Republic of Zambia

# Ministry of Lands Natural Resources and Environmental Protection

**United Nations Convention on Biological Diversity**

**Fifth National Report**

**June 2015**

# EXECUTIVE SUMMARY

## 1-Importance of Biodiversity in Zambia

Zambia is endowed with an abundance of natural resources and a rich biological diversity. Like 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. The ***importance of biodiversity for Zambia lies mainly in its contribution to the provision of ecosystem goods and services for national economic development and livelihoods***. At the ecosystem level, ***forests, agro-ecosystems and wetlands can be distinguished as the key ecosystem components*** that have a relatively greater bearing on the country's natural system integrity upon which the national economy and the livelihoods of the population depend.

## 2- Approach to Biodiversity Conservation

The approach taken to conserve biodiversity in Zambia has been through the management of existing protected areas system falling under the management of sectoral units of government and statutory bodies. There is need for a unified approach to biodiversity conservation in Zambia. The NBSAP of 1999 had ***no implementation plan and monitoring framework*** that has been used to ***systematically monitor the status and trends of the biodiversity groups and actions for implementation as recommended.*** The country has depended largely on the fragmented sector based activities to conserve, monitor the status, trends and threats to biodiversity in Zambia.

As a result, the overall status of biodiversity in the country since the Fourth National Report is largely based on literature review of sector based work due to ***lack of a systematic long term investment framework at national level and inadequate support at international level in supporting Zambia's long term biodiversity monitoring.***

## 3- Status of Biodiversity

### *3.1 National Protected Areas System*

The network of Zambia's statutory protected areas (PA) is composed of over 63,580 $km^2$ in 20 National Parks (NPs), about 167,557 $km^2$ in 36 Game Management Areas (GMAs) and about 74,361 $km^2$ in 490 Forest Reserves (FRs).. ***Although more than 18% of the country is made up of (NPs) and almost 10% made up of FRs, there is need for continuous monitoring plan and action to follow up on the baselines emerging from the project works done such as the Reclassification of protected areas which focused largely on National Parks and Game Management areas and the Integrated Land Use Assessment focused on methodology for a National Inventory of forests rather than adequately including the species diversity within the sampled areas for the forest inventory.***

The ***key changes in the status of National Parks, Forest reserves and the Game Management protected area system since the Fourth National Report is the creation of a new Lusaka National Park, degazetting of some forest reserves and the identification of gaps of***

***representation of plant and animal species within the existing National Parks and Game Management Areas by the reclassification conservation plan.***

Lusaka National Park was declared a national park in 2011. The recommendations from the reclassificastion conservation plan for filling the gaps in biodiversity representation included the need to carry out a comprehensive gap analysis of the species and improvement of the management effectiveness of the national protected areas system.

***3.2 Wetlands***

***3.3 Zambia has Eight Wetlands of International Importance*** which include, the Kafue Flats (Lochnivar and Blue Lagoon National Parks) Bangweulu Swamps (Chikuni), Lukanga Swamps, Busanga, Lake Tanganyika,, Luangwa Floodplains, Lukanga swamps, Barotse floodplain) listed under the Ramsar Convention. These wetlands are ***habitats of several important fauna and flora species including some endemic and endangered species***.(ZAWA, 2015)

***3.4 Agro-Ecosystems***

There are three agro-ecological regions in Zambia classified based on amount of rainfall received, patterns and to a limited extent the soil types. Each of these regions has a diverse farming systems and dominant crops grown. ***Agro-ecological region I covering parts of the south and western part of the country is characterized by short growing season due to low and poorly distributed rainfall*** with a mean annual rainfall of between 600 and 800 mm, and the length of the growing season varying from 80 to 120 days. ***Agro-ecological II covering part of Southern, Central and Eastern part of the country receives between 800 and 1000 mm of rain annually***. The length of the rain season ranges from 100 to 140 days. ***The medium rainfall and a relatively high number of sunshine hours (5 to 6) in Region II favour the production of many types of crops, making it the major agricultural production area in Zambia***. ***Agro-ecological Zone III covering the Northern and North-western parts of the country is classified as high rainfall region, receiving rainfall above 1000 mm per annum on average***, the length of the rain season ranges from 120 to 150 days.The ***soils are highly leached and generally acidic, making this as one of the major constraints to agricultural production*** while rearing of livestock is constrained by the prevalence of a number of pests and diseases.

***3.4 Important Bird Areas***

***At present, about 82% of the area covered by Important Bird Areas receives some form of protection*** (National Park: 60%, Game Management Area: 19%, National Forest: 2% privately owned: 1%). The remaining ***18% are in open areas with no legal status; a few of these have developed some local by-laws with the help of chiefs and traditional leaders.***

***3.5 Flowering Plants***

The assessment of flowering plants diversity in Zambia was undertaken using available data from field inventories. The total species of wild flowering plants in Zambia is estimated at 3,543. These are made up of 273 sedges, 2,660 herbaceous plants and 1,610 woody plants.

***Most of the data are on tree species and therefore underestimate the diversity of flowering plants in the country.*** The largest areas of high woody plant species richness (36 – 48 species ha-1) are in northern and north-western Zambia. The largest continuous area under forest reservation in this species-rich block is in the Kafue Headwaters, There are three other smaller blocks of high woody plant species richness: Mansa, Mkushi and Siavonga.

### *3.6 Mammal Species*

The stocktaking assessment for mammals was mostly concentrated on critical mammal species (threatened, endangered and vulnerable) due to a number of challenges including limited time as well as difficulties in accessing some data. The estimates of mammal diversity in Zambia is around 224 species. The REMNPAS (2010) on the other hand reports that ***approximately 43 species of large mammals are important; firstly on account of the potential income that can be generated from their use*** in photographic and consumptive tourism, secondly, their contribution to local household economies, as a source of protein and as a source of income through illegal market structures, and thirdly, their aesthetical appreciation by the global community including their existence value. According to the 2014 Red List of Threatened Species, ***over 28 animal species and subspecies are considered as threatened, endangered or vulnerable in Zambia.***

### *3.7 Fish Species*

***Four Hundred and ninety (490) species of fish have been reported in different water bodies of Zambia belonging to twenty four families.*** The stocktaking assessment exercise revealed that most of the studies of fish biodiversity in Zambia were undertaken mainly to support fisheries (fish stock assessment studies) work on gazetted to commercial fishery areas, on large water bodies. ***Relatively few sections of large fishery areas had fish specimens sampled. Other segments of large water bodies have not been investigated.*** Families that are important in the artisanal, commercial fisheries and aquaculture are well developed while ***small fish that are not important in artisanal and commercial fisheries have not been extensively investigated.***

### *3.8 Crop and Livestock genetic resources*

The proportion of ***crops categorized as indigenous***, which are those domesticated or originating within Africa (such as ***sorghum, millets, cowpea, Bambara groundnuts, sesame and a range of vegetable species) take about 15 percent of the total number of cultivated crops.The gene bank conserves*** both inter-specific and intra-specific diversity of crop species and ***needs to be supported with adequate equipment, manpower and financial resources to more acceptable levels than currently levels.*** Some of the crops, whose Crop Wild Relatives (CWR) ***have received relatively more attention in terms of collection, characterization and conservation in Zambia include Cowpea (Vigna unguiculata), Rice (Oryza sativa), Finger millet (Eleusin ecoracana), Pearl millet (Pennisetum glaucum) and Sorghum (Sorghum bicolor).***

***The traditional subsector owns the majority of livestock in Zambia (83% cattle, 97% goats, 64% sheep and 90% pigs) as indigenous breeds or crosses with exotic breeds*** The difficulties associated with accessing feeds and drugs has made ***many rural small pig producers to turn to***

***indigenous breeds*** with little management requirements and natural resistance to diseases compared to exotic breeds.

### *3.9 Invertebrates*

The total diversity of invertebrates in Zambia is estimated at 6,135 species (Professor Keith Mbata, personal communication), of these 69 species are endemic and 14 (mainly fresh water molluscs) are threatened. There are 57 identified and known species of Molluscs in Zambia. The centers of molluscan endemism are Lake Tanganyika, Mweru wantipa and the Barotse plains. Endemic molluscs in Zambia include *Gabbiella stanleyi*, *G. zambica and Mutela zambesiensis*, the first two only known from their type localities (Chitipa, Eastern Zambia and Mankoyo, Northwestern Zambia respectively). ***More than 200 Crustacean species are known in various ecosystems in Zambia, of which more than half are endemic to Zambia.***

### *3.10 Vertebrates*

The diversity of Amphibians (frogs and toads) in Zambia is estimated at 74 species and there is no discernible geographical gradient in species richness***. A total of 13 species are rare having been recorded in one locality only.*** The diversity of reptiles (lizards, snakes and tortoises) in Zambia is estimated at 156 species. ***A total of 45 species are considered rare because they have been recorded in only one locality.***

## 4-Trends and Threats to Biodiversity in Zambia

### *4.1 Forest reserves and plant species*

A time series comparison of Forest Department data shows a significant deterioration in the integrity and quality of national forests. Soaring levels of encroachment through cultivation and settlement have compromised some Protected National and Local Forests. ***By 2011, it was estimated that less than half of the National Forest estate could be considered free from some form of encroachment or settlement.***

***A significant reduction in the area under National Forest has taken place withmore than 280,000 ha of forest reserve being de-gazetted or excised over the past decade***. In North-Western Province, it is estimated that at least 350,000 ha of national forest is undergoing conversion, a process driven mostly by mining related activities. ***The negative impact of the loss of protected forests in North-Western Province is disproportionately high and alarming as this is the province, which hitherto, had most of its area remaining with intact forests.*** N***orthern Zambia has lost much of its primary forest cover, largely due to shifting cultivation. This is also the area with the highest tree species diversity as well as the highest species density of miombo genera.***

Uncontrolled bush fires also contribute to forest degradation in Zambia***. Most wild fires that damage forests and woodlands in Zambia are caused by human activity.*** Timing and frequency of fires determine the effect of fire on the ecosystem.

***A number of timber trees are locally threatened due to overexploitation*** that has caused mature tree individuals to become rare. These include *Afzelia quanzensis, Daniela ostiniana, Pterocarpus angolensis, Khaya nyasica* and *Mitragyna stipulosa and more recently the Mukula* tree *(Pterocarpus chrysothrix).**This is in spite of declaring some of these species as protected or reserved.***

### *4.2 National Parks and mammal species*

Out of the 20 National Parks, two are degraded (Lochnivar and Mosi-oa-Tunya) and six are encroached (Lukusuzi, Mweru-Wantipa, Nsumbu, Isangano, Sioma Ngwezi and Lower Zambezi). Lochnivar NP has been invaded by the prickly bush, *Mimosa pigra*, while Mosi-oa-Tunya NP has been invaded by *Lantana camara* and water hyacinth, *Eichhornia crassipes*.**. *In addition, some national parks have suffered greatly from excessive illegal hunting (poaching) which now threatens the viability of a number of larger mammals***, especially those with a low intrinsic growth rate, such as the elephant.

