



**Government of the Republic of Zambia  
Ministry of Environment and Natural Resources**



**National Biodiversity strategy and  
Action Plan**

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## FOREWORD

Zambia is endowed with an abundance of Natural Resources and a fairly rich biological diversity. In common with other developing countries, Zambia is highly dependent on the exploitation of biological resources for the livelihood of the majority of its people especially those living in rural areas. Since the early 1980s Zambia has witnessed rapid degradation of its biological resources due to over exploitation and destruction from pollution, fires and other human activities. Although the total contribution of biological diversity to the national economy is not known, the contribution of agriculture, forestry and fishing to GDP was estimated at 17.2 percent in 1996 and 16.0 percent in 1997

Zambia recognizes the importance of biodiversity and has over the years developed a number of programmes aimed at conserving the country's biodiversity and ensuring its sustainable use. On May 28, 1993 Zambia ratified the Convention on Biological Diversity (CBD) to signify our commitment to the convention, and early in 1997, we embarked on the process of developing a national Biodiversity Strategy and Action Plan (BSAP) as a tool for biodiversity conservation. This plan states Zambia's development priorities, potential and constraints and identifies opportunities for donor support in the conservation and management of the country's biodiversity during the next five years (2000-2004).

The preparation of this document also serves to comply with the provisions of Article 6 of the CBD requiring all contracting parties to develop national strategies, plans or programmes for the conservation and sustainable use of the national biodiversity. The overall process of preparing the BSAP therefore followed a coordinated participatory approach involving broad representation of all stakeholders including policy and development planners, resource managers, academics, NGOs, the private sector, traditional leaders, international organizations and individuals.

The preparation of this document was made possible through funding kindly made available by the Global Environmental Facility (GEF) through the United Nations Development Programme (UNDP) to whom we are greatly indebted. Technical support and guidance for the preparation of this document was provided by IUCN - The World Conservation Union. We are greatly indebted to these organizations.

On behalf of the Government of the Republic of Zambia and indeed on my own behalf, I would like to express sincere gratitude to all the consultants and participants who were involved in various workshops and those who worked tirelessly to make this report possible.

Hon. William J. Harrington, MP  
Minister of Environment and natural Resources

## **ACKNOWLEDGEMENTS**

This document integrates the outputs of three components of a strategy and action plan formulation process. The first part of the process gathered existing information on the status and trends of Zambia's ecosystem diversity and species biodiversity. Among others, the study component prepared a preliminary inventory of ecosystems and species biodiversity and identified threats and emerging issues. These studies prepared ground for the overall biodiversity country study or assessment. The biodiversity stock-taking assessment was undertaken by various national consultants including M. Bingham, M.L. Bangwe, E. Chisanga, G. Kalyocha, H. Mwima, G. Kapooria, K. Mbata, D.N. Mbewe, G.P. Mwila, H.G. Mudenda, L. Mumba, D.K. Mwinga and M. Sichilongo under the leadership of Prof. E.M. Chidumayo.

The second part of the process was consensus building and it entailed conducting 7 consultative workshops at the provincial level and 2 at the national level. The workshops served to enhance public awareness and involvement to ensure that project and process ownership remained vested in the local stakeholders. The consensus building process was led by Mr. L. Aongola, Mr. G. Chilukusha and Mr. K. Mwansa in the Ministry of Environment and Natural Resources in collaboration with IUCN - The World Conservation Union.

The third component of the process was the synthesis and analysis of the findings of the stock taking exercise and of reports from the consensus building workshops to draft the national BSAP. This component of the process was preceded by training of a Core Team of professionals in analysis and selection of options and drafting of an integrated NBSAP document for consideration by the national stakeholders. The training exercise was essential considering the complexity of the process and the diversity in its content. Training of the Core Team was done by Mr. Roy Hagen, an international consultant provided by the UNDP-GEF, New York. Compilation of the draft BSAP was done by IUCN who also conducted the final review and editing of the same document through the services of a team led by Mr. L. Aongola on behalf of IUCN.

The IUCN - Zambia Office is proud to have been associated with Zambia's BSAP process and wishes to express sincere gratitude to all the people who contributed to the success of the preparation and production of Zambia's first BSAP. In this regard, particular note is made of the input of indigenous knowledge experts through traditional leaders and the local communities. The Government of Zambia's commitment during the process was demonstrated through high level participation by the institutions of all concerned sectors such as the Ministry of Agriculture, Food and Fisheries, Ministry of Tourism, Ministry of Energy and Water Development, Ministry of Local Government and Housing along side the Ministry of Environment and Natural Resource. Their broad participation is an indicator of the shared ownership the process and the outcome of the national BSAP enjoys. I wish to express my gratitude to them all!

