in this context is the Transfrontier Conservation Areas (TFCA). The TFCA's are relatively large areas of mostly communal land incorporating one or more recognized biodiversity conservation or utilization centres, all to be developed in an integrated fashion for the economic benefit of indigenous communities without loss of biodiversity (see Section 2.6).

Constraints and Opportunities

There are several daunting constraints facing the establishment and rehabilitation of the protected areas network in Mozambique, including lack of data on biodiversity, the poor infrastructure, the lack of capacity and finances for management planning, and the lack of staff for implementation, the sometimes poor demarcation of the areas, and, not least, the lack of involvement of local communities in relevant decisions. The latter consideration is an integral and important component of the Transfrontier Conservation Areas Project (TFCA, see Section 2.6).

There are, however also opportunities arising from the relatively new climate of peace, which has resulted in a reformulation of economic and social policies, a revitalization of market economy and the private sector and government activities in general.

Consequently there will be new opportunities to improve current knowledge, and there will be a growing market for forest and wildlife related tourism and products, and an increased private investment interest.

Given these new opportunities there is a potential for collecting revenues for the state to be used for upgrading the protected areas network.

FRESHWATER WETLANDS

Status in Mozambique

Freshwater wetlands in Mozambique can be divided into four main types:

- lakes, deep or shallow;
- rivers, including floodplains;
- dams, which convert stretches of a river into artificial lakes; and
- palustrine areas (swamps and dambos).

Wetlands are important both as habitat for wild species and for agriculture during the dry season because of the additional water availability. Lakes and rivers supply much fish protein in Mozambique. Floodplains, such as Marrromeu in the Zambezi Delta and the Lower Limpopo River provide breeding for fish as well as wildlife habitat and specialised agriculture. Wetlands also provide temporary habitat for migratory species.

The largest natural lake in Mozambique is Lake Niassa (also known as Lake Malawi). With a surface area of between 24,504 km² and 30,800 km² it is the third largest lake in Africa and the world's third deepest. Lake Niassa is shared

by Mozambique, Malawi and Tanzania. Mozambican territory occupies 6.400 km² (20.8 percent).

The lake contains the most diverse fauna of any kind in the world. Substantial stocks of commercially important fishes occur in the lake. Intensive development of both artisanal and industrial fisheries has occurred in Malawi waters but less so in Mozambican waters. The Mozambican portion of the Lake is not protected.

The most important river system in Mozambique is the Zambezi River which enters national territory at Zumbo where it immediately swells into the impoundment of Lake Cahora Bassa. The most important tributary of the Zambezi in its lower course is the Shire River, which drains Lake Malawi via Elephant Marsh.

The Limpopo is the second largest river in Mozambique with a catchment of more than 390,000 km². It drains parts of Botswana, South Africa and Zimbabwe before reaching Mozambique.

Marshy areas, commonly known *dambos*, are found in the central part of southern Africa. *Dambos* are actually groundwater discharge zones where groundwater discharges into low-lying areas. They are common in the highlands of north-western Mozambique (where they are known as "milambos") and are important in maintaining the base flow of river systems that drain the higher areas.

The conservation status of dambos is not well known and a study of these habitats should be considered a priority.

Current Protection Status of Wetlands

Comparatively little of the vast amount of riverine wetland is protected. The northern stretch of the Maputo River constitutes the western boundary of the Reserva Especial do Maputo in the south giving protection to several thousand hectares of reed and papyrus swamp and floodplain.

Some 125 km of the Changane River and its tributaries, with their associated strip wetlands, are protected in the Banhine National Park (established 1973), together with numerous endorheic reed swamps and some lakes and pans along seasonal watercourses.

Almost 100 km of the south bank and bed of the Save River is protected where it forms the northern boundary of the Zinhave National Park. Substantial areas of wetland; reed swamp, papyrus swamp, swamp forest, riverine thicket and forest, river bed and riverine lagoon system, are protected in the Gorongosa National Park, the southern boundary of which is formed by a stretch of the Pungue River. Part of the Molocu River and some small tributaries with riparian swamps, at an

altitude of 150-220 m, are protected in the Gile Reserve (established 1960). On the northern border, a section of the Rovuma River and associated dambos and swamps are protected in the Niassa Game Reserve.

ACTIONS

1. Promote the rehabilitation and redefinition of existing protected areas.
2. Promote the involvement of local communities and other stakeholders in the management of protected areas, e.g. using the model of the TFCA Project.
3. Assess the need for additional measures for the protection of natural habitats, both inside, adjacent to, and outside of protected areas.
4. Review and where necessary update existing legislation, especially related to the rights of local communities to acquire rights over their land and resources.
5. Promote the identification of sensitive ecosystems, with a view to appointing additional conservation areas if necessary, including TFCA's.

1.4. EX-SITU CONSERVATION

OBJECTIVE 1.4.
Strengthen the capacity for ex-situ conservation of animals, plants, fungi and micro-organisms

Role of ex-situ conservation

Ex-situ conservation involves the conservation of wild and domesticated animals, plants, fungi and micro-organisms outside of their natural habitat. A variety of methods are used for ex-situ conservation of biodiversity, including: botanical and zoological gardens, captive breeding units, arboreta, herbaria, seed banks, gene banks and culture collections.

Although it is recognized that wherever possible in situ conservation is the preferred option for conserving biological diversity there are situations in which ex-situ conservation may be necessary. This is especially the case with regards to small, isolated populations of a particular species or genotype facing imminent threat. Ex situ conservation measures may be temporary in order to allow numbers to build up for subsequent re-introduction in the wild or until the threat has been removed. In some cases ex-situ conservation may be permanent as in the case of irreversible and permanent loss of habitat.

Ex-situ approaches for conservation and distribution of plant genetic resources are widely adopted by the agricultural and plant breeding community.

In Mozambique, ex situ conservation has mainly focused on plant species of economic or food security importance following the establishment of the National Plant Genetic Resources Programme. In this respect there is a need for collecting germplasm of existing land-races, under-utilised plants and endangered plant species for conservation and future utilisation. There is also a need for regeneration of some of the already existing collections, but training of personnel in regeneration techniques is required.

Current ex-situ conservation in Mozambique

Current ex-situ conservation measures in Mozambique are characterised by being very limited both in scope and capacity.

Ex-situ conservation methods used in Mozambique include seed conservation, field gene banks, arboreta, botanical gardens and in-vitro collections:

Seed conservation

Seed conservation is being carried out by the National Plant Genetic Resources Centre (NPGRC) of National Institute for Agronomic Research (INIA), Faculty of Agronomy and Forestry (FAEF), Forestry Research Centre (CEF), the Mozambique Seed Company (SEMOC) and the Institute of Animal Production (IPA).

Field gene banks

Some accessions are kept in field gene banks in Mozambique. Most of these accessions are not properly maintained, documented and evaluated. The lack of financial resources, trained personnel and poor management capacity are the main constraints to adequate management of these field gene banks.

In-vitro collection

The root and tubers crops sector of INIA is managing a tissue culture laboratory meant for rapid multiplication, maintenance and safe distribution of cassava and sweet potato germplasm. Strictly speaking, this is not an in-vitro gene bank since nearly all accessions are used for experimentation and distribution.

Botanical gardens

Botanical gardens may play an important role in conserving the germplasm of ornamental plants, wild food plants, wild relatives of crops, medicinal species and forest species. In addition to insurance against in-situ extinction botanical gardens have the following roles: (i) educational, (ii) recreational facilities; (iii) research to complement field research and (iv) commercial.

Mozambique has very few botanical gardens in the true sense.

Maputo Zoological garden

The Maputo Zoological Garden is currently being rehabilitated to fulfill the role with regards to both education and conservation. The Zoo might also in the future be used in relation to breeding and reintroduction of threatened species.

Actions

1. Strengthen the capacity of existing ex-situ institutions and if necessary establish additional ones
2. Upgrade the existing botanical gardens and arboreta and the creation of new ones
3. Promote the upgrading of Maputo Zoological Garden, particularly as it relates to ex-situ conservation of threatened species.

2. SUSTAINABLE USE OF BIOLOGICAL RESOURCES

Protected areas are important for the conservation of biodiversity, but almost 90% of Mozambique's total area falls outside the protected areas. As a result the conservation of biodiversity will to a large extent be dependant on proper measures being introduced relating to the sustainable use of the areas outside or adjacent to protected areas.

The land uses outside the protected areas include small-scale farming, private sector commercial farming and private sector farming in association with the Government, as well as state farms and concessions related to natural resources e.g. timber extraction and tourism.

This calls for the use of a wide range of instruments, including incentives, to meet the multiple obligations of the Convention related to conservation and sustainable use, as well as to securing the fair and equitable sharing of benefits from the use of natural resources. Such instruments are described in the following sections as they relate to the individual sectors and to the cross-sectoral issues, as well as to the very important role of the local communities as custodians of natural resources in a mainly rural society as is the case of Mozambique.

2.1. AGRICULTURE

OBJECTIVE 2.1.

To ensure that biodiversity considerations are an integral part of the agricultural sector legislation, policies and strategies and of agricultural practises

Status of agriculture and effects on biodiversity

The agricultural areas comprise arable, irrigable and grazing lands. The land considered highly suitable for intensive agriculture is relatively small compared to the total area of the country and is located in a few well defined areas.

It is estimated that 90% of arable land in use is under cultivation by the small-scale farming sector. The remaining 10% (corresponding to approximately 200.000 ha) is being exploited by the commercial sector (joint venture, private sector and state).

Although there appears to be sufficient land, taking into account the relatively low population density at the national level (10 hectares for each of the 2.5 million rural families) the impression is misleading. Due to physical and climatic constraints the area available is much less. Furthermore, the rural population utilize a wide variety of natural resources, including their food resources, and are thus dependant on larger areas for their livelihood.