It is quite difficult to establish an up-to-date picture of the wildlife status and trends in Zambia due to inadequate data on sightings, sizes and distribution for most species. However, ***data collected revealed that a number of surveys have been conducted to obtain information on abundance and distribution status of large mammals between the year 2000 and 2014 in National Parks (NPs) and Game Management Areas (GMAs), showing generally a neutral trend across the national parks surveyed for many of species.*** Unplanned human settlement in GMAs and encroachment in NPs is one of the major long-term threats to wildlife survival as this results in the destruction and reduction in the size of available habitat for mammals. ***Mining activities in certain protected areas*** such as Kafue NP, Lochnivar, Lower Zambezi and Lukusuzi NPs ***have had negative effects on wildlife species and their habitats.***

### *4.3 Invertebrates*

Studies on the Kafue ecosystem indicate that effluents from the mines affected the diversity of butterflies, dragonflies and other benthonic invertebrates by significant levels with increasing redox, electrical conductivity and turbidity. ***Quantities of caterpillar worm*** in Mpika, Chinsali and central Zambia ***have significantly reduced between 2008 and 2013***. There seems to be several factors that may be responsible for this reduction. With minimal barriers to entry into both the collection and trade of the worm, coupled with increasing incidence of poverty in landscapes where the worms are found, ***there is a general increasing trend of overexploitation and a decline in selective harvesting.***

### *4.4 Fish species*

***The planned construction of dams*** at Devil's and Batoka Gorges, as well as some sites below Cabora Bassa, ***could destroy the last remaining riverine habitats and fishes of the Lower Zambezi.*** As the need for electricity increases, the demand for the construction of additional hydroelectricity infrastructures increases. Currently, plans are underwayfor establishing ***hydroelectric projects along the Kalungwishi River. This is an area where the biodiversity of the river system is not well known.***

***Aquaculture affects*** fish biodiversity among others mainly through the escape of farmed fish into the wild. For example, ***the Oreochromis niloticus that was at one time farmed in Mazabuka area, has escaped into the Kafue River and has since spread to all parts of the Kafue*** Flats. There may not only be competition between this species and the indigenous species of the area but hybridisation between the introduced species and the indigenous *Oreochromis niloticus* is taking place. ***This has most likely altered the genetic composition of the cichlid species of the Kafue Flats and the catchment areas.***

### *4.5. Agro biodiversity*

Although Zambia has not officially sanctioned the growing of GMOs and this is prohibited by law, the country continues to be under threat from importation of agricultural products. There is also ***mounting pressure from seed companies to introduce genetically modified seed varieties***. It has also been observed that more and ***more land continues to be taken up by cash crops*** (monocrops) such as cotton, tobacco and hybrid maize***, thereby reducing the land area under traditional crops and by implication on-farm genetic diversity.***

### *4.6 Climate change*

Studies indicate that as a result of the projected increased rainfall variability and higher temperatures ***due to climate change a number of biodiversity components will be negatively affected such as fish species, wildlife and forests***. This is because these climate change effects are likely to alter the ecosystems and habitats and subsequently species. These indications point to the need for urgent attention to be paid to climate change for biodiversity conservation.

## 5- Country Biodiversity Targets and Actions Taken

Zambia's 1999 National Biodiversity Strategy and Action Plan (NBSAP) set out a total of 14 targets. ***NBSAP implementation towards the set targets encountered a number of problems,*** notably: (a) lack of a monitoring framework to assess changes in the baselines and the absence of a financing framework with clear commitments from both the Zambian Government and support from external sources. The draft monitoring plan developed was never fully developed and adopted. ***A cursory review of achievements towards the set targets under the 1999 NBSAP shows very weak direct results. Most of the actions taken could broadly be classified as means rather than ends in meeting the set targets.*** In other cases, there were very few direct actions taken and hence limited data available.

## 6-Mainstreaming of Biodiversity into Relevant Sectoral and Cross Sectoral Strategies, Plans and Programmes

Between 2009 and 2014, Zambia has undertaken ***a number of Policy, Legal and Regulatory (PLR) reforms, all supportive of biodiversity conservation in the country. Among the key achievements was the enactment of the Environmental Management Act (EMA) in 2011.*** The EMA is the parent environmental legislation regulating environmental issues in the country with strict requirements for Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) for any large scale development projects. The WildlifeAct is also under review while the revised Forest Policy has been approved and the Forest Bill is pending

enactment by Parliament after having been passed by the Cabinet. In addition a National Heritage Policy is also under formulation.

## 7- Progress Towards the 2010 Aichi Targets and 2015 Targets of the Millennium Development Goals

***The progress towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets began in earnest in Zambia in 2015 due to administrative challenges*** at institutional level for the focal ministry arising from the ushering in of a new government in Zambia (2011) that took the restructuring of the Ministry quite long.

As a result the Ministry only managed to start the process of revising the NBSAP and preparing the Fifth a national Report with an inception workshop in December 2014 on how the the 1999 NBSAP will be updated in line with the Global CBD Strategic Plan and its Aichi Targets. ***Part of the first outputs of the updating the 1999 NBSAP process is the stocktaking assessment exercise whose initial results are reflected in this report.***

## 8- Lessons Learned from the Implementation of the UNCBD Convention

The key lessons learned in the implementation of the convention are as flows:

a) ***The current NBSAP (1999) was not implemented in a systematic manner*** and this needs to be addressed in the revised NBSAP by ensuring that the revised NBSAP has, besides an Action Plan, an Implementation Plan and a Monitoring Framework against which progress towards the recommended actions or targets can be clearly monitored.

b) The 1999 NBSAP was implemented through sector and project-based activities with little coordination for synergies thereby resulting in some overlaps. For example, the integrated land use assessment under forestry did not pay attention to collect information on biodiversity components of the plant species when it was very well placed to do so. This calls for a well-coordinated institutional arrangement for the implementation of biodiversity actions to achieve cost effectiveness and efficiency in conserving biodiversity.

c) ***The state of the biodiversity information base in Zambia has not improved on the 1999 stock assessment that came up with the species and ecosystems lists and status and therefore has very outdated baseline for monitoring the status and trends of the biodiversity components.*** This calls for long term investment in a well-coordinated and mainstreamed biodiversity monitoring system. The Convention on Biological Diversity should rally behind and support resource poor countries like Zambia in setting up and institutionalizing such systems.

d) Zambia is a huge country with well-endowed natural resources in which biodiversity is embedded. Taking into account the resource base the country has to share between human development activities and conservation activities, the need for a rationalization of the protected areas system remains imperative. ***There is need to revisit the reclassification efforts as the previous efforts failed to fully meet the original objective for rationalization of the Zambian Protected Areas network. A rationalized network has better chances for conservation and monitoring.***

***e)*** Biodiversity components have intricate relationship to livelihoods and national economic developments. As a result the ***conservation efforts need to take into account how biodiversity conservation can contribute to livelihoods while at the same time developing mechanisms for how communities and other stakeholders (including the private sector) who benefit from the environmental goods and*** services can ***also contribute to its conservation. This should be at the core of conservation efforts in Zambia.***

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AFDB | African Development Bank |
| CBD | Convention on Biological Diversity |
| CBNRM | Community Based Natural Resources Management |
| CIFOR | Centre for International Forestry Research |
| CPFP | Country Partnership Framework Paper |
| CRB | Community Resources Board |
| CSO | Central Statistics Office |
| CWR | Crop Wild Relatives |
| ECZ | Environmental Council of Zambia |
| EIA | Environmental Impact Assessment |
| EMA | Environmental Management Act |
| FAO | Food and Agriculture Organization |
| FAO | Food and Agriculture Organisation of United Nations |
| FD | Forestry Department |
| FNDP | Fifth National Development Plan |
| FR | Forest Reserve |
| FSP | Fertiliser Support Programme |
| GDP | Gross Domestic Project |
| GEF | Global Environment Fund |
| GMAs | Game Management Areas |
| GMOs | Genetic Modified Organisms |
| GRZ | Government Republic of Zambia |
| HIV/AIDS | Human Immuno-deficiency Virus/Acquired Immune Deficiency Syndrome |

| | |
|---|---|
| IBA | Important Bird Areas |
| ILUA | Integrated Land Use Assessment |
| IRDB | Integrated Resource Development Board |
| IUCN | The World Conservation Union |
| KAZA | Kavango-Zambezi Trans-frontier Conservation Area |
| MDGs | Millennium Development Goals |
| MENR | Ministry of Environment and Natural Resources |
| MEWD | Ministry of Energy and Water Development |
| MLNREP | Ministry of Lands Natural Resources and Environmental Protection |
| MTENR | Ministry of Tourism, Environment and Natural Resources |
| NAIP | National Agricultural Investment Plan |
| NAIP | National Agricultural Investment Plan |
| NAP | National Action Programme |
| NAPA | National Adaptation Programme of Action |
| NBA | National Biodiversity Authority |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NCCRS | National Climate Change Response Strategy |
| NF | National Forest |
| NGOs | Non-Governmental Organisations |
| NORAD | Norwegian Agency for International Development |
| NP | National Park |
| NWFP | Non Wood Forest Product |
| OAG | Office of the Auditor General |
| PA | Protected Area |
| PFAP | Provincial Forestry Action Programme |
| PPP | Public Private Partnership |
| SEA | Strategic Environmental Assessment |
| SIDA | Swedish International Development Agency |
| SNDP | Sixth National Development Plan |
| UNCCD | United Nations Convention to Combat Desertification |
| UNDP | United Nations Development Programme |

| | |
|---|---|
| UNFCCC | United Nations Framework Convention on Climate Change |
| WCS | Wildlife Conservation Society |
| WWF | Worldwide Fund for Nature |
| ZAWA | Zambia Wildlife Authority |
| ZCCN | Zambia Climate Change Ne |
| ZFAP | Zambia Forestry Action Programme |
| ZNRCF | Zambia Natural Resources Consultative Forum |

# CHAPTER 1:

# OVERVIEW OF BIODIVERSITY STATUS, TRENDS , THREATS AND IMPLICATIONS FOR HUMAN WELL-BEING

## 1.1 Importance of Biodiversity in Zambia

Zambia is endowed with abundant natural resources and a fairly rich biological diversity. Like other developing countries, Zambia is highly dependent on the exploitation of its biological resources for the livelihood of the majority of its people especially those living in rural areas. The importance of biodiversity for Zambia lies mainly in its contribution to the provision of ecosystem goods and services for national economic development and livelihoods.