**Ms Sally Linda Mulalu  
Country Representative  
IUCN-The World Conservation Union, Zambia Office**

## **ABBREVIATIONS AND ACRONYMS**

ADMADE	Administrative Management Design for Wildlife Management
ASIP	Agricultural Sector Investment Programme
BSAP	Biological Diversity Strategy and Action Plan
CBD	Convention On Biological Diversity
CBNRM	Community Based Natural Resources Management
CCD	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa
CITES	Convention On International Trade in Endangered Species of Flora and Fauna
ECZ	Environmental Council of Zambia
EPPC	Environmental Protection and Pollution Control
ERP	Economic Recovery Programme
ESP	Environmental Support Programme
FAO	Food and Agricultural Organization of the United Nations
GDP	Growth Domestic Product
GEF	Global Environment Facility
GMAs	Game Management Areas
GMOs	Genetically Modified Organisms
GRZ	Government of the Republic of Zambia
HIV/AIDS	Human Immuno-Deficiency Virus/Acquired Immune Deficiency Syndrome
IMF	International Monetary Fund
IUCN	International Union for the Conservation of Nature (now called 'The World Conservation Union')
LIRDp	Luangwa Integrated Resource Development Programme
MAFF	Ministry of Agriculture, Food and Fisheries
MCDSS	Ministry of Community Development and Social Services

<b>MENR</b>	<b>Ministry of Environment and Natural Resources</b>
<b>MEWD</b>	<b>Ministry of Energy and Water Development</b>
<b>MIBS</b>	<b>Ministry of Information and Broadcasting Services</b>
<b>MLA</b>	<b>Ministry of Legal Affairs</b>
<b>MLGH</b>	<b>Ministry of Local Government and Housing</b>
<b>MOH</b>	<b>Ministry of Health</b>
<b>MOT</b>	<b>Ministry of Tourism</b>
<b>NCS</b>	<b>National Conservation Strategy</b>
<b>NEAP</b>	<b>National Environment Action Plan</b>
<b>NGOs</b>	<b>Non-Governmental Organizations</b>
<b>NISIR</b>	<b>National Institute for Scientific and Industrial Research (formerly known as the National Council for Scientific Research)</b>
<b>NORAD</b>	<b>Norwegian International Development Agency</b>
<b>NPWS</b>	<b>National Parks and Wildlife Services</b>
<b>PA</b>	<b>Protected Area</b>
<b>PFAP</b>	<b>Provincial Forestry Action Plan</b>
<b>SADC</b>	<b>Southern Africa Development Community</b>
<b>UNDP</b>	<b>United Nations Development Programme</b>
<b>UNESCO</b>	<b>United Nations Educational, Scientific and Cultural Organisation</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>UNZA</b>	<b>University of Zambia</b>
<b>WCMC</b>	<b>World Conservation Monitoring Centre</b>
<b>WWF</b>	<b>World Wildlife Fund</b>
<b>ZAWA</b>	<b>Zambia Wildlife Authority</b>
<b>ZFAP</b>	<b>Zambia Forestry Action Plan</b>

## **TECHNICAL TERMS**

<b>BIODIVERSITY</b>	Biodiversity is a short form for biological diversity and is defined by IUCN as the variations in biological organisms which occurs at ecosystem, species and gene level.
<b>CATCHMENT AREA</b>	The area from which rainfall flows into a river, reservoir etc.
<b>CHILA</b>	Communal system of hunting Lechwe by the Ila-speaking people on the Kafue flats.
<b>CHITEMENE</b>	A system of cultivation which involves lopping of tree branches which are then heaped in a circular fashion and burnt to create an ash bed.
<b>DE-CENTRALIZATION</b>	The allocation of responsibilities for decision making and operations to lower levels of government, community organizations, the private sector, and NGOs.
<b>ECOSYSTEM</b>	A dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit.
<b>FUNDIKILA</b>	A system of cultivation which involves turning the grass and covering it with soil to allow it to decompose.
<b>PROGRAMME</b>	A definite plan of intended procedure.
<b>STAKEHOLDER</b>	An organization or individual that is concerned with or has an interest in Zambia's biological resources and that would be affected by decisions about biological resource management.
<b>STRATEGY</b>	A set of chosen actions to support the achievement of a specified development goal.
<b>WATERSHED</b>	The line separating waters flowing into different rivers or basins. Sometimes used interchangeably with catchment area.

## **EXECUTIVE SUMMARY**

### **Country Setting**

Zambia is a landlocked country in Southern Africa. The country covers an area of 752,614 Km<sup>2</sup> and is surrounded by Mozambique, Malawi, Tanzania, and the Democratic Republic of Congo, Angola, Namibia, Botswana and Zimbabwe.

The whole country lies on the Central African Plateau with altitude between 1000 and 1600 metres above sea level, giving it a moderately cool sub-tropical climate with three seasons; the cool dry (April-August), hot dry (August-November) and hot wet (November-April). Rainfall varies from 700mm in the south to 1500mm in the north and most of it is concentrated over the period November-March.

Zambia's population has doubled in size over the past decades, from 3.41 million in 1963 to about 7.99 million in 1993, and is expected to double again by the year 2010. Attributes of the country's population contributing to its dynamism include; (i) youthfulness, with 51 percent of the population under the age of 16; (ii) high fertility of an average 6.7 children per women; and, (iii) decline in mortality rate prior to the advent of Human Immuno-Deficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) epidemic in the late 1980s. The rapid population growth has led to greatly increased pressure on the country's natural resource base including its biodiversity.