Due to the occurrence the tse-tse fly much of the country is unsuitable for cattle grazing. It is estimated that 70% of cattle are located in the south of the country.

Areas used for agriculture often coincide with ecologically sensitive areas such as river banks, freshwater springs, and wetlands, resulting in some cases in adverse impacts on these habitats.

It is not only through the conversion of habitats that biodiversity is affected by agriculture. Agricultural practices such as the use of heavy machinery, fertilizers and pesticides often have adverse impacts on soil biota, natural vegetation and adjacent habitats such as water bodies and riverine and swamp forests.

In addition, most of the species cultivated are exotic or introduced improved varieties, often at the expense of indigenous species and land-races.

Agricultural legislation and policy

The National Programme for Agricultural Development (PROAGRI, 1997) establishes that sustainable use of natural resources depends fundamentally on the adoption of strategies that ensure the conservation of soil, inland waters and biodiversity, the involvement of local authorities and communities in conservation efforts, as well as the contribution of the agricultural sector towards the management of water resources. All of these strategic objectives have major implications for biodiversity.

Overall, there is a need to review existing agricultural legislation, policy and institutional setup in order to identify any gaps in relation to the provisions of the Convention on Biological Diversity and the decisions taken by The Conference of the Parties on agricultural biodiversity.

Genetic resources for agriculture

Agriculture is dependent on the genetic variation of varieties of plants and animals, and of their wild relatives, used for food production. The variation is not only important in terms of the yield, but the adoption of the varieties to certain conditions, especially drought, is essential for food security. The variation is also important in relation to e.g. resistance to pests.

These genetic resources can either be preserved in-situ or ex-situ.

In-situ conservation is especially important for locally developed land-races. These land-races have been developed for generations by local communities and are often well adapted to the specific conditions of a particular geographic area. This makes them valuable in terms of food security, even if they are not as high-yielding as some of the commercially bred varieties.

Very little is known about the local varieties of the most important crops.

Ex-situ conservation in seed banks is an important complementary conservation component (see Section 1.4).

Use of genetically modified organisms for agriculture

Instead of varieties created through traditional or commercial breeding genetically modified organisms (see Section 1.4) can be used.

The release of genetically modified organisms used in agriculture, can potentially have adverse effects on biodiversity. It is often difficult to predict the effects. The issue is relatively new, and the number of developed organisms relatively low, but there is a need to start considering the issue. In recognition of this the MICOA has, based on recommendations from a regional meeting in Zimbabwe (1995) designated a National Focal Point for biotechnology and bio-safety related issues under the Ministry of Agriculture.

A pilot survey is currently being undertaken in order to assess for one part of the country the extent to which GMO's are being used in Maputo Province. The survey has so far shown that GMO's are used in at least two forms, namely *Bacillus Thurengensis* for pest control and a variety of banana (from Malaysia). There are no regulations in the field of biotechnology, and a preliminary result of a review of the existing legislation within agriculture, health and trade shows that there are no provisions related to biotechnology and genetically modified organisms.

Currently a protocol for the safe handling and transfer of GMO's is being negotiated under the CBD. Mozambique is actively taking part in these negotiations.

Note that genetically modified organisms are not only used for agricultural purposes, but also by e.g. the pharmaceutical industry. This wider application of GMO's is not treated separately in this strategy, but should be seen in relation to Section 3.2.

Actions

1. Review and evaluate legislation, policies and programmes related to the agricultural sector with regards to conservation and sustainable use of agricultural biodiversity.
2. Promote and encourage activities and incentives aimed at developing and implementing agricultural practices supporting the conservation of biodiversity.
3. Promote national legislation and codes of conduct related to access to genetic resources and intellectual property rights, in line with relevant decisions by the COP of the CBD.
4. To establish, improve and strengthen existing/proposed animal, plant and microbial genetic resource centres.
5. Promote on-farm conservation of genetic resources, especially land-races in areas where they evolved.
6. Identify and promote technologies with minimal adverse impacts on biodiversity.
7. Strengthen and refocus agricultural extension services to promote farming practices and techniques which contribute to the conservation and sustainable use of biodiversity.
8. Establish an inter-ministerial body related to biotechnology and bio-safety issues.
9. Develop legislation and procedures for the safe handling and use of GMO's as called for in existing guidelines and any future provisions of the protocol on bio-safety, and strengthen national institutions responsible for this issue.
10. Promote a thorough assessment of the current and potential use of GMO's in Mozambique.

2.2. FORESTS AND FORESTRY

OBJECTIVE 2.2.

To ensure that biodiversity considerations are an integral part of the forestry sector legislation, policies and strategies and of forest management practices

Current status and use of forests

Natural forests, defined very broadly as land covered by woody species, comprise an area of approximately 62 million hectares or 78% of the Mozambican Territory. These natural forests can be divided into a number of different types as described in part 1, and range from areas covered by dense forests to open canopy woodlands. These forests and woodlands include some of the most diverse ecosystems in the country.

In addition about 46 thousand hectares of plantations have been established, mainly using exotics, such as *Eucalyptus* and pine.

The small-scale family sector is the main consumer of forest products and depend heavily on forest resources for their livelihood. At the national level the consumption of fuel-wood by the small-scale family sector is estimated to be 16 million cubic meters/year. In addition, this sector exploits a wide variety of other forest products.

A preliminary forest inventory has identified approximately 19 million hectares as high and medium density forests, with a potential for production forest management. The majority of the areas with a potential for commercial forestry are at the same time of major importance to the conservation of biodiversity. However, only a relatively small percentage of these forests are under protection, comprising 17 forest reserves established with a total area of 450,000 hectares (see Section 1.3). Knowledge about the biodiversity of the majority of the indigenous forests is limited.

Causes of degradation and loss of forests

Deforestation and degradation of forests and woodlands pose major threats to the biodiversity at both the ecosystem, species and genetic levels.

During the period 1972-1990 deforestation was about 4,2% at the national level.

However, deforestation levels varied widely. Based on satellite imagery it is estimated that there has been a 2,9% reduction in mangrove cover over the last 18 years with a relatively higher rate in Maputo Province.

In addition unsustainable forest management practices can lead to degradation of forest and woodland biodiversity.

Deforestation and degradation of indigenous forest resources is due to a variety of factors, including growing demand for firewood, expansion of agriculture and inappropriate agricultural practices, forest fires and weakening of cultural and traditional values with regards to use and management of forests.

The problems are aggravated by the lack of proper demarcation of protection zones, lack of management planning due to lack of resources, and lack of resources at provincial and local levels to control forest exploitation.

Legislation, policies and strategies

The Forestry and Wildlife Policy and Strategy (FWPS, 1997) recognize the need for both protection and sustainable use of forests.

The overall goal of the strategy is to protect, conserve, develop and utilize forest and wildlife resources on a rational and sustainable basis for the economic, social and ecological benefits of the present and future generations of Mozambicans.

Apart from economic, social and institutional objectives the strategy has an ecological objective, which seeks to improve the protection, management and use of the forest and wildlife conservation areas in order to contribute to national and local sustainable development, appropriate land use, and biodiversity conservation.

There is a need to review the forestry and wildlife policy and strategy to analyze whether or not it conforms with other policies and legislation, including the provisions related to biodiversity in the newly passed Land and Environmental Laws. It is of vital importance that forest biodiversity considerations are fully taken into consideration in the implementation of this recently passed related legislation.

Institutional aspects

The National Directorate of Forestry and Wildlife (DNFFB) is responsible for the formulation of national strategies in the sector. The mandate of the Directorate includes an obligation to ensure the protection, conservation and sustainable use of forests and wildlife resources.

It is recognized in the FWPS that there are major institutional constraints that prevent DNFFB and its provincial and district services from fulfilling their mandate. These constraints include lack of sufficiently qualified staff (and consequently, weak planning capacity), as well as lack of operational facilities. It is therefore part of the DNFFB institutional objective to strengthen both the human resources and institutions within the sector.

Actions

1. Ensure that biodiversity considerations are fully reflected in the implementation of existing forestry legislation, policies and programmes.
2. Support and encourage activities aimed at developing and implementing forest management practices securing conservation of biodiversity. Activities could include development of methods for natural regeneration of indigenous forests.
3. Develop procedures and methods for incorporating biodiversity considerations in Environmental Impact Assessments of forestry related activities.
4. Develop criteria and indicators for sustainable forest management, including criteria and indicators for the conservation of biodiversity.
5. Support and encourage activities related to inter-sectoral dialogues on biodiversity conservation and sustainable use of forest resources.
6. Ensure, through legislation, policies and land-use planning, that sufficient land is destined for permanent forest cover, especially in areas of high diversity.
7. Develop mechanisms and incentives for the involvement of rural communities, NGO's and private sector in forest use, management and conservation.
8. Establish a fire management plan for each forest management unit.
9. Conduct assessments of biodiversity in forests, especially in those suspected of having a high diversity.

2.3. FISHERIES

OBJECTIVE 2.3.

To ensure that biodiversity considerations are an integral part of the fisheries sector legislation, policies and strategies and of fisheries practises

Status for the sector

Fishing takes place along the entire Mozambican coast at different scales ranging from large-scale industrial fishing to small-scale individual fishermen.

Shrimps, lobsters, crayfish, crabs, as well as a number of fish species and molluscs comprise the most important groups of marine resources.

Shrimp stocks have been intensely exploited since mid-eighties and from 1990 several management measures have been introduced in order to reduce yearly catches to a sustainable level. From 1995 a yearly Total Allowable Catch (TAC) was set for industrial shrimp catches. In addition, a two month (January and February) closed season to allow recovery of the main species was implemented.