At the ecosystem level, forests, agro-ecosystems and wetlands can be distinguished as the key ecosystem components that have a relatively greater bearing on the country's natural system integrity upon which the national economy and the livelihoods of the population depend.

### i) Forest ecosystem and species importance

The contribution of forest ecosystems to livelihoods and the key categories of sectors that benefit from forest biodiversity at ecosystem, species and genetic resources levels in the Zambian context can be concisely articulated as follows:

#### *a) Subsistence and livelihood uses*

Forests are known as a valuable natural and economic resource for supporting natural systems and improving peoples' livelihoods. Zambia's forests are not only important for their timber species and fuel wood, they are also important repositories of biodiversity and provide a wide range of goods for livelihoods (especially for the rural poor) such as non-timber forest products including, fibre, medicinal plants, edible wild vegetables, edible wild fruits, edible insects, bush meat, mushrooms, honey, etc. In essence forests are known within the Zambian context as contributing to both food and livelihood security and as a safety net in times of unfavourable agricultural production (increasingly associated to climate change).The national biodiversity study (Chidumayo and Aongola, 1997)[1] estimated that one-third of rural households harvest wild food resources in form of fruits, mushroom and root/tubers with a gross annual output of about 31 kg per household. Overall, harvested forest products make a significant contribution to incomes of the rural poor. Forest contribution to rural household income is estimated at 20.6 percent (Puustjärvi, Mickels-Kokwe and Chakanga, 2005)[2]. Most forest product harvesting and sale is seasonal, providing cash income at different times of the year, and few households use only one product.

[1]Chidumayo, E.N. and Aongola, L. 1998. Zambia biodiversity strategy and action plan: The country report. IUCN, Lusaka.

[2] Puustjärvy E, Mickels-Kokwe G. and Chakanga M. (2005). *The contribution of the forestry sector to the national economy and poverty reduction in Zambia*. Report prepared by SAVCOR INDUFOR for the Forestry Department, Zambia, and The Ministry of Foreign Affairs of Finland

Estimates of the value of non-wood forest products (NWFP) vary considerably, but based on the assumptions applied in the study byTurpie *et al*. (2014)[3] it is estimated the overall income from NWFPs is around**$135.8 million per annum.**

### *b) Commercial uses*

Commercial uses of tree and forest resources are oriented towards sale. The distinction between livelihood use and commercial use is not always clear as these use-systems normally develop from subsistence and increasing to commercial use. Commercial uses of biodiversity contribute more in terms of assessing the economy of various resources (Chidumayo, 2012)[4]. Commercial uses of the forests are mainly in form of timber production and sale. Commercially valuable timber trees include *Pterocarpus angolensis* (Mukwa), *Afzelia quanzensis, Khaya nyasica, Baikiaea plurijuga* (Zambezi teak) and *Brachystegia* species. At the household level, wood is used for construction poles, fence posts, saw logs, furniture and joinery, sawn timber, boats and canoes, carvings, mortars and pestles, axe and hoe handles, etc. Annual consumption varies geographically but is estimated at about 1.0 $m^3$ per household.

Relatively large amounts of wood biomass in the country are used for energy, in form of firewood and charcoal. Consumption of firewood and charcoal vary not only among provinces but also between urban and rural areas. Annual consumption per household is about 8.0 tonnes of wood equivalent. Charcoal is produced for both subsistence use and sale. Between 66% and 98% of the urban households rely on charcoal for domestic energy (GRZ/FNDP, 2006). In 1997, about 41,000 rural households were full-time employed in charcoal production and an additional 4,500 people involved in transportation, marketing and distribution (GRZ, 1997). In 1998, the charcoal industry generated about US$30 million, and in the same year about 60,000 Zambians directly depended on charcoal production for the bulk of their income (Kalumiana 2000; AEO, 2006, pg. 198). By 2010, it was estimated that over 50,000 households were engaged in charcoal production on full-time basis and earned a living from charcoal.

Nature-based tourism is the dominant form of holiday tourism to Zambia, and forests are an integral part of the nature-based tourism experience. Estimates of forest-based tourism range from $110 – 179 million per annum for direct value added by forest-based tourism (Turpie *et al.*, 2014).

In summary, the analysis of the study by Turpie *et al*. (2014) showed that the direct and indirect values of forests considered (excluding the market value of carbon) made a direct contribution equivalent to about 4.7% of Gross Domestic Product (GDP) or US$932.5 million (using 2010 figures) to the Zambian economy. However, when the multiplier effects of forestry and tourism-related activities on other sectors are taken into account, the overall or economy-wide contribution of forests on GDP was estimated to be at least 6.3% or US$1,252 million.

[3]Jane Turpie ,Benjamin Warr, Jane Carter Ingram and Michel Masozera (2014*). The Economic Value of Zambia's Forest Ecosystems and potential benefits of REDD+ in Green Economy Transformation in Zambia***.** Report to theUnited Nations Environment Programme on behalf of the Ministry of Lands, Natural Resources and Environmental Protection, Zambia

[4] Chidumayo, E.N.(2015) Biodiversity of Flowering Plants Stock Assessment Report for the review of the NBSAP. NIRAS, Zambia.

### *c) Health care uses*

According to Chidumayo (2015), the use of forests as a source of traditional medicines is common in Zambia. In Central, Copperbelt and Luapula provinces, a survey showed that over 70% of the respondents had used traditional medicines for domestic and/or commercial use and that the trade in medicines is worth over K10 billion per year (Njovu, 1996)[5]. Nswana (1996)[6] has listed 78 species of plants with medicinal value while Fowler (2002)[7] describes about 177 plants used in healing by the Ila people of southern Zambia. Traditional medicines derived from the forest are perceived to be cheaper, accessible and practical, especially where modern medical facilities are limited, or where these are available but not accessible due to cost.

### *d) Social and cultural uses*

Many ethnic groups in Zambia believe in ritual ceremonies, most of which are conducted in the forests. Locally, there are patches of forest protected for this purpose. Trees are also used to indicate the sacred nature of grave yards in many Zambian traditions. Other traditional uses of trees include protection of river banks and for ornamental purposes, as meeting places. Often traditional use of trees may focus on a single tree or species. For instance, among the Ngoni of eastern Zambia, *Adonsonia digitata* (Mlambe) and *Pseudolachnostylis maprouneifolia* (Msolo) are symbolized as holy trees and used as meeting places in villages while *Euphorbia tirucalli* (Nkhadzi) is commonly planted around grave yards. However, the protection accorded to individual species may extend to other trees around it, resulting in the protection of large patches of forest (Chidumayo, 2015).Although the impacts on human well-being of some ecosystem services provided by forests are indirect, they are nonetheless important for sustaining livelihoods and environmental health and security in the country.

### *e) Ecological uses and ecosystem services*

Forests have intricate relationships to changing forest landscapes and ecosystems that in turn have implications for biodiversity conservation, agricultural land productivity, energy needs, water needs, water catchment conditions and industrial needs in Zambia.

There are a number of key ecosystem services provided by the forests associated with socio-economic development in Zambia. Miombo woodlands on deeper sandy soils are characterized by tall, deep-rooted trees that act as "nutrient pumps". When these deep-rooted plants are removed from the system, the pool of nutrients available in the topsoil may be reduced (Dean *et al.,* 1999)[8].Tree canopy and grass cover intercept rain drops and reduce their power to erode soil particles. Surface litter also plays this protective function in addition to maintenance of soil organic matter (carbon) and nutrient content through decomposition. Soil fertility and quality has implications for the agricultural sector for crop and livestock (fodder) productivity.

[5] Njovu, F.C. 1996. Non-wood forest products. Provincial Forestry Action Programme(PFAP) Working Papers,Zambia
[6] Nswana, A. 1996. Preliminary study on cosmetic and traditional medicine in Central, Copperbelt and Luapula Provinces. PFAP, Ndola.
[7] Fowler, D.G. 2002. Traditional Ila plant remedies from Zambia. Kirkia 18:35-48.
[8] W. R. J. Dean w, S. J. Miltonw & F. Jeltsch†, 1998. Large trees, fertile islands, and birds in arid savanna. Journal of Arid Environments (1999) 41: 61]78. Article No. jare.1998.0455

The capacity of forests to help capture and store water helps to mitigate floods in periods of heavy rains and ensures steady water flow during drier seasons. For example, Richard Bleifuss and Do Santos (2001)[9] revealed that the mass curve for rainfall in the Kafue catchment reported a significant increase in surface water runoff per unit rainfall from the Kafue headwaters region during the 1950s and 1960s.These changes were attributed in part to deforestation in the Copperbelt region (Mumeka 1986)[10]. Forests role in the regulation of the hydrology in catchment areas extending to river flows and sufficient quantity of water in rivers will have repercussions for the energy sector in Zambia that predominantly depends on hydropower generation. Summary of the estimations of the economic value of forestry regulatory services are presented in Box 1 below:

**Box 1**.Estimated economic value of forest regulatory functions

| |
|---|
| **Carbon**: The value of **carbon** can be estimated in terms of its damage costs, but this social cost of carbon (estimated to be $29 per tonne), which if aggregated would amount to about **$15 million per annum**. In evaluating potential for REDD projects, carbon can also be valued in terms of its market value, which we estimate to be in the region of $6 per tonne. Depending on location, carbon stocks in Zambian forests are potentially worth about $150 per ha on average (once off), but ranging up to $745 per ha for intact forests. Annual values of sequestration in degraded areas are about $16-30 per ha per year. |
| **Sediment retention**: Based on a model of soil erosion and transport (using InVEST) developed through this analysis, it was estimated that current rates of sediment output are in the order of 250 million tonnes (average 2.23 tonnes per ha), and that **sediment retention** by forests are on the order of 274 million tones, generating a **cost savings of $237 million per annum.** |
| **Water and climate regulation**: While Zambia's forests are unlikely to have positive benefits on dry season flows through infiltration or contribute significantly to flood attenuation, the loss of forest cover over large areas could result in reduced precipitation in the region, impacting on flows, water yields and hydropower generation, and driving up the costs of electricity. This should be addressed in future studies. |
| **Pollination**: Based on the costs of alternative means of pollination, the value of forest **pollination services** was estimated to be in the order of **$74 million per annum.** |

Source: Turpie *et al*., 2014[11]

Vegetation forms important habitats for other organisms while individual trees support a host of other life forms, such as epiphytes, saprophytes and aboreal animals. Symbiotic microorganisms, such as bacteria and fungi, which live in roots of seed plants, are wholly dependent on their host plants for survival. Some plants are ecological indicators. For example. *Brachystegia boehmii* and *Parinari curatellifolia* trees are indicators of shallow soils with partial waterlogging while *Diplorhynchus condylocarpon* and *Pseudolachnostylis maprouneifolia* often indicate the presence of copper or nickel. Other species, such as, *Ficus sycamorus* and *Syzygium cordatum* indicate the presence of an aquifer near the surface and are used to site water wells (Chidumayo, 2015).