In order to try and arrest the poverty among its population that has seen a tremendous rise since the early 1980s, the Zambian Government has been implementing an Economic Recovery Programme (ERP) with the support of the International Monetary Fund (IMF) and the World Bank. The poor socio-economic situation prevailing in the country has largely contributed to the failure to effectively plan and manage its natural resources, and to ensure the equitable sharing of benefits accruing from biological resources among its people.

### **Biological Diversity in Zambia**

The Convention on Biological Diversity (CBD) defines biological diversity as the variability among living organisms. Variability occurs at the species, ecosystems and gene levels. Although this definition was adopted in the formulation of Zambia's Biodiversity Strategy and Action Plan (BSAP), much of the work in the Country is at species level and to a limited extent on ecosystem.

Floristically, Zambia lies within the Zambezian regional center of endemism. Savanna is the major terrestrial biome and lies between the rain forest conditions in the northwest and semi-desert conditions in the southwest. Therefore, in this context, Savanna consists of woodland and grassland type of vegetation.

The two, together with the forest and thicket, constitute the four main vegetation life forms upon which the country's fourteen terrestrial ecosystems are classified. Zambia

also has fresh water aquatic ecosystems and anthropic land cover types, of which agricultural land is the most important in terms of biodiversity. For agricultural purposes, Zambia has been divided into three agro-ecological zones corresponding to agro-climatic zones.

The country study showed that Zambia has a total of 8017 species of organisms of which microorganisms, plants and fauna constitute 8,47 and 45 percents, respectively. A total of 316 species of plants and animals are endemic, 174 are rare and 31 are endangered/vulnerable. The munga and miombo woodlands and grasslands are the ecosystems with the highest biodiversity while the montane forest, though limited in extent, has the highest number of endemic woody plants. The diversity of ferns and orchids is correlated to ecosystem diversity. Agricultural biodiversity contributes about 100 cultivated plant species of which 15 percent are classified as indigenous and 7 percent naturalized. There are also about 16 species of domesticated animals of which the majority are cattle and chickens.

### **Biodiversity and Development**

Conservation of biodiversity in Zambia is derived from the need to support the economic and livelihood activities of the country's population who depend on natural resource utilization. The agriculture, fisheries, forestry, wildlife and tourism sectors directly depend on biodiversity. Other sectors including mining, manufacturing, transport, trading and financial services, whilst indirectly dependent on biodiversity can impact negatively on it. Farming supports more than one third of the total population while a lot more depend on the formal and informal sector activities in the forestry, tourism and fisheries sectors. Conservative estimates show that agriculture, fisheries and forestry contribute about 18 percent of the total Gross Domestic Product (GDP), manufacturing from food, beverage and tobacco another 9 percent. The livelihood of the rural populace in Zambia is directly dependent on forests to provide ash fertilizer for shifting cultivation, timber, energy, household tools and construction materials. Wild plants and animals are important sources of food, medicine and valuable chemical products.

Apart from the direct economic benefits, biodiversity plays a critical role in the healthy functioning of ecosystems. These roles include nutrient and water recycling, land protection from erosion, climate stabilization through carbon in its forests/woodlands although annual forest loss is poorly known.

### **Threats to Biodiversity**

The major threats to biodiversity conservation in Zambia are mainly caused by human activities. These include deforestation, wildlife, population growth and pollution. Deforestation is a result of excessive cutting in illegal coupes, commercial harvesting and conversion of forestland to agriculture. These, in turn are driven by population growth and basic needs of people. With regard to wildfires, the most destructive ones are those caused by late burning. Fire intensity is influenced by the over-exploitation of forests that changes the light conditions and accelerates grass growth, which in turn provides fuel

for late fires. The result of deforestation and fires has been and habitat destruction that has changed the status of forest reserves in the country. About 20 percent of the forest reserves in the country are either encroached or depleted. Also contributing to habitat destruction is land use conflict between wildlife in National Parks and GMAs and human activities such as cultivations, livestock grazing and settlements. Tsetse-fly eradication programmes have also contributed in human encroachment of wildlife estate.

Some introduced species of plants have tended to be very invasive and also posed a threat to ecosystems and indigenous species. Among such weeds are lantana (*Lantana camara*), kariba weed (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*). The introduction of improved varieties of crops such as maize has almost completely replaced local varieties and landraces.

Pollution of water system has reduced invertebrate diversity while that caused by wide scale application of pesticides and herbicides to protect crops and control pests have alien aquatic weeds is also linked to eutrophication of water bodies by industrial, domestic and agricultural pollution.

The poor state of museums, herbaria and gene banks, as repositories of biodiversity resources poses as a threat to the maintenance of plants and animal collections. Limited access to biodiversity literature, some of which is maintained at institutions abroad, and lack of proper training hamper the advancement of biodiversity knowledge. Further, some of the cultural and social values attached to resources today are a threat to the conservation of these natural resources. For instance, the demand for game meat in urban areas despite livestock being readily available has a cultural connotation and is responsible for most of the illegal harvesting of the wildlife going on.