Other regulations include mesh sizes and minimum landing sizes and protection of certain species. However, the enforcement of these provisions are rather weak due to institutional and financial constraints.

As almost 70% of the population of Mozambique reside in the coastal areas the majority of the Mozambicans are directly dependent on marine resources for their livelihood.

The fisheries industry contributes significantly to Mozambique's national economy. Thus, in 1996 the industry accounted for 40% of the GNP. The fisheries sector as a whole in 1993 employed about 73,000 people.

The effect of fisheries practices on marine biodiversity is poorly documented. However, there is a recognized need to identify the status of unique and sensitive marine habitats and if necessary introduce conservation measures (see Section 1.4)

Threats to marine biodiversity

A number of factors can be considered to be major threats not only to the fishery sector, but to marine biodiversity in general, including:

Over-exploitation due to continuing population growth in coastal zones and coastal urban areas;

Land and sea based pollution from industrial and other sources

Increased and uncontrolled tourism activities affecting especially coral reefs.

Trawling, land reclamation, drainage, and coastal construction, leading to the destruction of estuaries

Manipulation of hydrological cycles by construction of dams upstream from estuaries

Unintentional by-catch of marine mammals (especially adversely affecting the endangered dugong)

Integrated approach

The described threats to marine biodiversity are characterized by being related to both land and sea based activities. This calls for an integrated approach when formulating coastal-zone and marine policies, strategies and plans.

It is a major task for the fisheries sector to ensure that all fishing enterprises and related industries and other activities related to the coastal and marine environment give due consideration to the impact of their activities on coastal and marine biodiversity.

There is a need to review the existing legislation, policies and mandates related to the sector and to related sectors, in order to analyze whether conservation of coastal and marine biodiversity is adequately addressed.

Changes in legislation, policies and mandates, to allow for cross-sectoral approaches may be required.

Research, capacity building and raising of awareness

Scientific research and training carried out so far has focused on the management and conservation measures for economically important species.

The International Code of Conduct for Responsible Fisheries calls for the maintenance of the quality, diversity and availability of fisheries resources in sufficient quantities for present and future generations. The Code states that "management measures should not only ensure the conservation of target species but also of species belonging to the same ecosystem or associated with or dependent upon the target species". This implies modifying data collection methodology and research in order to improve scientific and technical knowledge of marine biodiversity. The fisheries sector will also need to adopt a new approach that assesses the impact of fisheries and marine ecosystem processes and marine biodiversity as a whole.

The need for responsible fisheries will require the promotion of technical research capacity. Although Mozambique is not a signatory to the Code, several capacity building initiatives are underway which will contribute to a broader approach to the sustainable use and conservation of Mozambique's fisheries resources.

The involvement of coastal communities in the co-management of fisheries resources is being developed in selected coastal sites. These initiatives coupled with awareness programmes for biodiversity conservation has resulted in improved management and conservation of components of marine biodiversity.

Actions

1. To review and revise policies, legislation and programmes to ensure the incorporation of biodiversity considerations in the fisheries sector, including the adoption of codes for sustainable fisheries in accordance with the FAO Code of Conduct for Responsible Fisheries
2. Promote and coordinate inter-sectoral planning, management and monitoring for the conservation and sustainable use of coastal and marine biodiversity.
3. Introduce improved data collection techniques to ensure that not only commercially important fish species are recorded and monitored
4. Identify and adopt fisheries management practices that will contribute to the conservation and sustainable use of marine biodiversity and minimize adverse impacts on marine biodiversity

5. Promote the full participation and sharing of benefits by local communities, as an incentive to the conservation and sustainable use marine biodiversity
6. Review existing international legal instruments related to marine biodiversity and where appropriate promote accession to these
7. Promote training and capacity building to ensure that biodiversity considerations are incorporated into coastal and marine research, planning and management.
8. Promote the enforcement of existing regulations for the conservation and sustainable use of marine biodiversity.

2.4. TOURISM

OBJECTIVE 2.4.

Ensure the development of a tourism industry which incorporates in plans and operations, considerations for the conservation and sustainable use biodiversity.

Status of industry

Currently Mozambique's tourism industry is poorly developed in spite of its enormous potential. Mozambique possesses a wide variety of natural, historical and cultural resources that could form the basis for a world-class tourism industry. One of the country's most valuable assets is its near pristine coastline of some 2700 km in length comprising a wide variety habitats including sandy beaches, coral reefs and island ecosystems.

There exists, therefore, the immense opportunity for developing tourism that ensures the highest economic returns while conserving the wealth of Mozambique's biodiversity.

Policy and strategy

Although Mozambique does not have a recent tourism law the Government is using a set of guidelines in the form of policy and strategy documents for re-invigorating the tourism industry, i.e. National Policy for Tourism and the Strategy for Tourism Development in Mozambique.

The National Directorate of Tourism and the National Tourism Company (both under the Ministry of Commerce, Industry and Tourism - MICTUR) plan, manage and regulate tourism operations in Mozambique.

The National Policy recognizes that Mozambique possesses a variety of natural resources that should form the basis for developing high quality tourism. The potential attraction of Mozambique's flora and fauna for tourism development is specifically highlighted. The policy recognizes the need to develop tourism whilst conserving the country's natural resource base. One of the principal objectives of the Policy is to: "identify and protect strategic zones for sustainable tourism development whilst maximizing economic benefits".

In order to achieve this objective The National Tourism Policy identifies and recommends the creation of partially protected tourism zones to ensure sustainable tourism development and protection of the natural resource base in these areas.

The Policy recognizes that the expansion of tourism should be made on a gradual and sustainable basis to minimize or eliminate risks and negative environmental impacts. Wherever possible tourism within the strategic zones should be developed within the context of a sub-regional development plans. In order to obtain maximum social and economic benefits from tourism the Policy seeks to:

"Contribute to the rehabilitation, conservation and protection of natural and man-made heritage sites especially those of outstanding ecological, historical and cultural value".

This objective will be achieved through:

- Equilibrated spatial development
- Protection of the natural environment especially coastal zones
- Definition of the tourism carrying capacity for each development zone
- Protection of regional and urban architecture
- Preservation of monuments and surrounding areas
- Creation of incentives for artisanal and folkloric tourism

A guiding principal of the Policy is: "The promotion of initiatives which assure the maintenance of ecological integrity, preservation of the environment and the sustainable use of the natural resource so as to improve the quality of life of local people".

Environmental Impact Assessments

In accordance with the recently passed Law of the Environment and the National Tourism Policy and Strategy, all tourism developments likely to have adverse impacts on the natural and/or social environment are made subject to an Environmental Impact Assessment. MICOA will be responsible for ensuring that recommendations and mitigating measures for reducing or eliminating adverse environmental impacts arising from tourism development are implemented and maintained.

According to the policy tourism activities must be developed taking into account environmental issues and where necessary tourism projects will be subject to an environmental impact assessment especially in the strategic tourism development zones.

Protected zones

In order to ensure sustainable tourism development concomitant with environmental protection the Council of Ministers created 19 Partially Protected Zones in 1996. In these zone title-holders to land and individuals or companies with rights to develop tourism can only do so in accordance with a previously agreed development and management plan.

ACTIONS

1. Promote and implement tourism development that will contribute to the conservation and sustainable use of the biodiversity, including through the use of incentives for tourism developments which actively contribute to biodiversity conservation and/or rehabilitation through restocking and/or re-vegetation programmes.
2. Promote private sector tourism developers who seek to form equitable partnerships with local communities. Through these joint-venture schemes local communities will be involved in the co-management of biological resources, and from which they will accrue tangible economic benefits.
3. Monitoring the impacts of tourism especially those in, or adjacent to, sensitive areas and critical habitats.
4. Based on monitoring activities to propose and implement measures that may reduce or eliminate any identified adverse impacts on biological diversity.
5. Ensure that recommendations and mitigating measures for reducing or eliminating adverse environmental impacts arising from tourism development are implemented and maintained.

2.5. LOCAL COMMUNITIES AND TRADITIONAL KNOWLEDGE

OBJECTIVE 2.5

Promote community-based sustainable use of biodiversity, and recognize, document and promote the use of traditional knowledge systems of importance to the conservation of biodiversity.

ROLE OF COMMUNITIES IN THE CONSERVATION OF BIODIVERSITY

It is estimated that 80% of Mozambique's population resides in rural areas, depending entirely on natural resources for their largely subsistence economy. Consequently, the local communities are important custodians of biodiversity in our country. It is therefore of vital importance to the conservation and sustainable use of biodiversity that these communities are involved in all decisions related to land-use, and that local community incentives for conservation and sustainable use are introduced.

It should be noted that the small-scale farming system (comprising cultivated, fallow and grazing subsystems) is but one component of the overall natural resource base that contributes to the livelihood of the local communities. Natural habitats such as forests, grasslands, freshwater swamps, mangroves, freshwater lakes and rivers, inter-tidal zones and littoral waters provide many additional services and goods.

Through the newly passed Land Law (1997) the rights of the local communities to use their land will be ensured, which will serve as an incentive for these communities to play their role as custodians of the natural resources.

COMMUNITY INVOLVEMENT

The economic potential of Mozambique's natural resources is clearly recognized by commercial operators who are making major investments e.g. in wildlife-based concessions and in tourism development. However, this is currently taking place with little benefit to, or consultation with, local communities.

Currently the role of local communities is most significantly recognised in the National Forestry and Wildlife Strategy, through which Mozambique has formulated a policy to enable the implementation of Community-Based Natural

Resource Management (CBNRM) projects where the rights for the use and management of natural resources are devolved to the community.

Social Objective of the DNFFB strategy is to "increase the participation of local communities, as direct agents and beneficiaries in the integrated management, fire protection, use and conservation of forest and wildlife resources".