[9] Richard Bleifuss and David Do Satos (nd) working paper #2 program for the sustainable management of Cahora Bassa dam and the Lower Zambezi valley – Birdlife international

[10] Mumeka, A, 1986. Effect of deforestation and subsistence agriculture on runoff of the Kafue river headwaters of Zambia. Hydrological Sciences Journal 31:543-554.

[11] Turpie, J., B. Warr, J. Carter Ingram and M. Masozera. 2014. The Economic Value of Zambia's Forest Ecosystems and potential benefits of REDD+ in Green Economy Transformation in Zambia. Report to the United Nations Environment Program on behalf of the Ministry of Lands, Natural Resources and Environmental Protection, Zambia. Chapter 6, Draft. 131 pp.

### *ii) Wetlands Ecosystems and Species Importance*

**a)** ***Contribution to livelihoods and national economy***

*W*etlands, including rivers, lakes, swamps and dambos, covering about 3.6 million hectares or 4.8 percent of the total land area (NAIP, 2014)[12], are a source of livelihood for the majority of rural populations in Zambia. Total water withdrawal from river systems was 1.737 km3 in 2000, with agriculture use accounting for 1.320 km3 (77 percent), or more than three-quarters of the total domestic water use claiming 0.286 km3 and industries taking 0.131 km3 (ibid.).

Dambo and floodplain wetlands are used for grazing animals in the dry season when upland vegetation is dry and with little nutritive value. They are also important for fishing, livestock-watering, hunting of small animals, collection of thatching grass, and most importantly, for dry season vegetable growing. Seepage zones and shallow wells are used as sources of water. Non-equipped wetlands and inland valley bottoms, and non-equipped recession area dominated by the rural households gives a total water-managed wetland system contributing 100,010 ha of irrigated land (FAO Aquastat Data, 2005). However there is scarcity of empirical data on the contribution of wetlands to the livelihoods with respect to its contribution towards small scale river and dambo based crop irrigation, livestock grazing and domestic water supply in economic terms.

Fish production from Fresh water wetland ecosystems in Zambia is concentrated in the Northern, Western and Southern parts of the country and along major rivers and lakes. The fisheries sub-sector plays an important role in the economy of the country through the provision of employment and income generation, and contributes to food and nutrition security. The sub-sector contributes about 3.2 percent to national GDP (GRZ, 2013)[13]. Current estimates indicate that over three hundred thousand persons directly or indirectly obtain part of their income from the fisheries sector. Fish is a major food item in the diet of Zambians as it accounts for 29 percent of the animal protein supply (CSO, 2006)[14]. By 2014the sub-sector produced about 80,826 metric tonnes of fish.

***b) Contribution to ecosystem services***

Wetland ecosystems provide water for different uses by storing water (sponge effect), helping to recharge both surface and groundwater and in the process. Additionally, wetlands improve the quality of water by filtering pollutants and sediments while retaining the nutrients required by and to support the ecosystem thereby improving productivity of wetlands.

Flood plains reduce or delay downstream floods.This function arises in part because floodplains provide provide space for water to spread and in part because of higher hydrolic roughness of flood plains reduces the velocity of flow. Wetlands are a major habitat for a number of living organisms key to national economy and livelihoods. Endemic mammal species such as the Lechwe breeding cycle is dependent on the health of the Kafue Flats wetland ecosystems.

[12] GRZ 2013, Zambia National Agriculture Investment Plan (NAIP) 2014-2018.Under the Comprehensive Africa Agriculture Development Programme (CAADP) Ministry of Agriculture and Livestock, Zambia

[13] GRZ, 2013. National Agricultural Policy (DRAFT), Ministry of Agriculture and Livestock, Zambia.

[14] Living Conditions Survey 2006, Central Statistical Office ,Zambia.

Bird species such as the Wattled Crane, ducks, geese and a wide range of fish and other aquatic species depend on wetland habitats.

***iii) Agro-ecological systems and agro-biodiversity importance***

The Zambia Agro-ecological systems are categorized into three agro-ecological regions based on differences in rainfall amounts received per annum and 36 zones categorized based on rainfall and soil characteristics are the major provider of employment and food security for the majority of the rural population. Food and livelihood security of many people and communities depend on the sustained management of various biological resources that are important for food and agriculture, which include the following , harvested crop varieties, livestock breeds, fish species and non-domesticated (wild) resources within field, forest, rangeland including tree products, wild animals hunted for food and in aquatic ecosystems (e.g. wild fish);

There are three main categories of farmers in Zambia relying on the agro-ecological system; i) small scale; ii) medium-scale and iii) large-scale. The number of small-scale households involved in farming is estimated at 1,417,992 million (Lubangu and Mofya-Mukuka, 2012)[15]. In terms of crop production these are responsible for contributing an estimated 80 percent of output. The contribution of small scale farmers to livestock production has been around 30%. A small number of commercial or large scale farmers are involved in commercial crop and livestock production. These are responsible for much of wheat, soya bean and sugar cane production.. Despite being a vital resource underpinning food security and livelihoods of people, agro-biodiversity has not been given adequate attention in terms of management and utilization, compared to other components of biodiversity such as forestry, wild animals and fisheries, and is therefore threatened with loss by a number of causes.

## 1.2 Changes in Status, Trends and Threats to Biodiversity

### 1.2.1 Overall status of biodiversity

The current assessment recorded a total of 12,505 species in the country compared to 7,884 in the 1998 assessment (Table A). Of these species 4.5% are microorganisms, 31.7% are plants, 62.8% are animals and 1.0% are domesticated plants (crops) and animals. At least 144 and 28 plant and animal species, respectively, are threatened according to the IUCN conservation status classification.

[15] Lubangu, M. and R. Mofya-Mukuka (2012).The Status of the Smallholder Livestock Sector in Zambia, Technical Report No.1., IAPRI, Lusaka, Zambia.

**Table A:** Total number of recorded species in Zambia by 2015

| Group | | Number of species | |
|---|---|---|---|
| **Main** | **Sub-group** | **1998** | **2015** |
| Microorganisms | | 563 | 563 |
| Plants | Algae | 147 | 147 |
| | Mosses | 129 | 129 |
| | Ferns | 142 | 147 |
| | Flowering plants | 3,410 | 3,543 |
| Animals | Invertebrates | 1,808 | 6,135 |
| | Amphibians | 67 | 74 |
| | Reptiles | 150 | 156 |
| | Fish | 409 | 490 |
| | Birds | 733 | 757 |
| | Mammals | 224 | 242 |
| Domesticates | Crops | 86 | 106 |
| | Animals | 16 | 16 |
| **Total** | | **7,884** | **12,505** |

Source: NIRAS, 2015

The network of Zambia's statutory protected area (PA) in Zambia covers about 40% of the total surface area of the country and comprises National Forests, Local Forests, National Parks, Game Management Areas, Bird and Wildlife Sanctuaries and Heritage Sites and some private and community game ranches whose coverage is not fully known. These PA categories, which largely conform to the IUCN classification, have a critical role in the protection of biodiversity and physical environment in Zambia.

While institutional coordination of biodiversity management does exist in the country, a number of sector institutions are mandated to manage different compoennts of biodiversity. Sometimes, this poses challenges in coordination. Overall, the country has largely depended on the fragmented and project based activities to conserve, monitor the status, trends and threats to biodiversity.

The biodiversity status from the biodiversity stocktaking assessments undertaken for the revision of the 1999 NBSAP shows the following status and trends in the biodiversity components so far assessed.

### 1.2.2 Overview of the forest estate and protected area system status

a) ***Forest estate and other land use classes status***

The statistics from the ILUA, 2008 report field inventory refer to only the general natural forest estate and other land use classes within Zambia.
As indicated in Table 1 below, the semi-evergreen, evergreen and deciduous forests cover 66 percent of the total area of Zambia. Other land accounts for the next greatest extent of land use, approximately 21%. Within this major land use class, one finds that approximately 10% of the total land area is grasslands and marshland, about 10% of the total land in Zambia is dedicated to crop land and pasture land and less than 1% of the total land is considered to be occupied by built-up rural and urban settlements. Figures for inland water extent indicate that over 4% of the Zambia is occupied by rivers and lakes. ILUA preliminary results also found that 'other wooded land', consisting of wooded grasslands (including dambo plains) and shrublands (including Munga woodland, Termitaria and Machia-type scrub), account for 8% of the total land area.

**Table 1**: Total area of Zambia by all land use class/forest types ('000 ha and %)

| **Forests (=/> 10% Canopy cover) Calculated from ILUA survey data** | **Area Cover ('000 ha)** | **Proportion %** |
|---|---|---|
| Evergreen forest | 819 | 1.1% |
| Semi-evergreen Forest | 34,145 | 45.4% |
| Deciduous Forest | 14,865 | 19.8% |
| Other Natural Forests | 139 | 0.2% |
| Broadleaved forest plantations* | 0 | 0% |
| Coniferous forest plantations* | 0 | 0% |
| **Total** | **49,968** | **66.4%** |
| **Other Wooded land (5-10% Canopy Cover or shrubs/bushes canopy cover >10%)** | **Area Cover ('000 ha)** | **Proportion %** |
| Wooded Grasslands | 4,897 | 6.5% |
| Shrubs/thickets | 1,158 | 1.5% |
| **Total** | **6,055** | **8.0%** |
| **Other land (<5% Canopy Cover or shrubs/bushes canopy cover <10%)** | **Area Cover ('000 ha)** | **Proportion %** |
| Barren Land | 9 | 0% |
| Grassland | 6,085 | 8.1% |
| Marshland | 1,332 | 1.8% |
| Annual crop | 4,700 | 6.3% |
| Perennial crop | 236 | 0.3% |
| Pastures | 464 | 0.6% |
| Fallow | 2,387 | 3.2% |
| Urban | 7 | 0% |
| Rural | 551 | 0.7% |
| Extraction site/mining area | 0 | 0% |
| **Total** | **15,771** | **21.0%** |
| **Inland Water (area occupied by major rivers, lakes and reservoirs)** | **Area Cover ('000 ha)** | **Proportion %** |
| Lake | 2,693 | 3.6% |
| River | 774 | 1.0% |
| Dam | 0 | 0% |
| **Total** | **3,467** | **4.6%** |
| **Total Country Area of Zambia** | **75,261** | **100%** |

*Source:* ILUA 1 Report, 2008.

b) ***Status of the Protected Areas System***

The network of Zambia's statutory protected areas is composed of 20 National Parks (NPs) covering 63630 km$^2$, 36 Game Management Areas (GMAs) covering about 167557 km$^2$ and 490 Forest Reserves (FRs) covering 74361 km$^2$.The PA network map (Figure 1) was overlaid on the vegetation map (Edmonds, 1976) in order to derive a very preliminary overview of vegetation-based ecosystem representation in NPs and FRs (Table2).