### **Sharing Benefits from Biodiversity Use**

The property rights regime determine the way in which benefits accruing from biodiversity use are distributed. Historically, communal ownership of biological and other resources has to a large extent been replaced by state and private ownership. Most of the existing protected wildlife and forest reserves were established during the colonial era upon what used to be customary land. The premise was that the Government could share the benefits more appropriately. However, over the years it is the communities who live adjacent to protected areas who suffer the negative consequences of environmental degradation and erosion of biodiversity without any compensation. The marginalisation of local communities has tended to promote opportunity over-exploitation of resources by these communities. The basis of Community Based Natural Resources Management (CBNRM) programmes being implemented in various parts of the country is the need to reverse the marginalisation of local communities.

## **Biological Management in Zambia**

The protected area system in Zambia serves the purpose of in-situ conservation and consists of national parks, bird sanctuaries, Game Management Areas (GMAs), game ranches, forest and botanical reserves and national heritage sites. National Parks established primarily for conservation of biodiversity are nineteen in number and cover a total area of 6.358 million ha. There are two bird sanctuaries, 34 GMAs (total area 16.57 million ha) 28 game ranches, 432 forest reserves (total area of 7.4 million ha), and 59 botanical reserves (total area 148,000 ha)

Ex-situ conservation involves the establishment of botanical gardens, herbaria and gene banks. However, these are inadequate and most of them are not well managed and are in a state of disrepair.

Indigenous conservation practices play a critical role in biodiversity conservation especially outside protected areas. These are embedded in customary law and have been practiced since the pre-colonial era. Though over the years these practices have been extensively modified by external influence such as colonialism, they still exist in many parts of the country where they are enforced side by side with modern statutory law. CBNRM programmes have tried to resuscitate some of the positive aspects of these traditional practices so that they are incorporated in modern approaches of biodiversity management.

There are more than thirty legislative instruments that address the conservation of biodiversity and protection of the environment. Most of these instruments were enacted more than thirty years ago and some of them have been reviewed several times since then. There are also corresponding policies and institutions. The most important legislation, policies and institutions in the conservation of components of biodiversity are in forestry, wildlife, agriculture, and fisheries. An overall environmental and natural resources management framework also exists through the National Conservation Strategy of 1985 and the National Environmental Action Plan of 1994. In terms of legislation the Environmental Protection and Pollution Control (EPPC) Act of 1990 is considered a principal legislation covering a number of sectors. At international level, Zambia is a party to the CBD since 28 May 1993 and also to a number of other biodiversity related international conventions. These Conventions are being implemented through the Ministry of Environment and Natural Resources.

## **Institutional and Legal Framework**

The state in Zambia plays a major role in biodiversity conservation given that the majority of forests, wildlife reserves, wetlands, botanical and geological gardens and gene collection are under state control. However, the private sector, Non-Governmental Organisation (NGOs), and groups of individual have a strong effect on biodiversity. Most of the laws in Zambia follow a sectoral approach and deal specifically with forests, wildlife, land, water fisheries, and many other components of biodiversity. Due to poor coordination, the promulgation of these laws brought about duplication and gaps.

Further, biodiversity management requires that a holistic approach to the conservation of organisms, plants and animals be taken. Attempts have been made to harmonize these pieces of legislation, however, most of them still remain outdated. The EPPC Act and its Environmental Impact Assessment Regulations, the Zambia Wildlife Act of 1998 and the recently (1999) enacted Forestry Act, provide good examples of meeting the requirements of biodiversity conservation.

### **The BSAP Process**

The Zambian BSAP process is derived from the commitment to fulfill the objectives of the CBD. The process consisted of three cyclical steps, the Country Study, the National Strategy and the Action Plan. The Country Study was primarily a desktop activity to prepare inventories and assessment of the values and threats to biodiversity. The result of this exercise was an overview of the status of and trend in biodiversity in the country. This activity was undertaken from April to September 1998 and mainly followed the ecosystem approach. Fish diversity was assessed on the basis of the major fisheries and river basins while agro-biodiversity was based on agro-ecological zones. The country-study, however, did not include biotechnology assessment, which was undertaken through another process with the aim of putting in place a national biosafety framework.

Strategy formulation was aimed at defining immediate management objectives within the goal of conserving Zambia's biodiversity. Strategies were derived the objectives followed by analysis of advantages and disadvantages of each option and finally choosing the best option for incorporation into the national strategy.

Action Plan development followed after formulation of strategies and objective and entailed the translation of these into a set of specific actions to be carried out by specific institutions over a given period. The planning period was set as five years given a poor database on which it was based.

The BSAP process applied the approach of stakeholder consultations and consensus building through national and provincial workshops based on multisectoral and participatory involvement methods. The basis for this approach was to create awareness and involve a range of groups of people and individuals to identifying issues, problems and opportunities for the conservation of biological diversity.