Furthermore, the delegation of decision-making power to lower levels of government (municipalities) is being promoted across other sectors in Mozambique. The recently passed Law of the Municipalities refers to community involvement in, and responsibility for, natural resources management.

These new strategies and developments greatly enhance the possibility of implementing successfully CBMNR projects in Mozambique.

It is now recognized that approaches which pursue indigenous resource management practices and local institutional arrangements are more successful in combating food insecurity whilst, concomitantly, contributing to biodiversity conservation. Throughout southern Africa CBNRM has become an important component of rural land use. In some cases it has become the primary form of land use providing higher economic benefits than subsistence agriculture.

Community-based natural resource management may be based on tourism, forest or wildlife resources. Together with the community, products for commercialization are identified.

Community-based Natural Resources Management (CBNRM) Programs are successful when: (a) strong local institutions are in place (b) communities are empowered and (c) communities have rights to their natural resources and land.

In essence, a community-based natural resource management strategy should:

- a) involve the community in the development process and in management of natural resources;
- b) promote institutional arrangements whereby communities derive greater income from the natural resources base;
- c) develop a range of marketable products from the natural resources base with maximum value-added for the community;
- d) identify, with the community, appropriate management strategies and technical options for natural resources and biodiversity conservation.

Non-government organizations have an important role in assisting in the creation/strengthening of local community institutions and development of local skills. With the support of DNFFB and possibly in association with the private sector there is now an immense opportunity for combining economic upliftment and biodiversity conservation through CBNRM.

There is a need to extend the the basic ideas of the CBNRM to all sectors and to all decisions related to land use policies and programmes, recognizing also the need to take into consideration traditional knowledge systems as mentioned below.

ROLE OF TRADITIONAL KNOWLEDGE SYSTEMS

The role of traditional practices for managing and controlling resource utilisation is often overlooked. Emerging evidence indicates, however, that approaches which recognise, and pursue, indigenous resource management practices and local institutional arrangements, are more successful in combating environmental degradation and subsequent loss of biodiversity and food security, than modern approaches. Consequently, there is a need to recognise that traditional communities possess a wealth of information that may provide social and economic benefits for wider society, as well as information of major importance for the conservation of biodiversity.

It is therefore of great importance that these traditional practices are identified and extended to a wider range of users, not least in a mozambican context where so many people will be resettled after the end of the war, and given the newly passed Land Law.

Mozambique is characterised by high levels of biodiversity as well as cultural diversity and traditional natural resource use patterns vary widely throughout the country.

Many traditional rules regarding resource use and conservation are in place including conditions on dress, harvesting methods, time of harvesting, age and gender.

Sacred and cultural sites play a central role in the in the lives of local communities. These may include sacred forests, trees, pools and streams, animals and mountain.

It is important to note, that the recording of traditional knowledge systems should at all times be carried out in association with, and the consent of, the traditional owners of that knowledge, and that a fair and equitable sharing of the benefits

arising from the use of such knowledge, should be encouraged as an important incentive for conservation. Another important incentive for conservation to be considered is the safeguarding the intellectual property rights related to such knowledge and practices.

OBLIGATIONS RELATED TO TRADITIONAL KNOWLEDGE

The Convention on Biodiversity has two provisions related to traditional knowledge systems.

Article 8(j), states that, subject to it's national legislation, contracting Parties must:

- 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 utilisation of such knowledge, innovations and practices.

Furthermore article 10(c) states that contracting Parties shall:

"Protect and encourage customary use of biological resources in accordance with traditional practises that are compatible with conservation or sustainable use requirements"

The future plans, programmes, strategies and actions should, as a matter of priority, take into consideration these provisions of the Convention.

Actions

1. Promote and establish community-based natural resource management schemes in accordance with existing national strategies and policies.
2. Monitor and audit the socio-economic and biodiversity impacts of community-based management schemes, and where necessary, adjust the activities and approaches of these schemes.
3. Promote the documentation and use of traditional knowledge systems relevant to the conservation of Mozambique's biodiversity.
4. To establish ethical guidelines to ensure that research related to ethnobiology is carried out in cooperation with, and with the consent of, the owners of traditional knowledge. Wherever possible the research should be directed at providing tangible benefits to the communities providing that knowledge.
5. Promote the integration of traditional knowledge concerning biodiversity into scientific research programmes and the as well as projects and activities that involve the use and management of biological resources.
6. Ensure, through adequate legislation and regulations, that the community rights to their traditional knowledge and practices is secured, including that communities gain royalty payments, or other forms of compensation, from commercial products using traditional knowledge and/or from natural resources belonging to these local communities.
7. Promote the integration of traditional knowledge and management practices into conservation and sustainable use policies, plans and initiatives.

2.6. INTEGRATED MANAGEMENT PLANNING

OBJECTIVE 2.6.

Promote integrated management planning, where necessary on a regional basis, for the conservation and sustainable use of Mozambique's biodiversity.

The Government of Mozambique recognizes that integrated management approaches greatly improve the conservation, sustainable use and management of natural resources.

Regional co-operation

Mozambique shares most of its river catchment systems and ecosystems with neighboring countries and an integrated approach will require planning at both national and regional level. Mozambique has therefore signed several regional protocols for the management of shared resources, including the Protocol on Shared Water Systems in the SADC Region, and the Zambezi River Multilateral Agreement.

The objectives of the *Protocol on Shared Water Systems* are co-operation in order to attain a rational, judicious and co-ordinated use of the watercourse systems and to co-ordinate an environmentally sound management towards achieving the sustainable use of these resources.

Each country should establish in accordance with this Protocol, a special authority to carry out monitoring activities in the respective drainage basins. Regionally a Water Resources Centre will be created which will co-ordinate measures for the conservation and protection of water resources in shared water courses and exchange available data regarding the hydrology and ecology of watercourses systems.

The Zambezi River basin extends over parts of Namibia, Angola, Botswana, Zimbabwe, Zambia, Tanzania, Malawi and Mozambique. The *Multilateral Agreement* has as its main tasks the inventory of all projects planned for this watercourse, the development of an integrated water resources management plan for the Zambezi river basin – the ZACPLAN, environmental impact assessments for on-going and planned projects, strengthening the technical capacity at the national and regional levels, and the development of management schemes for water resources.

National management plans

At the national level the Government has tasked several ministries to draw up and implement integrated management plans, including the Integrated Coastal Zone Management (ICZM) Plan, The Transfrontier Conservation Areas Project (TFCA) and The Northern Sofala Integrated Management Plan for Forestry and Wildlife.

Integrated Coastal Zone Management (ICZM)

It is believed that 70% of the Mozambican population resides in the coastal areas and are dependent on wide variety of coastal and marine resources for their livelihood. The greatest proportion of Mozambique's foreign currency income is derived from the exploitation and sale of marine resources.

Therefore, there is an urgent need for the formulation of an integrated management plan for the conservation and sustainable use of Mozambique coastal and marine resources, including considerations related to the conservation and sustainable use of biodiversity. However, due to the sectoral nature of coastal and marine resource use and the interface between land and sea, nowhere is the task more daunting for an integrated approach to planning and management than in coastal and marine areas.

The National Environmental Management Programme (NEMP) recognizes coastal zone management as a priority. Specifically, the NEMP states that coastal management will be based on an inter-institutional co-ordination among the relevant stakeholders and in a programme which should be elaborated and approved by them. The main issues for this programme are (i) fisheries, (ii) coastal and marine ecosystems management, (iii) coastal and marine protection (iv) marine parks and (v) tourism. It is recognized that a successful strategy for conserving marine and coastal biodiversity must have certain general characteristics:

- 1) It must be cross-sectoral, embracing all categories of marine and coastal ecosystems and species, all types of human use, and all sources of threats.
- 2) It must govern actions on land as well as in the sea, since much of the damaging impact on marine and coastal systems originate on land.
- 3) It must be capable of decentralization on national, regional and local levels.
- 4) It must have flexibility to address priorities that will inevitably vary from one area to another.

The GOM has charged the Ministry for the Co-ordination of Environmental Affairs (MICOA) to draw up an ICZM for Mozambique through the National Coastal Zone Management Programme.

The Northern Sofala Integrated Management Plan

The Direcção Nacional de Florestas e Fauna Bravia (DNFFB) has drawn up an integrated forestry and wildlife management plan for northern Sofala Province (the NSIMA Plan). The NSIMA Plan has identified critical areas requiring special conservation measures. The conservation of biodiversity with community participation is a key feature of the plan.

Objectives of the NSIMA Plan include the conservation of ecosystems and biodiversity and promotion of appropriate land use, designation of an appropriate conservation category for some parts of the area, multiple use of natural resources and promotion of the conservation of habitats and wild animals.

Transfrontier Conservation Area Project

The GOM has in 1996 approved the development of three Transfrontier Conservation Areas, i.e. Maputo - Tembe/Nduma, Chimanimani and Kruger National Park/Gazaland (Figure 9).

The Transfrontier Conservation Areas (TFCA's) are relatively large areas of mostly communal land incorporating one or more recognized biodiversity conservation or utilization centres, all to be developed in an integrated fashion for the economic benefit of indigenous communities without loss of biodiversity. As such a TFCA is a particular type of multiple resource use area, being one that is contiguous with an area in a neighbouring state that enjoys level of biodiversity protection. Tourism plantation forestry, agriculture and livestock production may form part of the multiple resource use mix in a TFCA although the renewable natural resources would by definition form the basis of significant local activity, or have the potential to do so. A TFCA is perceived to be the final stage of an integrated rural development process based on multiple resource use.

Since TFCA's straddle international frontiers biodiversity conservation will, therefore, be promoted at the regional level. This will require the identification inter-governmental mechanisms to ensure co-ordination for the conservation of biodiversity at a regional level.