Although more than 18% of the country consists of NPs and FRs, a lot of work is required to undertand and document the state of ecosystems in this protected area system.

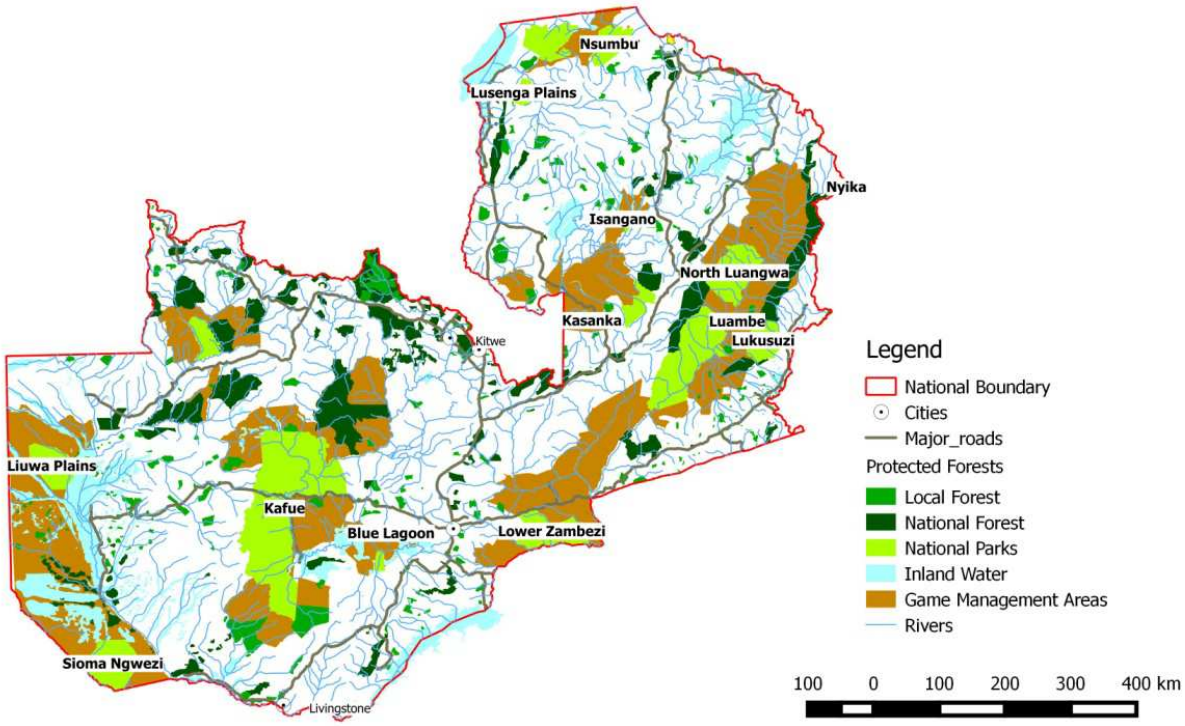



**Figure 1:** National Parks**,** Game Management Areas and Forest Reserves in Zambia (*Source*: GRZ Forest Department, 2014)

There are two main categories of forest reserves in the country: Local Forests (306) and National Forests (184). The management objective in Local Forests is to meet the needs for forest products for present and future generations of local people. The objective for establishing National Forests is to protect and conserve major water catchments and their biodiversity. For these reasons, both Local and National Forests fall in the IUCN conservation area category VIII (Multiple use management area or Managed resource area). Regardless of the type of forest reserve, no permanent settlements are allowed in a forest reserve. Within each category of forest reserves, two functional sub-categories are recognized: production (107) and protection (383) forests. Licensed exploitation of forest products is allowed in production forests while protection forests are intended for the protection of water catchments, biodiversity and cultural values. In addition to forest reserves, there are also 59 Botanical Reserves which are located either within or outside forest reserves.

Botanical Reserves were established to preserve relic vegetation types and/or promote the *in-situ* conservation of important plant genetic resources. They are also sources of germplasm for multiplication and breeding programmes. Although FRs are classified as either protection for the conservation of biodiversity and watersheds or production for sustainable utilization of forest resources, in practice there is no difference in the way the different FRs are managed.

The Zambia Wildlife Authority (ZAWA) administers NPs and oversees the protection of wildlife. TheWildlife Act of 1998 provides for the establishment of Community Resources Boards (CRBs) that provde for the involvement of local communities in co-management of wildlife in GMAs. By the time of writing this report, there were 54 CRBs in the country. The Act also provides for the establishment of private game ranches.

**Table 2**: Approximate ecosystem representation in Zambia's national parks and forest reserves

| Vegetation-based ecosystem | Total area (square km) | Area (square km) in Protected Areas | |
|---|---|---|---|
| | | National Parks | Forest Reserves |
| Forest | 45690 | 9610 (21.0%) | 6783 (9.5%) |
| Woodland | 576587 | 43734 (7.6%) | 47970 (8.3%) |
| Woodland/Grassland Transition | 25698 | 3330 (13.0%) | 921 (3.6%) |
| Grassland | 93720 | 6854 (7.3%) | 3633 (3.9%) |
| Aquatic | 10905 | 52 (0.5%) | 0 (0.0%) |
| **Total** | **752600** | **63580 (8.4%)** | **59307 (7.9%)** |

**N.B.** Some forest reserves are not included because they are not shown on the 1988 Forest Estate map of Zambia while others are either not listed or have insufficient data in the Forest Department database.

The key changes in the status of National Parks and Game Management protected area system since the Fourth National Report is the creation of a new Lusaka National Park. The Lusaka National Park was established in 2011 on pieces of land which were forest reserves numbers 26 and 55. The forest reserves have since been de-gazetted to pave way for the establishment of the park. The Park is stocked with 827 animals which comprise nine different species.

The reclassification conservation plan (REMNPAS, 2010)[16] identified gaps of representation of plant and animal species within the existing National Parks and Game Management Areas and made recommendations to improve the protection effectiveness of the current wildlife protected areas system through a comprehensive gap analysis.

The identified species representation gaps are as follows:

*i) Large mammal representation*

Most of the large mammal species are well represented in the national parks except for Giraffe (*Girriffa camelopardelis angolensis),* Black lechwe (*Kobus leche smithemani),* Kafue lechwe (*Kobus leche kafuensis)* and Black Rhinoceros (*Diceros bicornis).*

[16] Reclassification and conservation plan for the national system of protected areas in Zambia(2010). Ministry of Tourism Environment and Natural Resources, Zambia.

Although Giraffe is currently represented in Sioma Ngwezi National Park and Mosi-oa-Tunya National Parks, the population in Mosi-oa-Tunya NP was only introduced, and the species did not naturally occur in this area. Black lechwe are represented in Isangano National Park but this is only seasonal with a very small percentage of the lechwe population entering the park.
There is a need to ensure adequate representation of this sub-species. Similarly the Kafue Flats lechwe population, seasonally move in and out of the Lochinvar and Blue Lagoon National Parks, as the bulk of the population range remains outside the two Protected Areas. Black rhinoceros is represented in North Luangwa NP but its original range included most of the National Parks in Zambia. The numbers in North Luangwa NP are still low.

To raise the representation of the mentioned species/sub-species, it is important and critical that a look is given at either reclassifying surrounding areas/GMAs or parts thereof into new PA categories or consider realigning boundaries of existing National Parks to incorporate significant size of the affected animals' effective range(s).

*ii)Bird's representation*
The birds representation shows that the Shoebill (*Balaeniceps rex),* although occasionally seen in Kasanka NP, Mweru-Wa-Ntipa NP and Nsumbu NP, it is considered only as very rare vagrants in these areas. The only site in Zambia where it has been recorded as a breeding resident is Bangweulu swamps incorporating the Bangweulu GMA. Another species that are not at all represented in any National Park in Zambia is the Papyrus Yellow Warbler (*Chloropeta gracilirostris).* This bird only occurs in Zambia in a large area of dense papyrus swamp in the lowest reaches of the Luapula River as it fans out to meet Lake Mweru.

*iii) Vegetation representation*
Priority vegetation types for which suggestively Protected Areas need to be reclassified or their current boundaries realigned are Dry Evergreen Forest, Kalahari Woodland, Miombo Woodland, Grasslands and Munga Woodland. Table 3 presents the national coverage of vegetation types and the percentage of each vegetation type, protected within National Parks. The figures in red or highlighted (from Dry Evergreen Forest to Munga Woodlands) indicate the respective type which is currently under-represented (below the target minimum of 10%).

**Table 3:** Summary of vegetation types and their distribution in Zambia

| Vegetation Type | National Coverage (%) | Occurring in National Parks, a category that offers effective Biodiversity Conservation (%) |
|---|---|---|
| Dry Evergreen Forest | 5.0% | 4.6% |
| Kalahari Woodland | 13.2% | 5.6% |
| Miombo Woodland | 47.2% | 6% |
| Grassland | 20.6% | 7.7% |
| Munga Woodland | 5.6% | 7.7% |
| Terminataria Vegetation | 2.0% | 13% |
| Dry Deciduous Forest | 1.4% | 15% |
| Mopane Woodland | 3.4% | 28% |
| Moist Evergreen Forest | 0.1% | 45% |

*Source*: REMNPAS, 2010.

### 1.2.3 Aquatic ecosystems status

There are three basins in Zambia: the Zambezi; Luapula and Lake Tanganyika basins. The Luapula consists of the following major sections or rivers: the Bangweulu Lakes and Swamps Complex; Chambeshi River; Kalungwishi River; Luapula River; and Lake Mweru. The Zambezi Catchment area is the largest and is composed of the following major sections: Luangwa River; Lukanga Swamps, Kafue River; Upper Zambezi; the Middle Zambezi, now dominated by Lake Kariba; and Lower Zambezi (see Figure 2).The Lake Tanganyika basin in Zambia is the smallest and consists of a fish fauna with Nilotic affinities but with the most diverse biodiversity.