Key stakeholders who participated included Traditional Leaders representing local communities, NGOs, private sector and Government officials representing relevant sectors. A National level steering committee under the leadership of the Permanent Secretary, Ministry of Environment and Natural Resources (MENR) with membership from key Government and Non-Government institutions including the academia and research institutions drove the process. IUCN Zambia Country Office was contracted by MENR to provide technical backstopping through a Planning Team of national consultants. IUCN Regional Office for Southern Africa based in Harare, Zimbabwe and the Global Environmental Facility (GEF) also provided technical backstopping. The

United Nations Development Programme (UNDP) administered the disbursement of funds on behalf of GEF and provided documentation.

The main outputs of Zambia's BSAP process included the training of the core Planning Team, the National Steering Committee and some MENR staff in strategy and Action Planning; the raising of awareness of environmental issues through the Steering Committee; and, the generation of tremendous amount of information on biodiversity through the stocktaking and assessment phase of the Country Study.

### **Assumptions and Constraints**

The process encountered a number of constraints: Firstly, the requirement to complete the process in one year was difficult to meet given inadequate information and the need for a participatory and transparency process. Consequently, the funds allocated for the process were not adequate for a comprehensive inventory and assessment. Secondly, the ecosystem approach by the process had its own limitations given that most of the available distributional data on biodiversity was given in sectoral form and in accordance with administrative boundaries. Thirdly, most of the information was outdated. Lastly, the exclusion of the assessment of biotechnology and risk management of biosafety from the process left a gap.

Despite these constraints, the Zambian BSAP process represents the first national attempt to respond to the requirements of the CBD and the shortcomings were taken into account in the Action Plan.

### **Unmet Needs for Biodiversity Conservation in Zambia**

After analyzing the issues arising from the needs for biodiversity conservation in Zambia, the following six priorities unmet needs were agreed upon: -

- (i) conserve ecosystems and protected areas;
- (ii) sustainably use and manage biological resources;
- (iii) equitably share benefits arising from utilisation of biodiversity;
- (iv) conserve crop and livestock genetic diversity;
- (v) provide an appropriate legal and institutional framework and the needed human resources to deal with biosafety; and,
- (vi) provide an appropriate legal and institutional framework and human resources to implement biodiversity programmes.

### **Goals, Objectives, Strategies and Actions**

Through the stakeholder participation and consensus building approach undertaken by the BSAP process, Zambia set for itself the vision *'to have a progressive and enlightened nation, whose people value and equitably derive sustenance and prosperity from the sustainable management and use of its biological resources'*. The mission of the

Government of the Republic of Zambia is, therefore, *'to establish legal, policy and institutional frameworks and mechanisms that promote the conservation, management and sustainable use of Zambia's biological resources by all sectors of the population'*. To do this, Zambia is guided by a set of 12 principles discussed in chapter 12 of this document.

Six strategic goals agreed upon during the process are: -

- (i) ensure the conservation of a full range of Zambia natural ecosystems through a network of protected areas of viable livestock;
- (ii) conservation of the genetic diversity of Zambia crops and livestock;
- (iii) improve the legal and institutional framework and human resources to implement the strategies for conservation, sustainable use and equitable sharing of benefits from biodiversity;
- (iv) sustainable use and management of biological resources;
- (v) develop an appropriate legal and institutional framework and the needed human resources to minimize the risks of the use of GMOs; and,
- (vi) ensure the equitable sharing of benefits from the use of Zambia's biological resources.

Each of these goals is accompanied by objectives, strategies and action that have been arrived at based on the synthesis and analysis of the information generated by the process.

### **Project Implementation Arrangements**

The coordination of environmental issues in Zambia is the main responsibility of MENR however, the sectoral Ministries and other organisation with comparative advantages and specific mandates and specializations will specifically undertake the implementation of activities arising from the BSAP. The multi-disciplinary nature of the BSAP programme would, however, still call for a coordinated approach guided by the BSAP Steering Committee. The MENR role will remain that of overall coordination and ensuring that the sector ministries integrate biodiversity conservation in their policies, plans and programme. The MENR will also ensure that the local communities, NGOs, and private sector organisations are empowered to play their rightful roles in biodiversity management in line with their demonstrated capacities and comparative advantages. Monitoring and evaluation of BSAP implementation would be carried out regularly by a multidisciplinary team led by the MENR for progress on specific activities, strategies, objectives and sub-goals.

## CHAPTER 1 - BACKGROUND

### A. Zambia: Country Setting

1.1 Zambia is a landlocked country located in the Southern Africa region between latitudes 8° and 18° south and longitudes 22° and 33° east (Map 1). It occupies a land area of 752,614 km<sup>2</sup> and shares borders with Mozambique and Malawi in the east, Tanzania in the northeast, the Democratic Republic of Congo in the north, Angola in the west, Namibia, Botswana and Zimbabwe in the south and southwest respectively.