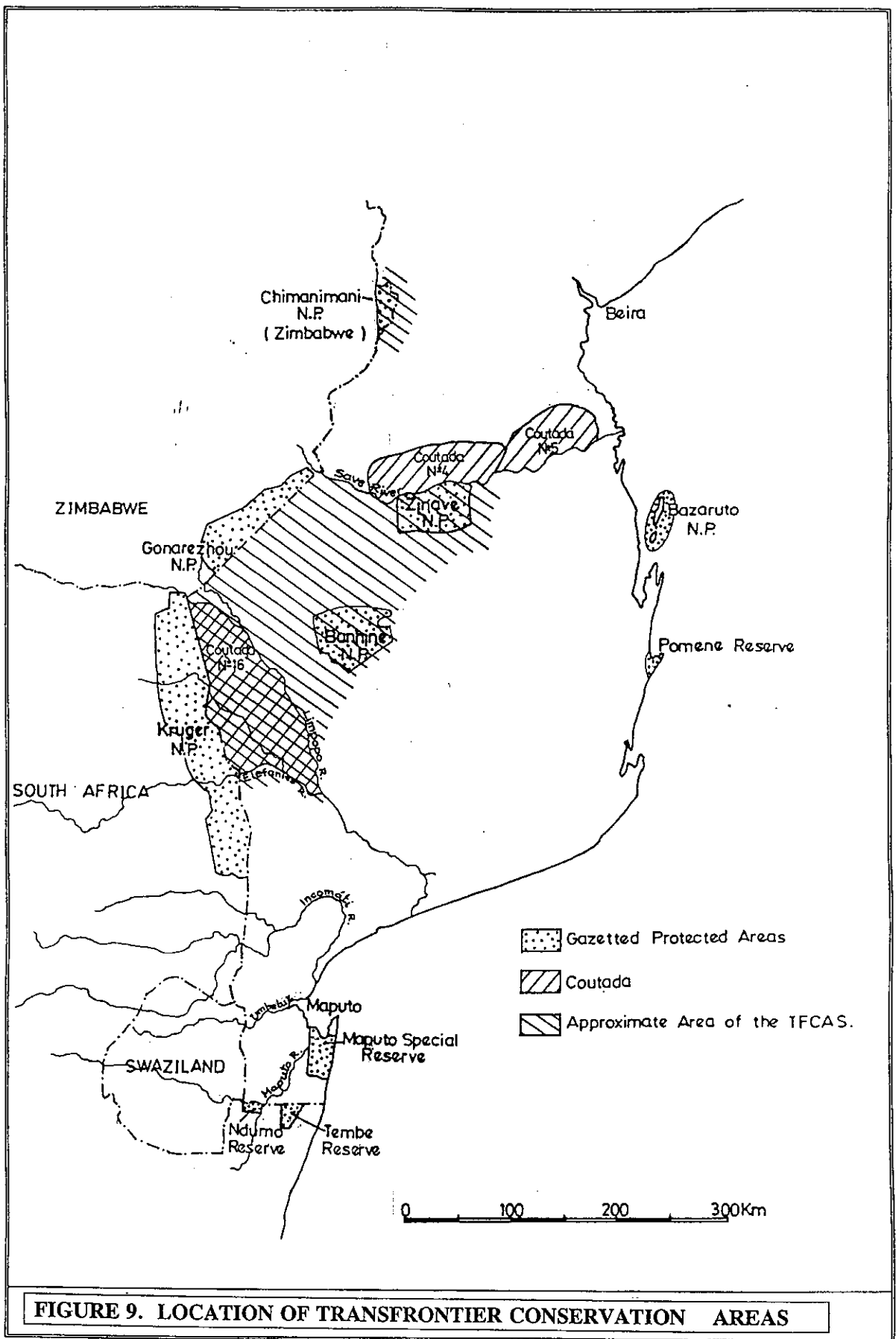


FIGURE 9. LOCATION OF TRANSFRONTIER CONSERVATION AREAS

Legal and institutional aspects

The recently passed Environmental Law has provisions that will allow for drawing up of complementary legislation related to integrated management planning approaches if necessary. Furthermore, the recent Land Law has a broad provision pertaining to Land Use Plans, stating that principles for the elaboration and approval of land use plans shall be defined by law.

Currently, in relation to the ICZM, this is being undertaken by a multi-sectoral group co-ordinated by MICOA. Legislation to enable ICZM will be formulated if required.

Priorities include a legal definition of the coastal zone, adoption of a land use plan for the coastal zone and enforcement mechanisms, and a legal basis for the creation of coastal protected areas and definition of management mechanisms.

Furthermore, there is a need for enactment of rules and guidelines for the development of agriculture, tourism, urban infrastructures, industrial infrastructures etc. in the coastal zone and for legal provisions for prevention of coastal pollution and a contingency plan for oil spills.

Within MICOA, the already established CZM Unit will be responsible for the activities related to coastal area management.

A multi-sectoral technical committee headed by MICOA will co-ordinate the preparation and implementation of the coastal zone program.

Land use planning will be one of the first steps for the ICZM. Three aspects will be taken into consideration, namely (i) the geographic scope, (ii) the current situation of coastal natural resources and their potential use, including by the local communities, and (iii) the institutional framework and legislation for coastal management.

The technical committee headed by MICOA will liaise with an inter-ministerial body falling under of the National Committee for Sustainable Development (NCSD) whose functions will be to co-ordinate coastal zone planning activities..

The establishment of a Coastal Zone Management Centre in Xai-Xai will be promoted which will lead the co-ordination of ICZM activities.

Actions

1. Promote the use of Integrated Management Planning, including co-ordination and support to on-going integrated management planning activities in relation to the conservation of biodiversity.
2. Provide for better co-ordination of activities related to intergrated coastal zone management, including definition of institutional mandates, adjustment of mandates to avoid gaps, overlap of powers and conflicts, and definition of common responsibilities and strategies on the management of the coastal area (MICOA in liaison with NCSD)
3. Promote the integrated Use of Shared Catchment Resources, in accordance with regional protocols.

2.7. SECTORAL AND CROSS-SECTORAL INTEGRATION

OBJECTIVE 2.7.

Integrate the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programmes and policies.

The Government of Mozambique approved the National Environmental Management Programme (NEMP) in 1996.

NEMP represents the culmination of a series of initiatives and activities co-ordinated by the Ministry for Coordination of Environmental Affairs (MICOA). NEMP is the master-plan for the Environment in Mozambique. It contains a National Environment Policy, Environment Umbrella Legislation and Environmental Strategy.

The NEMP consists of Sectoral Plans, for the medium and long term, which are intended to lead to sustainable development of Mozambique. Three policy areas are defined: rural, coastal and urban. For rural areas agriculture and forestry issues are considered the most important in coastal areas mangrove degradation, coastal pollution and erosion are the main issues to be addressed under the programme. For urban areas the degradation of sanitation systems and the poor water quality are the most urgent issues.

MICOA has been given the authority to oversee the implementation NEMP. To this effect, environmental rules and regulations will be devised and enforced. In this regard MICOA will evaluate policies of other ministries as well as their capacity to promote and implement sound environmental policy.

The Law of the Environment proposed by NEMP was passed by the GOM in 1997, which will facilitate and strengthen the role of MICOA.

The law recognises the responsibility of the Government of Mozambique to promote and implement the National Environment Management Programme. In order to ensure the effective co-ordination and integration of policies and activities related to environmental management a National Commission for Sustainable Development (NCSD) is created. The NCSD is a consultative body directly linked to the Council of Ministers (the Cabinet).

The law contains provisions directly linked to conservation of biodiversity, prohibiting all activities that adversely affect the conservation, reproduction, quality and quantity of biological resources especially those threatened with extinction.

The law also calls for the special protection of plant species threatened with extinction or those botanical components, isolated or in groups, requiring protection due to their genetic potential, importance, age and cultural and scientific value. It also obliges The Government to ensure that adequate measures are taken with regards to the maintenance and regeneration of animal species, rehabilitation of degraded habitats and the creation of new habitats through the control of activities or the use of substances likely to prejudice faunal species and their habitats.

Actions

1. Ensure that that considerations related to the conservation and sustainable use of biodiversity are integrated into sectoral plans, programmes and policies in accordance with the NEMP.
2. Establish a Biodiversity Unit within MICOA in order to promote and co-ordinate the integration of biodiversity considerations into sectoral and cross-sectoral planning and management (see Section 7).
3. Develop and promote integrated resource-use planning
4. Promote sector legislation and establishment of norms and criteria for sustainable use of the countries' natural resources
5. Strengthen MICOA's capacity to meet the requirements stated in its mandate, especially with regards to cross-sectoral issues related to biodiversity conservation.

3. IMPACT ASSESSMENT AND MINIMIZING ADVERSE IMPACTS

3.1. ENVIRONMENTAL IMPACT ASSESSMENT

OBJECTIVE 3.1.

To develop guidelines for environmental impact assessments and to ensure that environmental impact assessments are conducted for projects and activities, likely to have significant adverse effects on biodiversity.

Legal and institutional aspects

The Convention (Article 14) calls for the introduction of appropriate procedures requiring environmental impact assessments of its proposed projects that are likely to have significant adverse impacts on biological diversity.

In line with this provision of the Convention The National Environmental Management Programme (NEMP) and the recently passed Environmental Law both include provisions for conducting Environmental Impact Assessments (EIA's) for a range of projects which are likely to have significant impacts on the environment. In addition, several sectoral policies refer to the necessity for EIA's to be carried out for development projects, including tourism, forestry & wildlife, roads & bridges, and the Investment Promotion Centre.