Zambia has eight wetlands of international importance or Ramsar sites. Table 4 below shows the Ramsar sites in Zambia and their relative size. These wetlands are habitats of several important fauna and flora species including some endemic and endangered species. (COP 12 Wetlands National Report, 2015). The Wetlands National Report to the Twelfth Session of the Conference of Parties (COP 12) held in Uruguaay in 2015 indicates improved status of the Lukanga swamps, Bangweulu swamps and Liuwa Plains. However, the report does not give details of the scope of improvement but attributes the improvement to the attention these wetlands have received from the private sector engagement in their conservation regimes.

**Table 4:** Ramsar sites in Zambia

| **Name of Ramsar Site** | **Area ($km^2$)** |
|---|---|
| Bangweulu Swamps | 11,000 |
| Busanga Swamp | 2,000 |
| Kafue Flats (includes Lochinvar & Blue Lagoon NPs) | 6,005 |
| Lake Tanganyika (portion in Zambia) | 2,300 |
| Luangwa Floodplains | 2,500 |
| Lukanga Swamp | 2,600 |
| Mweru-Wa-Ntipa Swamps | 4,900 |
| Barotse Floodplain | 9,000 |
| **Total** | **40,305** |

*Source*:
http://en.wikipedia.org/wiki/List_of_Ramsar_wetlands_of_international_importance

### 1.2.4 Status of Important Bird Areas of Zambia

A network of 42 Important Bird Areas (IBAs) have been identified in Zambia (Figure 3), using the Bird Life International standard guidelines for the identification of IBAs (Leonard, 2005)[17]. These guidelines were closely followed in selecting Zambian IBAs, with the recognition that the need for scientific objectivity and standardization has to be balanced by common sense and practical objectives.

The Forty-two sites cover a combined area of 10,538,250 ha; approximately 14% of Zambia's total land surface. At present, about 82% of the area covered by IBAs receives some form of protection (National Park: 60%, Game Management Area: 19%, National Forest: 2%privately owned: 1%) (Leonard, 2005). The remaining 18% are in open areas with no legal status; a few of these have developed some local by-laws[18] with the help of chiefs and traditional leaders.

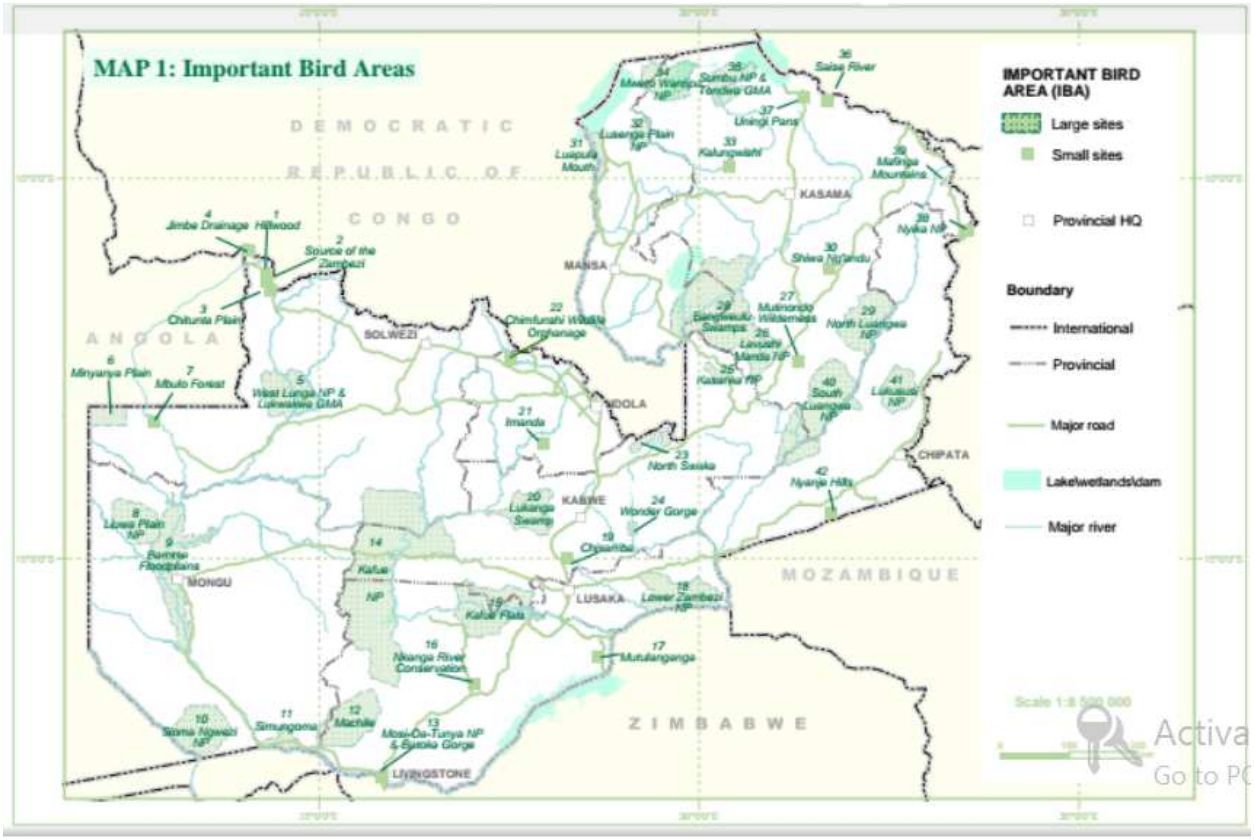
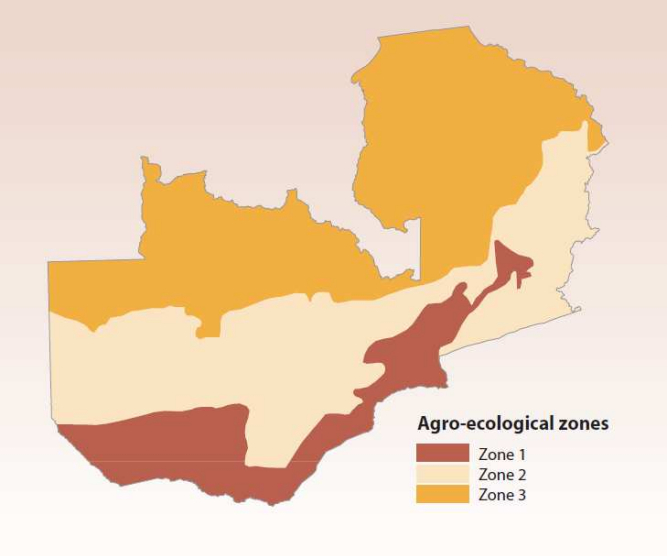



**Figure 3**: Important bird areas of Zambia (*Source*: BirdWatch Zambia, Status and Trends Report, 2012)

[17] Leonard P (2005) *Important Bird Areas of Zambia; Priority Conservation Sites*, Zambian Ornithological Society
[18] Nyoni M (2010), Cnservation Bye-laws for Magumwi-Machile Site in Machile Important Bird Area, Zambian Ornithological Society.

### 1.2.5 Agro-ecological systems status

Zambia has three agro-ecological zones differentiated mainly by amount of precipitation received per annum (**Figure 4**).




Zone 1 covers 23% of Zambia, and includes the major valleys (Gwembe, Lunsemfwa and Luangwa). It has the lowest agricultural potential, with rainfall of less than 800 mm per annum, a short growing season of between 80–120 days, and a medium to high risk of drought.

Zone 2 covers the Sandveld Plateau, the Kalahari Sand Plateau and the Zambezi floodplains of the Western Province. Rainfall is between 800–1,000 mm per annum, and the growing season is 100–140 days. It has a medium to low risk of drought. 87% of the area is suitable for agriculture, but only half of this is accessible, as the remainder is in national parks, game management areas and forests.

Zone 3 has a mean annual rainfall of 1,000 mm and a growing season of 120–150 days. The risk of drought is almost nil. However, only 52.7% of the land is suitable for cultivation due to the soils being highly leached. Very little of this zone is in national parks, game management areas and forests.

**Figure 4:** Agro-ecological zones of Zambia**. (**Source, Ministry of Agriculture and Cooperatives, 2010)

### 1.3 Species diversity status

There are at least 12,505 different kinds of organisms (species) in Zambia and of these 4% are bacteria and microorganisms, 33% are plants and 63% are animals (NIRAS, 2015)

***i) Flowering plants species diversity***

The assessment of flowering plants diversity in Zambia was undertaken using available data from field inventories. Most of the data are on tree species and therefore underestimate the diversity of flowering plants in the country. Mathematical factors for estimating all woody and flowering plant species were developed from the few complete plant inventories that have been conducted in the country. The total species of wild flowering plants in Zambia is estimated at 3,543. These are made up of 273 sedges, 2,660 herbaceous plants and 1,610 woody plants. Almost 53% of the flowering plants are rare and these occur throughout the country, suggesting that the current extent of the protected area system is inadequate for conserving all the rare species which by their nature of rarity also require large areas to conserve viable populations.

The highest diversity of flowering plants is in northern and north-western parts of the country.(NIRAS, 2015).

Due toinadequate information, the threat status of the majority of plants in Zambia is not known. Of the 364 plant species in Zambia listed by the World Conservation Monitoring Centre (1992), 79.4% had no information, 18.1% were not threatened and 1.4% were rare and the status of 1.1% was indeterminate.
The Southern African Botanical Diversity Network (SABONET) classified 144 plant species in Zambia as threatened (Golding, 2002[19]; Appendix 1A); of these 33% are woody plants and 67% are herbs. Species richness was estimated and mapped as species density (i.e. number of species per plotorha). Based on the ILUA I data, the estimated woody plants species density is highest in five separate areas in the country. The largest areas of high woody plant species richness (36 – 48 species ha-1) are in northern and north-western Zambia. The largest continuous area under forest reservation in this species-rich block is in the Kafue Headwaters, P105, P111 and P112 in Solwezi district, P170 in Kasempa and P85 in Mwinilunga. There are three other smaller blocks of high woody plant species richness: Mansa, Mkushi and Siavonga.Spatial modelling revealed three areas of high diversity of *Brachystegia* species: the Mpulungu block in Northern Province, the Solwezi block in North-western Province and the Mpika-Serenje block in central Zambia.