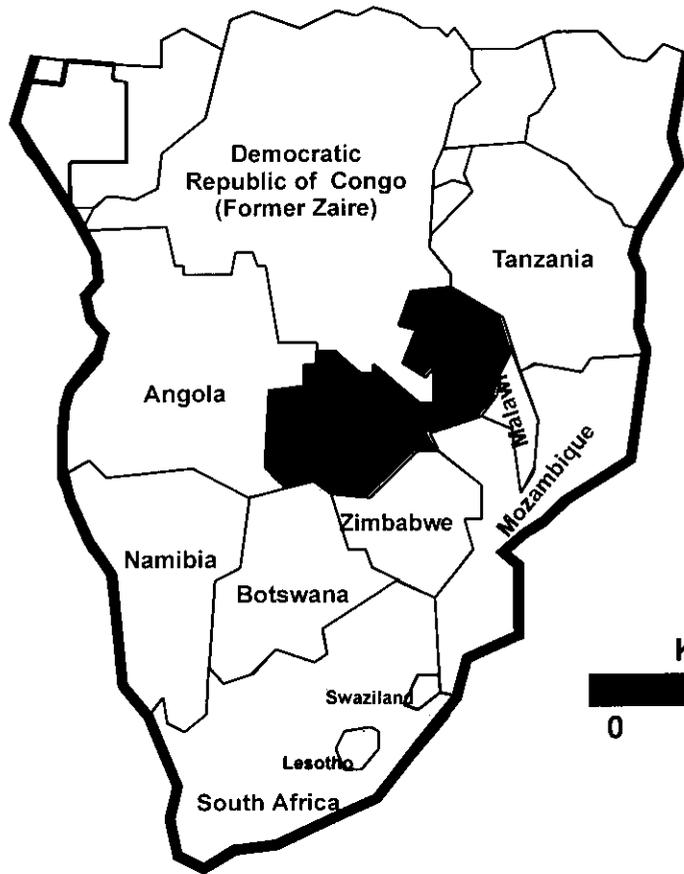
1.2 The whole country lies on the Central African Plateau with altitude between 1000 and 1600 metres above sea level, a factor that gives it a moderately cool sub-tropical climate. The plateau landscape is dissected by two main river systems; namely the Zambezi and its tributaries, Kafue and Luangwa; and, the Chambeshi-Luapula system, which is part of the Congo River basin. The dominant plateau soils are oxisols, ultisols and alfisols which give way to entisols in the western part of the country and to vertisols in valleys and floodplains.

1.3 Although Zambia has a tropical climate, temperatures are modified by altitude. There are three seasons: the cool dry (April-August), hot dry (August-November) and hot wet (November-April). Average temperatures range from a mean monthly minimum of about 10°C in June and July to a mean monthly maximum of 30°C in October and November. Most of the rainfall is concentrated over the period November-March. However, rainfall varies from 700 mm in the south to 1500 mm in the north (Map 2).

1.4 The natural vegetation is savanna woodland dominated by miombo which cover about 50 percent of the country. Mopane and munga woodlands cover much of the hot and dry southern valleys of the Zambezi and Luangwa. The country has abundant wildlife.

1.5 Zambia's population has more than doubled in size over the past three decades. The *de jure* population rose from 3.41 million in 1963 to an estimated 7.99 million in 1993. The population is expected to double again by the year 2010. This dynamism of the Zambian population is attributed to a number of factors. Most important of these is the youthfulness of the population. With 51 percent of the population under the age of 16 in 1993, dependency ratios are high and there is a considerable hidden momentum for future population growth (CSO 1990; 1995). Fertility is another factor determining the growth, size and composition of the population. At an average of 6.7 children per woman, the fertility of the Zambian population is among the highest in Africa. Fertility is even higher in rural areas (7.0) than in towns (6.3), due to lower levels of literacy and contraceptive use in the former. These factors together with the mortality rate that had shown a decline from the sixties to the eighties determined the country's rate of population growth of 2.7 percent between 1980 and 1993. Although the mortality rate has begun to rise in the present decade due to deterioration in living standards of many Zambians and the advent of Human Immuno-Deficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS), the rate of population growth is not likely to see a substantial reduction.