The Ministry for the Coordination of Environmental Affairs is responsible for drawing up the necessary regulations to ensure that all sectors comply with the Environmental Law. MICOA will ensure that all developments projects are subject to an EIA which will be carried out by independent assessors according to Terms of Reference agreed up on by the Ministry. MICOA will ensure that the EIA studies are conducted according to the TOR.

An important part of the EIA process will be public consultation where all interested and affected parties will be consulted. Issues and concerns arising during the public consultation will be recorded and addressed in the EIA.

Content and guidelines

A broad meaning is currently given to the term environmental, including biophysical, socio-economic and cultural components. With regards to the impacts on biodiversity, special attention will be given to sensitive marine and terrestrial habitats and ecosystems, threatened habitats and ecosystems, endemic, restricted range, rare and/or threatened species.

The Environmental Impact Assessment report will identify and recommend mitigation measures to eliminate or reduce negative impacts on biodiversity and enhance positive impacts, for example the restocking of wildlife and rehabilitation of habitats.

There is, however, a recognized need to develop clearer guidelines for Environmental Impact Assessments, including provisions defining when assessments should be carried out, e.g. for which types of potentially harmful activities and the scale the activities should have in order to call for an EIA ("minimum limits")

Environmental management plan

Each EIA Report will include an environmental management plan which will outline the measures required to conserve biodiversity during the construction and operational phases of the project.

Of critical importance for the success in this respect will be the capacity of MICOA to ensure that the project managers adhere to the plan, i.e. monitoring during the construction and operational phases of the project cycle.

Actions

1. MICOA will draw up and submit regulations and guidelines for Environmental Impact Assessments in Mozambique which will include clauses pertaining to biodiversity conservation. This is currently being carried out by the MICOA.
2. Strengthening of MICOA to : a) draw up Terms of Reference for EIA's related to a variety of development projects b) Review EIA Reports c) Monitor the implementation of mitigating measures and the environmental management for *inter alia* the conservation of biodiversity.
3. Draw up national emergency response capabilities to deal with:
 - a) environmental impacts arising from oil spills and other marine pollutants
 - b) terrestrial impacts arising spillage of hazardous and toxic materials
 - c) definition of responsibilities related the rehabilitation of degraded habitat arising from (a) and (b) above.
 - d) review existing legislation and regulations with regards to culpability, compensation and indemnity in cases of environmental degradation resulting from oil spills, marine pollution and terrestrial pollution.

3.2. ALIEN SPECIES AND MODIFIED ORGANISMS

OBJECTIVE 3.2

Control the introduction and spread of alien species and genetically modified organisms that threaten or have the potential to threaten Mozambique's biological diversity.

The Convention on Biodiversity refers to the need for each Contracting Party to "Prevent the introduction of, control or eradicate those alien which threaten ecosystems, habitats or species" (Article 8(h)).

A related provision (Article 8(g)) calls for establishing means to regulate, manage or control the risks associated with the use and release of living modified organisms. This provision is dealt with in Section 2.1.

Status for Mozambique

Mozambique is blessed with a diversity of natural terrestrial and aquatic ecosystems. As recognized throughout this Strategy, sustainable development is dependent upon the maintenance of ecosystem productivity and processes. The causes and consequences of the destruction and degradation of natural habitats and ecosystems through incompatible land and water use practices are generally well-known. However, the introduction either deliberate or accidental, of non-indigenous plants, animals, fungi or microorganisms that may adversely affect biological diversity is often an overlooked issue in Mozambique.

The impact of introduction species (including man himself) is especially well documented for islands which are particularly sensitive to perturbations in ecosystem structure and function. In Africa the ramifications of the purportedly "successful" introduction of Nile Perch into Lake Victoria, for example, includes the extinction of species of haplochromine cichlids, unpredicted and unmanageable alterations in ecosystem food web structure.

Inland freshwater systems

There are no precise data related to the introduction of alien species in Mozambique. Most existing knowledge regarding exotic species is related inland freshwater system.

Common carp, *Cyprinus carpio*, was introduced into southern Africa in the 1700's and are well-established in several shared river systems in the region. In Mozambique common carp are regularly caught in the Nkomati and Limpopo River systems.

Chinese carp (grass carp, *Ctenopharyngodon idella*; silver carp, *Hypophthalmichthys molitrix* and bighead carp, *Aristichthys nobilis*) were introduced into Mozambique from Cuba for food production and weed control in the early 1990's. In 1994 the introduction of silver and grass carps into selected coastal barrier lakes in the Chidenguele area c. 20 km north of Xai-Xai was contemplated although this was not fully implemented.

It is generally held that Chinese carp have precise requirements for reproduction and that they are unable to reproduce outside their native range in the wild. However, increasing evidence exists that, contrary to expectations based on "reported knowledge", Chinese carps may be able to breed in the wild in southern African shared water systems. River scientists working in the Kruger National Park bordering Mozambique have expressed concern about silver carp which escaped from dams and reservoirs and are now breeding in the river systems of the Park. These river systems are shared with Mozambique and silver carp are reported for the Massingir Dam (on the Olifants River) and possibly the Limpopo River.

In 1967/1968 the Lake Tanganyika sardine (or kapenta) *Limnothrissia miodon* was introduced into Lake Kariba on the Zimbabwe/Zambezi border (dammed in 1958 and 500 km upstream of Lake Cahora Bassain Mozambique) the second largest man-made lake in Africa. Kapenta now provides the majority of the fish catch in Lake Kariba, about 21,000 t/yr.

Subsequently kapenta became established in Lake Cahora Bassa (created in 1975) apparently by invasive spread from Lake Kariba. Evidently *Limnothrissia* had been able to survive passage through the Kariba barrage hydro-electric turbines and move down the Zambezi River to colonize Lake Cahora Bassa. Once established the kapenta populations of Cahora Bassa thrived taking advantage of the high productivity in the Lakes early years as well as the newly created lacustrine (deepwater) environment.

Aquatic weeds such as the water hyacinth (*Eichornia*) have become established in several freshwater systems for example the Nkomati and Sabie Rivers in southern Mozambique and the wetlands of the Gorongosa National Park, Sofala Province.

Marine ecosystems

The extent, nature and impact of alien species in relation to the marine environment are not well known in Mozambique. There is increasing evidence that the accidental introduction of fish species translocated by ocean-going vessels has resulted in their establishment in South African marine waters shared by Mozambique.

Terrestrial ecosystems

The Indian crow (*Corvus corvus*), which has become established at several localities along the east African coast, most notably Dar es Salaam and the Seychelles Island with disastrous effects on the indigenous biodiversity, is now flourishing on Inhaca Island c. 35 km east of Maputo. The Indian crow population on the Island originates from a single pair that was introduced in the 1960's as pets by the hotel manager. Recent attempts (1994-1997) to eradicate the population have proved unsuccessful. It is believed that the crow population is still restricted to the Island. However, should they become established on the mainland it may be impossible to eradicate this introduced bird species.

There are several forestry plantations comprised mainly *Eucalyptus* and *Pinus*; these currently cover an area of c. 46,000 ha of the national territory whilst *Casuarina* have been extensively used for dune stabilization. It is not known whether these introduced tree species have become established outside the plantation areas.

Lantana camara (common lantana), locally known as "chimunhuamunhuana", is one of the most serious invader species in southern Africa and is considered to be one of the world's ten worst weeds. This weed has become established in various areas of Mozambique including Gorongosa Mountain from where it is spreading into the adjacent National Park. *Lantana* is toxic to cattle by attacking the liver and making them sensitive to sunlight.

Policy for Mozambique

Notwithstanding these above concerns, it is recognized that certain alien species could contribute significantly to the socio-economy of the country. Mozambique will, therefore, formulate proper procedures for the introduction and if necessary eradication of alien species to ensure that adverse impacts on indigenous biota and ecosystems are reduced or eliminated whilst, concomitantly, enhancing socio-economic benefits.

ACTIONS

1. Review, revise and formulate policy, legislation and programmes related to the control, introduction, translocation and management of alien species that may adversely affect ecosystem processes and/or biological diversity.
2. Ensure that projects involving the introduction and management of alien organisms (such as re- and afforestation and fresh water and marine aquaculture) are subject to a proper EIAs in accordance with the Environmental Law.
3. Promote research into the extent nature and impacts introduced alien organisms that threaten or have the potential to threaten Mozambique's biological diversity.
4. Develop and implement appropriate control and eradication measures for alien organisms that threaten biological diversity.
5. Promote, and collaborate in, regional initiatives for the control of alien species in shared ecosystems
6. Promote the use of indigenous flora and fauna for the rehabilitation and re-vegetation of degraded areas or areas prone to erosion.
7. Promote, through the dissemination of information, public awareness regarding the risks of introduction of alien species.

4. SCIENTIFIC KNOWLEDGE AND CAPACITY

OBJECTIVE 4.1.

Improve the knowledge of important components of Mozambique's biodiversity

Current knowledge

Mozambique is a vast country comprising a diversity of terrestrial freshwater and marine habitats. However, the biodiversity of Mozambique is poorly known and poorly documented due to a number of reasons including lack of human resources, lack of possibilities to carry out field-studies during the period of civil unrest and weak institutional capacity.

A limited amount of data is available for some taxonomic groups, but some of the data is outdated, as it was collected before the war.

Existing knowledge is dispersed over various sectoral agencies as well as with individuals in the form of project documents, reports, scientific articles, maps, aerial photographs and satellite imagery. The information has not been integrated at the national, local and even in some cases the institutional level. In addition, data sets are based on different classification systems, organized along different formats and are of varying accuracy.

A number of biodiversity mapping and inventory activities have been undertaken, or are underway, but a first major task will be to compile and synthesize existing information on biological and socio-economic issues, as well as the existing legal and institutional provisions pertinent to biodiversity use, management i.e. identify institutional jurisdiction, responsibilities, structure and co-ordination.