***ii) Mammals species diversity***
There is a paucity of data on overall mammal species status, trends and distribution, as a result the stocktaking assessment report concentrated on critical mammal species (threatened, endangered and vulnerable). The stocktaking report estimates the mammal diversity in Zambia at around 224 species. The REMNPAS, (2010) on the other hand reported that aapproximately 43 species of large mammals were important; firstly on account of the potential income that can be generated from their use in photographic and consumptive tourism, secondly, their contribution to local household economies, as a source of protein and as a source of income through illegal market structures, and thirdly, their aesthetical appreciation by the global community including their existence value. The large mammals represents nine (9) species of large carnivores (*Carnivora*), two (2) species of odd-toed ungulates (Perissodactyla) and thirty one (31) species of even-toed ungulates (*Artiodactyla*) and one (1) species of elephant.

According to the 2014 Red List of Threatened Species, over 28 animal species and subspecies are considered as threatened, endangered or vulnerable. Annex 1 lists critical mammal species in Zambia with their conservation status.

***iii) Bird species diversity***
Zambia is known to have around 757 species of birds as of June 2013; this is a comparatively rich measure of avifauna for a landlocked country dominated by a single biome. Leonard, (2005) documents proof that at least 470, of the 757 bird species, breed in Zambia. In addition to that, well over 600 of the species are resident or Afrotropical migrants. Furthermore, about 100 are

[19] Golding, J.S. (ed.). 2002. Southern African Red Data Lists. SABONET Report No. 14, SABONET, Pretoria.

non-breeding migrants or vagrants from the Palearctic region and the remainder comprise non-breeding Afrotropical migrants and vagrants.

Out of 757 species, 15 are listed as either endangered, vulnerable or near threatened on the IUCN red list as of 2014, which indicates an increase from 13 in 2010 . The majority of these are raptors, viz. vultures. Of the fifteen listed species four are endangered, ten are vulnerable and one is near threatened. Table 5 below shows the listed species found in Zambia.

**Table 5**: Threatened species of birds in Zambia

| Common Name | Scientific Name | Status |
|---|---|---|
| Grey-crowned Crane | *Balearica regulorum* | Endangered |
| Ruppell's Vulture | *Gyps rueppelli* | Endangered |
| Hooded Vulture | *Necrosyrtes monachus* | Endangered |
| White-backed Vulture | *Gyps africanus* | Endangered |
| Zambian Barbet | *Lybius chaplini* | Vulnerable |
| Wattled Crane | *Bugeranus carunculatus* | Vulnerable |
| Slaty Egret | *Egretta vinaceigula* | Vulnerable |
| Taita Falcon | *Falco fasciinucha* | Vulnerable |
| Black-cheeked Lovebird | *Agapornis nigrigenis* | Vulnerable |
| Shoebill | *Balaeniceps rex* | Vulnerable |
| Blue Swallow | *Hirundo atrocaerulea* | Vulnerable |
| White-headed Vulture | *Trigonoceps occipitalis* | Vulnerable |
| Cape Vulture | *Gyps coprotheres* | Vulnerable |
| Lappet-faced Vulture | *Torgos tracheliotos* | Vulnerable |
| Lesser Flamingo | *Phoeniconaias minor* | Near Threatened |

Source: Niras 2015

***iv) Fish species diversity***

Four hundred and ninety (490) species of fish belonging to 24 families have been reported in Zambia. The highest fish species richness is found in Lake Tanganyika followed by Mweru-Luapula. Mweru-Wantipa has the lowest fish species richness in the country (Table 4). Cichlids with 191 species have the highest diversity followed by Cyprinids (93 species). Endemic fish species that are confined to one fishery are estimated at 289 and 76% of these are in Lake Tanganyika. The other fisheries with a reasonable degree of endemism are Mweru-Luapula (24 species), Barotse Floodplain (20 species) and Kariba (13 species). Species endemism in the rest of the fisheries ranges from zero in Mweru-Wantipa to 9 species in Bangweulu.

Lake Tanganyika has a unique fauna. It is estimated that the lake has over **200 species of fish** of which over 70% are endemic to the lake. This fishery needs special attention for fish biodiversity conservation, especially that it is a transboundary water body shared by four riparian countries.

***v) Plant and animal genetic resources diversity***

There are at least 107 cultivated plant species in Zambia and of these 52% are exotic species, 33% are naturalized and 15% are indigenous. There are also three species of wild rice that are related to the cultivated rice. In addition, there are 567 crop wild relatives based on 107 cultivated

crop species in Zambia. The total diversity of domesticated animals is estimated at 16 species. These consist of 10 species of mammals and 6 species of birds. Domesticated mammals are dominated by cattle while birds are dominated by chickens.

A number of crops, which include maize as a primary staple, sweet potato and groundnuts are cultivated almost throughout the country. Other food crops cultivated in some parts of the country include sorghum, finger millet, rice, cassava and beans.

Some of the crops, whose Crop Wild Relatives (CWRs) have received relatively more attention in terms of collection, characterization and conservation in Zambia include Cowpea (*Vignaunguiculata*), Rice (*Oryza sativa*), Finger millet (*Eleusinecoracana*), Pearl millet (*Pennisetumglaucum*) and Sorghum (*Sorghum bicolor*). A list of cultivated crops and their wild relatives and occurrence in Zambia are given in Annex 2.

According to a check list of Zambian vascular plants (Phiri, 2005)[20], one or more crop wild relatives are known to exist for about 25 crops cultivated in Zambia. Most are wide spread in terms of their distribution while others are confined to few areas.

The gene bank conserves both inter-specific and intra-specific diversity. The number of accessions or crop forms for different crops held in the gene bank by December 2007 is given in Table 4 below.

**Table 4:** Crop species and number of accessions conserved in the National Gene Bank

| **Crop Species** | **Number of Accessions** |
|---|---|
| 1. Groundnuts | 1,350 |
| 2. Cowpea | 561 |
| 3. Fingermillet | 657 |
| 4. Pumpkins Sorghum | 297 |
| 5. (cucurbits) | 641 |
| 6. Maize | 685 |
| 7. Bambara | 163 |
| 8. Beans | 309 |
| 9. Rice | 196 |
| 10. Pigeon pea | 153 |
| 11. Okra | 245 |
| 12. Water melon | 75 |
| 13. Castor | 45 |
| 14. Sunflower | 42 |
| 15. Other Crops | 194 |
| **Total** | **5,996** |

*Source: NIRAS, 2015)*

In Zambia 82.5 % of the estimated 1,417,992 smallholder farmers own at least one type of livestock (cattle, goats, pigs, sheep and donkey) or poultry (chicken, guinea fowls, ducks/geese

[20] Phiri, P. M. (2005). A SABONET Check List of Zambian Vascular Plants

and rabbits). Traditional sheep production is concentrated in Southern, Eastern and Luapula provinces, accounting for 63% of the traditional sheep population, which are mainly of indigenous fat-tailed and thin-tailed types. Almost 65% of the total Zambian pig herd consists of pigs from indigenous breeds.

The difficulties associated with accessing feeds and drugs has made many rural small pig producers turn to indigenous breeds with little management requirements and natural resistance to diseases compared to exotic breeds.

***vi) Invertebrates diversity***

The total diversity of invertebrates in Zambia is estimated at 6,135 species (Professor Keith Mbata, personal communication), of these 69 species are endemic and 14 (mainly fresh water molluscs) are threatened. Among the critically endangered snail species are *Bellamya mweruensis, Bellamya pagodiformis* and *Bellamya pagodiformis* while *Bulinus nyassanus*, *Bridouxia ponsonbyi* and *Tanganyicia rufofilosa* are vulnerable and *Melanoides admirabilis* is near threatened. The butterfly *Acrea acrita ambigua* is also endangered.

Insects comprise the largest known animals in the invertebrate group with more than 2,545 known species in Zambia in about 27 different orders (NIRAS, 2015)[21]. There are about 229 species of Dragonflies and 12 Mayflies identified and known to exist in Zambia. The areas that are richest in number of Odonata species and genera, but not necessarily in numbers of individuals, are swampy areas along forested water riverine, which also have a number of endemics.

There are about 57 identified and known species of Molluscs in Zambia. The centres of molluscan endemism are Lake Tanganyika, Mweru-Wa-Ntipa and the Barotse Plains.Endemic molluscs in Zambia include *Gabbiella stanleyi, G. zambica and Mutela zambesiensis*, the first two only known from their type localities: Chitipa, Eastern Zambia and Mankoyo; and Northwestern Zambia, respectively. More than 200 Crustacean species are known in various ecosystems in Zambia, of which more than half are endemic to Zambia. They include 10 species of freshwater crab (Platythelphusaand *Potamonautes platynotus*; all endemic); at least 11 species of small atyid shrimp and several copepods (Marshall, 2004)[22].Table 6shows the other aquatic species and their numbers known to occur in Zambia.

**Table 6:** Other aquatic invertebrates known to occur in Zambia

| Group | Known number of species | Endemic |
|---|---|---|
| Leeches | 32 | 12 |
| Sponges | 9 | 7 |
| Byozoa | 6 | 2 |
| Flatworms | 17 | 7 |
| Annelids | 28 | 17 |

[21] Based on inventories at Livingstone Museum

[22] See invertebrate report

***vii) Vertebrates diversity***

The diversity of Amphibians (frogs and toads) in Zambia is estimated at 74 species and there is no discernible geographical gradient in species richness. A total of 13 species are rare having been recorded in one locality only. The Nyika dwarf toad (*Bufo nyikae*, Figure 6) is considered a vulnerable species due to its restricted range, in Nyika plateau.

The diversity of reptiles (lizards, snakes and tortoises) in Zambia is estimated at 156 species. A total of 45 species are considered rare because they have been recorded in only one locality.

**Figure 5**: The Nyika dwarf toad (*Bufo nyikae*)

## 1.4 Trends and Threats to Biodiversity in Zambia

### 1.4.1 Trends and threats to forest reserves and plant species

Changes in the forest reserve status are reviewed annually in internal reporting by districts to Forestry Department (FD) headquarters. A comparison of FD data (Table 6) shows a significant deterioration in the integrity and quality of forest reserves.Soaring levels of encroachment through cultivation and settlement have compromised the Protected Forest Areas (PFAs). By 2011, it was estimated that less than half of the Forest reserve estate could be considered free from encroachment or settlement (Mickels-Kokwe,G and Kokwe, M. 2013)[23].

As stated earlier, the assessment of flowering plants diversity in Zambia was undertaken using available data from field inventories. Most of the data are based on tree species and therefore underestimate the diversity of flowering plants in the country. Due to paucity of data the overall trends of plant species is difficult to acertain.