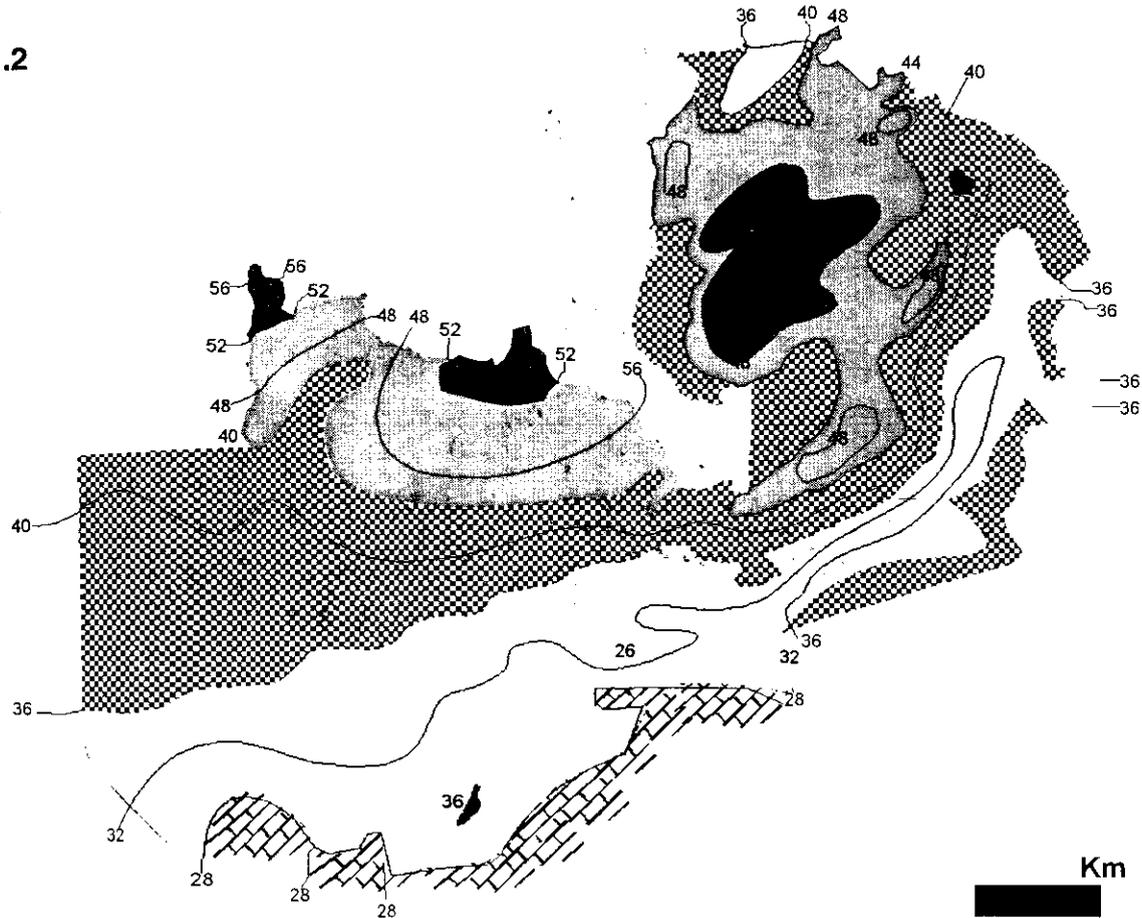
**MAP.1**  
**The Location of Zambia and its neighbours**



# MEAN ANNUAL RAINFALL

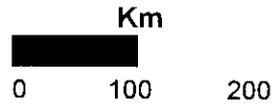
MAP .2

N



## LEGEND

-  Less than 711 mm
-  711-914 mm
-  914-1118 mm
-  1118-1321 mm
-  1321-1524 mm
-  More than 1524 mm



Source: Archer dr in Davies D.H. (1971) 0.21

1.6 As a result of the rapid population growth rates, the average population density in terms of persons per square kilometre rose from 5.5 in 1963 to 7.8 in 1980 and 10.6 in 1993 (ibid). Although the average population density remains low compared to other Eastern and Southern African countries, the aspect of overcrowded urban areas and sparsely populated rural areas is concealed. While only 20 percent of Zambia's population was living in urban areas in 1963, this rose to 42 percent in 1990, making Zambia second only to South Africa in Sub-Saharan Africa in terms of high urbanization. Urbanization in Zambia has a historical connotation in that it results from post-independence Government policies that gave a priority to developing a modern industrial economy while neglecting agriculture and rural development.

1.7 Zambia's rapid population growth has led to greatly increased pressures on the country's natural resources base including its biodiversity. Despite being well endowed in natural resources that include water, minerals, forests, fish and wildlife, the optimisation of the conservation, sustainable use and equitable sharing of benefits accruing from these resources has not been fully realised.

1.8 Poverty in Zambia has reached threatening levels. In 1991, about 68 percent of Zambians were living in households where income was not sufficient to meet even basic nutritional needs (The World Bank, 1994). This had risen to 78 percent in 1996 (CSO, 1997). Comparatively, rural poverty is more prevalent than urban poverty. In 1991, the proportion of the core poor in rural and urban areas was 76 percent and 29 percent, respectively (The World Bank, 1994). Poverty in Zambia is exacerbated by population growth, HIV/AIDS and environmental degradation. Population growth leads to the overburdening of social services while the HIV/AIDS epidemic, on the other hand, leads to reduction of productivity of households and diverts scarce resources to health care. Environmental degradation leads to reduced assets for the future generations and reduces livelihood options available for the poor.

1.9 The poor socio-economic situation prevailing in the country is largely responsible for the country's failure to effectively plan and manage its natural resources, and to ensure the equitable sharing of benefits accruing from biological resources among its people.

Since the mid-1980s, the Zambian Government has been implementing an Economic Recovery Programme (ERP) with the support of the International Monetary Fund (IMF) and the World Bank to try and reverse the sharp decline in the performance of the economy. This decline followed a period of economic boom from 1964 to 1974 when the favourable international prices of copper pushed the industry to almost the sole foreign exchange earner and contributing more than 80 percent of the country's Growth Domestic Product (GDP). The reforms currently being implemented are intended to produce economic growth, by stabilising the economy through: (i) the devaluation of the Zambian currency, the Kwacha; (ii) the liberalization of prices and the liberalisation of foreign exchange and interest rates; (iii) the removal of subsidies; (iv) scaling down of government expenditure through introduction of a cash-budgeting system; (v) privatization of state owned commercial activities; and, (vi) the improvement in infrastructure and social service delivery systems.