The Need for Research

It is recognized that many of the actions outlined in this Strategy can only be implemented when a more detailed understanding exists of the status of Mozambique's biodiversity. However, the implementation of these actions cannot await a full understanding of all facets of biodiversity and ecosystem processes.

The implementation of actions will, therefore, need to be accompanied by relevant and applied research to allow constant revision and, if necessary, refocusing of activities. There is also a need for a better compilation, synthesis and analysis of already existing data.

A major constraint facing Mozambique is the lack of trained personnel to carry out research. Prior to Independence in 1975 there were few trained Mozambican scientists. Following Independence, Mozambique embarked upon a massive educational development strategy focussing on primary, secondary and tertiary education.

It was only the late 1980's and early 1990's that the first cadre of trained Mozambican biologists, foresters and agronomists graduated from Mozambique's only national University. Today the process of consolidating scientific and research capacity building is continuing through a variety of postgraduate programmes. It should be noted that due to the inheritance of a very weak institutional and human resource base, all Mozambican postgraduates are still obliged to register for higher degrees Universities outside of the country.

It should be noted, that research will be carried out in close collaboration with natural resource users, not least the local communities (see Section 2.5), planners and managers, so that data arising from the research can be applied for the implementation of effective conservation measures and sustainable use strategies.

It is important that research not only be carried out in the technical and biological fields, but that the full range of issues of importance for the implementation of the Convention are included in research programmes.

Furthermore, traditional community-based knowledge related to the conservation of biodiversity should be recognized as an important source of information and should be viewed as being complementary to information collected using modern scientific methods (see Section 2.5)

Capacity building

One of the major challenges facing Mozambique is therefore, strengthening research capacity through scientific and technical training. It must be stated upfront that a major constraint to building research capacity as well as carrying out research is the very limited amount of funds that can be allocated to this sector.

The Government of Mozambique will, therefore, together with the national University and research institutes promote the acquisition of funds through a variety of mechanisms to support research.

Emphasis will be given for the training of taxonomists especially for those areas where taxonomic groups are poorly known such as small mammals, avifauna, ichthyofauna, reptiles, amphibians, insect fauna, non-vascular plants, fungi and micro-organisms.

A number of existing institutes will be relevant for capacity building, including The National Herbarium, The Mondlane University, The Natural History Museum, The Plant Genetic Resources Centre, The Department of Forestry and Wildlife and The Forestry Research Centre.

It is important that also institutions in the fields of social and economic sciences are involved in future research related to biodiversity, not least because many of the underlying causes of biodiversity degradation are of a socio-economic nature.

Actions

1. Promote the compilation, synthesis and analysis of existing biodiversity information, and ensure that this information is disseminated in a usable form, in order to facilitate the conservation and sustainable use of biodiversity.
2. Identify a focal point institute tasked with the activities referred to in action 1 above.
3. Promote the training of scientists and technicians from relevant institutions to carry out research into and inventories of Mozambique's biodiversity.
4. Promote research programmes, as well as individual surveys and inventories relevant to the knowledge about important components of biodiversity, and secure that, where necessary, activities are carried out using a multi-disciplinary approach.

5. PUBLIC AWARENESS AND EDUCATION

OBJECTIVE 5.1.

Improve the public awareness and education related to conservation and sustainable use of biodiversity

Importance of public awareness

The success of conservation efforts depends on the understanding and participation of all Mozambicans.

It is therefore important that both the relevant institutions involved in research, schools at all levels, and the various institutions involved in community work actively participate in information dissemination and building of public awareness related to conservation and sustainable use of biological diversity.

To achieve the objective it will be necessary to review existing programmes within research, public education and programmes related to community participation to ensure, that these adequately cover subjects relevant to the conservation of biodiversity. Based on this review a coordinated programme for public awareness and education related to conservation and sustainable use of biodiversity should be established.

Actions

1. Establish and implement, through the National Biodiversity Unit, a coordinated programme, to enhance public awareness and education related to conservation and sustainable use of biodiversity.
2. Encourage institutes and organization involved in research into and conservation of biodiversity to embark upon public awareness building and education through stimulating an interest in biodiversity related issues.

6. INTERNATIONAL RELATIONS

OBJECTIVE 6.1

To ensure the prioritised and co-ordinated participation of Mozambique, internationally and regionally, in initiatives aimed at the conservation and sustainable use of biological diversity.

Current Status

Mozambican governmental and non-governmental organisations involved in, and responsible for, environmental issues are relatively young. Nevertheless, they are working intensively to integrate Mozambique in international and regional environmental initiatives. Through the efforts of the recently created Ministry for the Coordination of Environmental Affairs Mozambique (MICOA) is party to several international environmental conventions and is represented in a number of international forums.

Apart from The Convention on Biological Diversity Mozambique is party to a range of international and regional environmental conventions and agreements of relevance to the conservation of biodiversity.

Some conventions and agreements of particular relevance to the conservation of biodiversity has been signed but not ratified by Mozambique, including The Convention on the Trade in Endangered Species (CITES) and the The Protocol on Shared Water Systems in the SADC Region and The Multilateral Management on the Zambezi River.

Furthermore Mozambique has not signed or ratified some international conventions of particular importance to the conservation of biodiversity, the most important being the RAMSAR Convention on Wetlands of International Importance Especially as Waterfowl Habitat.

At the regional level Mozambique needs be more integrated in existing initiatives. Policies related to the South African Development Community are mainly related to economic and political issues. More emphasis needs to be placed on environmental considerations especially with regard to use and management of natural resources at the catchment level.

ACTIONS

1. Review Mozambique's participation in regional and international agreements relevant to the conservation and sustainable use of biodiversity, and ensure that efforts are well co-ordinated and prioritised
2. Contribute to the formulation and development of new bilateral agreements relevant to conservation of biodiversity
3. Promote accession to, and ratification of, regional and international agreements relevant to biodiversity conservation will be promoted especially the RAMSAR Convention for the Protection Wetlands of International Importance and the ratification of the CITES convention
4. In accordance with international conventions and agreements identify sites of natural, biological or scenic value and promote the recognition of these sites according to international status for example Natural Heritage Sites, RAMSAR Sites, Biosphere Reserves etc
5. Maintain and strengthen Mozambique's participation in international organisations concerned with sustainable development and biodiversity conservation
6. Participate actively in agreements, protocols and activities of international organisations
7. Review, and if necessary revise, existing legislation in Mozambique to ensure that national legislation complies with the obligations and objectives of international and regional conventions and agreements

7. IMPLEMENTATION

In order to implement the Strategy it will be necessary to establish proper institutional arrangements within in Mozambique. In order to achieve this a Biodiversity Unit will be established within the Ministry for the Coordination of Environmental Affairs. Although housed within MICOA the Unit will comprise permanent and *ad hoc* members representing key government agencies and civil society (see organogram).

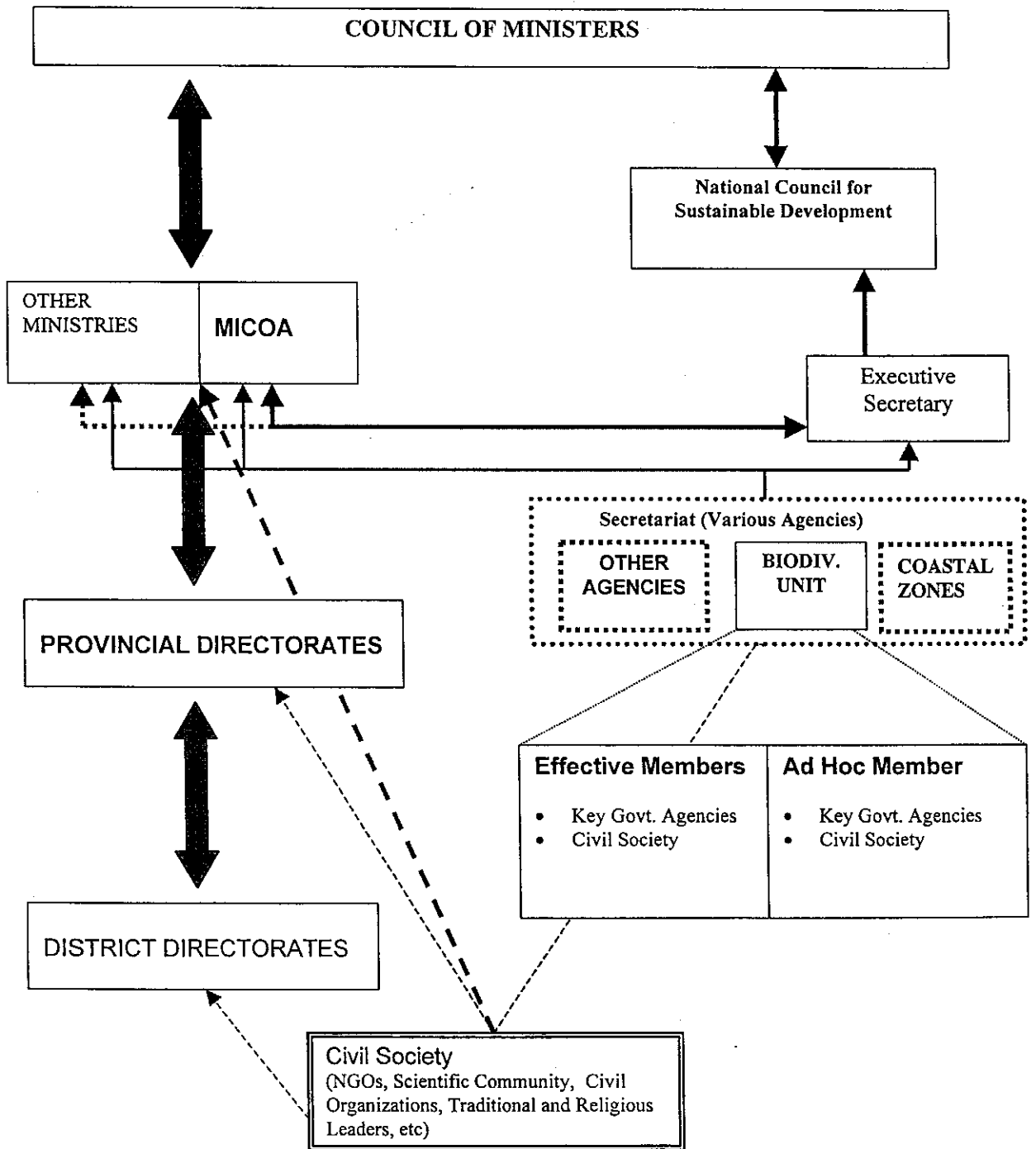
The Unit will liaise regularly National Council for Sustainable Development (linked to Council of Ministers) to ensure that biodiversity considerations are included in cross sectoral plans, programmes and policies.

In order to effectively implement the Strategy it will be necessary for the Biodiversity Unit to prioritize activities and establish time frames for their realization.

Several of the objectives are current being pursued by other national strategies and programmes and their will be taken into account when prioritizing actions.

The Biodiversity Unit will be responsible for national coordination and review at all stages of implementation. The institutional arrangements have been designed to ensure full participation of all sections of Mozambican society in the implementation and, where necessary, revision of the Strategy; these include:

- Government agencies at the National Provincial and District Levels;
- Non-Governmental organizations;
- Local community associations and representatives;
- Research and Educational Institutes;
- Private sector



ANNEXES

REFERENCES

Dutton, T.P. and Dutton, E.A.R. (1975) Reconhecimento preliminar das montanhas de Chimanimani e zonas adjacentes com vista à criação duma área de conservação. *An. Serviços Vet. Moç* **20/21**, 123-203.

Gove, D. & Magane, S. (1996). The status of sea turtle conservation and research in Mozambique. Proceedings from the Workshop on the Role of Research in Coastal Zone Management, Maputo, 24-25 April, 1996. Published by: Departamento de Ciências Biológicas, Universidade Eduardo Mondlane.

Guissamulo, A. (1993). Distribuição e abundância de golfinhos e Dugongos e sua interacção com algumas pescarias nas baías de Maputo e Bazaruto. Trabalho de Licenciatura. DCB/UEM. Maputo, Moçambique. 93pp.

Hughes, G.R. (1971). Preliminary report on the sea turtles and dugongs of Mozambique. *Moç.Vet.J.* 4(2):45-62.

Tello, J.L.P.L. (1973) Reconhecimento Ecológico da Reserva dos Elefantes do Maputo. *Veterin. Moçamb.* Lourenço Marques, 6 (1): 19-76.

Tinley, K.L. (1971) Determinants of coastal conservation: dynamics and diversity of the environment as exemplified by the Moçambique coast. *Proc. Symp: Nature Conservation as a Form of Land Use. Gorongosa National Park.* 13-17 September 1971. SARCCUS:125-153

Tinley, K.L. (1997) *Framework of the Gorongosa Ecosystem.* PhD Thesis, University of Pretoria.

Tinley, K.L. Rosinha A.J., Lobao Tello, J.L.P. and Dutton, T.P. (1974). Wildlife and wild places in Mozambique. *Oryx* 13:344-349.

Saket, M. and Matusse, R.M. (1994). Estudo de Determinação da Taxa de Deflorestamento da Vegetação de Mangal em Moçambique. FAO/PNUD MOZ/92/013. Unidade de Inventário Florestal, Departamento Florestal, Direcção Nacional de Florestas e Fauna Bravia, Ministério da Agricultura, Maputo.

Smithers, R.H.N. and Tello, J.L.P.L. (1970) Check List and Atlas of the Mamals of Moçambique. *Museum Memoir*, Number 8. 184pp.

van Wyk, A.E. (1994) Maputaland-Pondoland Region. South Africa, Swaziland and Moçambique. In: *Centres of Plant Diversity. A guide and strategy for their conservation.* Vol.1. WWF & IUCN 227-235.

GLOSSARY

Alien species – A species occurring in an area outside its historically known natural range as a result of intentional or accidental dispersal by human activities (including exotic organisms, genetically modified organisms and translocated species).

Biological diversity – The variety of life forms: the different plants, animal and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystems diversity.

Biota – All of the organisms at a particular locality.

Conservation – The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment.

Ecologically sustainable use – The use of a species or ecosystem within the capacity of the species ecosystem and bioregion for renewal or regeneration.

Ecosystem – A dynamic complex of plant, animal, fungal, and microorganism communities and the associated non-living environment interacting as an ecological unit.

Endemic – Restricted to a specified region or locality.

Exotic species – see Alien species

Ex-situ conservation – Conservation of species outside their natural habitats; for example, in zoos, botanic gardens and seed banks.

Gene – The functional unit of heredity; that part of the DNA molecule that encodes a single enzyme or structural protein unit.

Genetically modified organisms (GMO's) – Organisms whose genetic make up has been altered by the insertion or deletion of small fragments of DNA in order to create or enhance desirable characteristics from the same or another species. (see also: Living Modified Organisms)

Genetic material – All or part of the DNA of a genome or all or part an organism resulting from expression of the genome.

Genetic products – Identifiable chemical compounds from extracts, distillates, secretions and exudates of biological material that result from the expression of a gene, or set of genes governing a metabolic pathway, within an organism.

Genome – The total genetic complement of the cell(s) of organism – in eukaryotic cells, all the genes contained in a single set of chromosomes, and extra-nuclear DNA; in prokaryotic cells, circular DNA molecule(s) and any plasmids; in viruses, the RNA or DNA combined with the viral protein coat.

Germplasm – The genetic material that carries the inherited characteristics of an organism.

Habitat – The place or type of site in which an organism naturally occurs.

Indicator species – A species whose presence or absence is indicative of a particular habitat, community or set of environmental conditions.

In-situ conservation – Conserving species within their natural habitats.

Introduced species – see Alien species.

Living modified organisms – (LMO's) There are two distinct categories of LMO's. The first category includes organisms whose genetic material been modified by traditional or conventional techniques, such as plant breeding or artificial insemination. The second category includes genetically modified organisms whose genetic material has been more directly modified through, for example, recombinant DNA technology

Management for biological diversity – Taking action aimed at the maintenance of biological diversity and the environment, including protection, intervention and non-intervention.

Minimum viable population – The minimum number of individuals of a species in a given locality that could be expected to survive in the long-term.

Native vegetation – any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance. It excludes plantations and vegetation that has been established for commercial purposes.

Protected area – A protected area is defined in Article 2 of the International Convention on Biological Diversity as a 'geographically defined area which is designated or regulated and managed to achieve specific conservation objectives'.

Species – A group of organisms capable of interbreeding freely with each other but not with members of other species.

Taxon (pl. taxa) – The named classification unit to which individuals or sets of species are assigned, such as species, genus and order.

Threatened – A species or community that is vulnerable, endangered or presumed extinct.

LIST OF ABBREVIATIONS APPEARING IN THE TEXT

<i>CBD</i>	Convention on Biological Diversity
<i>CBNRM</i>	Community – Based Natural Resource Management
<i>CEF</i>	Centro de Experimentação Florestal (Forestry Research Centre)
<i>CITES</i>	Convention on the Trade of Endangered Species
<i>COP</i>	Conference of the Parties
<i>DNFFB</i>	Direcção Nacional de Florestas e Fauna Bravia (National Directorate of Forestry and Wildlife)
<i>DPAP</i>	Direcção Provincial de Agricultura e Pescas (Provincial Directorate of Agriculture and Fisheries)
<i>EIA</i>	Environmental Impact Assessment
<i>FAO</i>	Food and Agricultural Organization
<i>FAEF</i>	Faculdade de Agronomia e Engenharia Florestal (Faculty of Agronomy and Forestry)
<i>FWPS</i>	Forestry and Wildlife Policy and Strategy
<i>GMO</i>	Genetically Modified Organisms
<i>GNP</i>	Gross National Product
<i>GOM</i>	Government of Mozambique
<i>ICZM</i>	Integrated Coastal Zone Management
<i>INIA</i>	Instituto Nacional de Investigação Agronómica (National Institute for Agronomic Research)
<i>MICOA</i>	Ministério para a Coordenação de Acção Ambiental (Ministry for the Coordination of Environmental Affairs)
<i>MICTUR</i>	Ministério de Indústria, Comércio e Turismo (Ministry of Industry, Commerce and Tourism)
<i>NEMP</i>	National Environmental Management Programme

<i>NCSD</i>	National Commission for Sustainable Development
<i>NGO</i>	Non-Governmental Organization
<i>NPGRC</i>	National Plant Genetic Resources Centre
<i>NSIMA</i>	Northern Sofala Integrated Management and Action Plan
<i>PROAGRI</i>	Programa Nacional para o Desenvolvimento de Agricultura (The National Programme for Agriculture Development)
<i>SADC</i>	Southern African Development Community
<i>SEMOC</i>	Sementes de Moçambique (Mozambique Seed Company)
<i>SPFFB</i>	Serviços Provinciais das Florestas e Fauna Bravia (Provincial Forestry and Wildlife Services)
<i>TAC</i>	Total Allowable Catch
<i>TFCA</i>	Transfrontier Conservation Area
<i>UNCED</i>	United Nations Conference on Environment and Development
<i>ZACPLAN</i>	Zambezi River Basin Action Plan