1.10 Whilst much has been achieved in the implementation of the ERP, the greatest challenge still remains on how to promote sustainable economic growth while ensuring micro-economic stability. Moreover, the impact of the reforms have been harsh on the poor due to reduced Government spending on social services and introduction of cost saving measures in the health and education sectors.

## B. Biological Diversity in Zambia

1.11 **Definition of Biodiversity.** The United Nations Convention on Biological Diversity (CBD) defines biological diversity or biodiversity as the variability among living organisms (UNEP 1992); this includes diversity within species, between species and of ecosystems. This definition was adopted in the formulation of the Zambia's Biodiversity Strategy and Action Plan (BSAP). Biodiversity can therefore be considered at ecosystem, species and gene levels. Much of the work on biodiversity in Zambia is at species level and to a limited extent on ecosystems. Consequently, the country study focused more at species and ecosystem levels (Ministry of Environment and Natural Resources (MENR) 1998a).

1.12 **Biome.** Floristically, Zambia lies within the Zambezan regional centre of endemism which borders the Guinea-Congolian region to the north and the Karoo-Namib region to the south and southwest (White, 1983). Inter-regional transitions form broad ecotones that consist of a mix of flora from neighbouring centres of endemism. According to the FAO-UNESCO (1977) classification, the broad soil regions in the Zambezan centre of endemism are characterised by ferralsols in the north, arenosols in the west and acrisols and invisols in the east. Within Zambia, the western plateau has arenosols while the rest of the plateau has ferralsols that tend towards lithosols on hills and escarpments. The valleys and flood plains have vertisols.

1.13 Savanna is the major terrestrial biome in Zambia. This biome is characterised by annual mean temperature of 20-30°C and rainfall range of 500-1500 mm from south to north, as can be seen from Map 2. The biome lies between the rain forest conditions in the northwest and semi desert conditions in the southwest. In the context of this report, the savanna biome consists of the woodland and grassland types of vegetation.

1.14 **Ecosystem Diversity.** As shown in Table 1 and Map 2, Zambia has fourteen ecosystems based on vegetation types (Fanshawe, 1971). These fall into four main divisions, as shown in Box 1. In addition to the fourteen terrestrial ecosystems classified on the basis of vegetation life form, Zambia also has fresh water aquatic ecosystems and anthropic land cover types, especially different forms of agricultural land uses (Table 1 and Map 3).

1.15 The aquatic ecosystem consists of natural and man made lakes and the major perennial rivers. Man made lakes cover about 9000 km<sup>2</sup>. Anthropic ecosystems or land use/land cover types range from cropland to fallow, tree plantations, and the built-up environments.

1.16 Zambia has also identified agricultural biodiversity as an important form of biodiversity upon which more than 600,000 households depend directly for their livelihood. Agro-biodiversity in this respect is defined as the variation between and within crop and

livestock species. This diversity is affected by historical factors and differences in farming systems, agro-ecological and socio-economic conditions.

**Box 1. Main Categories of Ecosystems in Zambia**

*Forest.* This consists of a continuous stand of trees, usually over 10m tall, with overlapping crowns.

*Thicket.* A low forest of bushes and climbers, usually under 7m tall. This has been classified as forest in this study.

*Woodland.* An open stand of trees, usually over 7m tall, with an open canopy and a field layer dominated by grasses and herbs.

*Grassland.* Land covered with grasses and other herbs in which woody plants are either absent or if open stand of trees, usually over 7m tall, with an open canopy and a field present, cover an insignificant proportion of ground.

1.17 For agricultural purposes, Zambia has been divided into three agro-ecological zones (Veldkamp et al., 1984) corresponding to agro-climatic zones as shown in Map 4.

**Box 2. Main Agro-Ecological Regions in Zambia**

*Region I* covers the plateau sub-region in Southwest Zambia and the valley region in South Luangwa and Zambezi valleys. The region receives less than 800 mm annual rainfall and covers about 15 million hectares equivalent to 20 percent of the country.

*Region II* consists of the sandveld plateau of Central, Eastern and Southern provinces and the Kalahari Sand plateau of Western Province. The region receives 800-1000 mm annual rainfall and covers approximately 27 million hectares equivalent to 36 percent of the country.

*Region III* receives over 1000 mm annual rainfall and covers about 33 million ha equivalent to 44 percent of the country. This region mostly covers the Copperbelt, Luapula, Northern and North-western Provinces.

1.18 **Ecosystems Dynamics.** Ecosystems are dynamic due to the influence of environmental factors such as climate and geomorphological processes. Over the last million years, there have been drastic changes in the extent of these ecosystems, triggered by changes in climate, especially rainfall.