[23] Mickels Kokwe, G. and M. Kokwe. 2014. Forest Management Practices with Potential for REDD+ in Zambia. Report submitted to the REDD Programme, Zambia

**Table 7:** National Forest (NF) protected forest reserves in Zambia, by province, 2000 and 2011.

| Province | Total Land Area (ha) | 2000 | | | 2011 | | | Change | Loss of National Forest (% of 2000 estate area) |
|---|---|---|---|---|---|---|---|---|---|
| | | # of NFs | Area under NF (ha) | % of Land Area | # of NFs | Area under NF (ha) | % of Land Area | | |
| Central | 9 439 450 | 15 | 373 225 | 3.95 | N/A | 355 132 | 3.76 | - 18 093 | 4.85 |
| Copperbelt | 3 101 400 | 37 | 475 229 | 15.32 | N/A | 448 255 | 14.45 | - 26 974 | 5.68 |
| Eastern | 6 910 590 | 14 | 683 349 | 9.89 | N/A | 278 035 | 4.02 | N/A | - |
| Luapula | 5 056 680 | 8 | 212 547 | 4.20 | N/A | 202 663 | 4.01 | - 9 884 | 4.65 |
| Lusaka | 2 189 570 | 1 | 186 | 0.01 | N/A | 0 | 0.00 | - 186 | - |
| Muchinga | - | - | - | - | N/A | 903 098 | - | N/A | - |
| Northern | 14 782 580 | 23 | 801 592 | 5.42 | N/A | 232 188 | 1.57 | N/A | - |
| North-western | 12 614 090 | 35 | 2 044 344 | 16.21 | N/A | 1 818 718 | 14.42 | - 225 626 | 11.04 |
| Southern | 8 528 290 | 9 | 211 677 | 2.48 | N/A | 211 677 | 2.48 | - | - |
| Western | 12 838 600 | 37 | 315 893 | 2.46 | N/A | 312 878 | 2.44 | - 3 015 | 0.95 |
| **Total** | **75 461 250** | **180** | **5 145 162** | **6.82** | **N/A** | **4 699 918** | **6.23** | **- 283 778** | **8.65** |

(*Source*: GRZ 2004[24], GRZ 2012b[25])

***i) Internal threasts to forests***

More than 280,000 hectares of forest reserve have been de-gazetted or excised over the past decade (GRZ 2012a)[26]. In North-Western Province, it is estimated that at least 350,000 ha of national forest is undergoing conversion, a process driven mostly by mining. The negative impact of the loss of protected forests in North-Western Province is disproportionately high. Most 'intact' protected forests in Zambia, i.e. forests that are not encroached or otherwise compromised, are found in this province. These are the same protected forests that would be of greatest interest to biodiversity conservation.

***ii) Deforestation and forest degradation***

Among the most important threats to plants and their habitats are deforestation and forest degradation. The contour map generated from the spatial modeling revealed that northern Zambia has lost much of its primary forest cover (Figure 5), largely due to shifting cultivation (Chidumayo, 1987b; Sprague and Oyama, 1999). This is also the area with the highest tree species diversity as well as the highest species density of miombo genera. Thus deforestation and forest degradation are major threats to plant biodiversity in northern Zambia. In the east, central and southern Zambia, conversion of forest land to permanent crop agriculture is the main driver of forest cover loss.

Uncontrolled late bush fires also contribute to forest degradation in Zambia (Trapnell, 1959; Lawton, 1978; Chidumayo, 2013). Most wild fires that damage forests and woodlands in Zambia are caused by man (Figure 6). Timing and frequency of fires determine the effect of fire on the ecosystem. In the natural state, annual early dry season fires burn the ground layer of the forest in the cool season (from May to mid-August) when trees are dormant. Severe fires, caused by late dry season burning, are destructive to forests. Current unlawful forest practices have affected fire frequency and timing.

[24] GRZ (2004). *Status of forest reserves 2000*. Forestry Department, MTENR.
[25] GRZ (2012b). *The Forest Estate as at 31 December 2011*. Forestry Department, Forest Management Unit, MTENR.
[26] GRZ (2012a). *Degazettion, excision and gazettion of the Forest Estate 2004-2011*. Forestry Department, Forest Management Unit, MTENR.

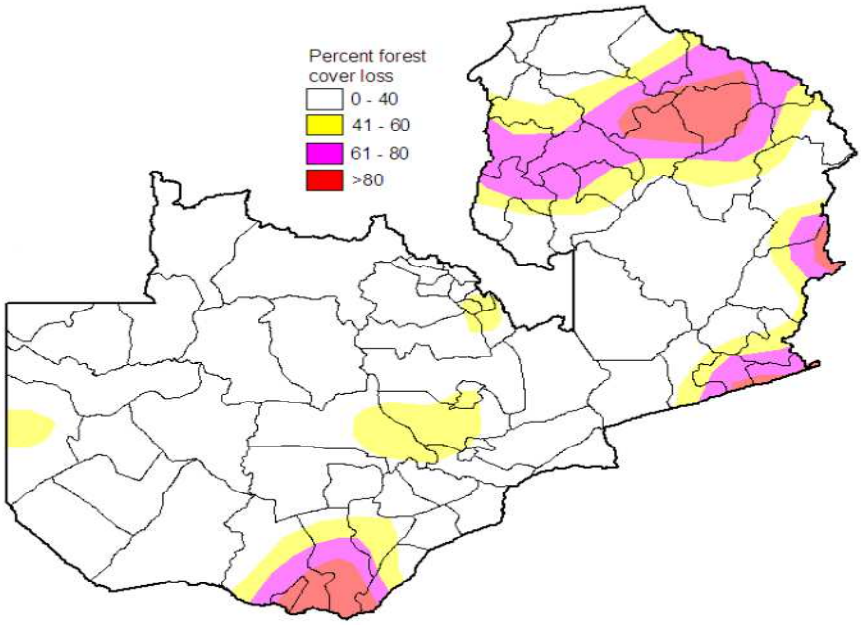



**Figure 5**: Modeled spatial pattern of forest cover loss in 2005 in Zambia. (*Source*: NIRAS, 2015).

**Figure 6:** Degradation of savanna woodland by late dry season fire in Chisamba area in central Zambia in 2012 (*Source*: Chidumayo, 2013).

### *iii) Overexploitation*

A number of timber trees are known to be locally threatened due to overexploitation that has caused mature individuals to become rare. These include *Afzelia quanzensis*, *Daniela ostiniana*, *Pterocarpus angolensis*, *Khaya nyasica* and *Mitragyna stipulosa* (Chidumayo and Njovu, 1998).

This is in spite of declaring some of these species as protected or reserved. Currently 17species of trees are reserved under the Forest Law and can therefore only be cut under license although in practice this is difficult to enforce. Overharvesting of edible tubers of some orchids, especially for sale, is also threatening some local orchid populations. Infact, the orchids occurring on Zambian markets today are mostly brought in from Tanzania with the Zambian orchid population being seriously rare (Bingham,*pers. communication*).

### *iv) Invasive alien plant species*

Some introduced species have become very invasive and pose threats to ecosystems and their constituent indigenous flora. Among such weeds are lantana (*Lantana camara)* and *Mimosa pigra*. Lantana has become a serious weed in forest plantations in the Copperbelt area and at Victoria Falls World Heritage site in Livingstone. Lantana is known to negatively affect the regeneration of some indigenous species such as *Bauhinia petersiana* (Lwando and Chidumayo 2009). Although the potential distribution range of Lantana is projected to contract in Africa under the future climate scenarios, much of Zambia will remain suitable and highly suitable for this invasive species (Taylor *et al*.,2012)[27]. Control of the Lantana weed is difficult because it regenerates both sexually and vegetatively, especially from roots. *Mimosa pigra*, together with the indigenous *Dichrostachys cinerea*, have been expanding their range in the Kafue Flats, perhaps due to climate change and flood regime regulation, at the expense of some indigenous herbaceous plants and the grassland ecosystems (Indira, 2007)[28].

## 1.4.2 Trends and threats to national parks, game management areas and mammals

It is quite difficult to establish an overall up-to-date picture of the wildlife status and trends in Zambia due to inadequate data on sightings, sizes and distribution for most species. However, population data are available for some iconic species, such as elephant, black rhino, and a few smaller antelopes, such as the Kafue lechwe. Trend analysis shows that the elephant suffered sharp declines in population size from the 1960s to 1990s but appears to have started recovering in the post-2000s. Assessment of the status of wildlife populations can also be determined from records of hunted trophies. The analysis of historical trophy size data indicates that the majority of antelopes in Zambia have stable population structures as there has been no significant change in the sizes of hunted trophies from the 1960s to present for the majority of antelopes (Nuzzo and Traill 2013)[29], except buffalo that has shown some decrease in the size of trophies

The following are the identified key threats to National Parks and Game Management Areas and mammals.

[27]Taylor, S., Kumar, L., Reid, N. and Kriticos, D.J. 2012. Climate change and the potential distribution of an invasive shrub, *Lantana camara* L.. PLoS ONE 7(4): e35565. doi:10.1371/journal.pone.0035565.

[28]Indira, T.J. 2007. Mapping and modeling of Mimosa pigra expansion in Lochinvar National Park, Zambia. MSc thesis, International Institute for Geo-Information Science and Earth Observation, Enschede, The Netherlands.

[29] Nuzzo, M. C. and Traill, L. W. (2013). What 50 years of trophy records illustrate for hunted African elephant and bovid populations. African Journal of Ecology 52: 250 – 253.

### *i) Human encroachment*

Most threats to mammal biodiversity are as a result of human actions. Unplanned human settlements in GMAs and encroachment in NPs is one of the major long-term threats to wildlife survival as this results in the destruction and reduction in the size of available habitat for mammals. Protected Areas such as GMAs attract settlements because of their relative abundant land and natural resources vital to the sustenance of rural livelihoods. High human population growth undoubtedly means increased demand for land for human settlements and farming. Increased human populations have resulted in increased demand for more land for agriculture and loss of wildlife habitat in GMAs. Data from Table 7 clearly show that Bilili Springs, Namwala and Mukungule GMAs are the most heavily settled GMAs in Zambia. The GMAs have almost been completely taken over by settlements leaving little land for wildlife conservation. With increasing settlements in GMAs also come human-wildlife conflicts.

**Table 7:**Estimate of extent of habitat conversion in some selected GMAs

| GMA | Average Size ($Km^2$) | Human Settled Area ($Km^2$) | Percentage (%) of Human Settled area |
|---|---|---|---|
| **Luangwa Ecosystem GMAs** | | | |
| Mukungule | 1,661 | 1,355 | 81.6 |
| Munyamadzi | 2,675 | 523 | 19.5 |
| Lumimba | 4,149 | 959 | 23.1 |
| Lupande | 4,393 | 1,994 | 45.4 |
| Musalangu | 7,810 | 2,769 | 35.5 |
| Sandwe | 1,299 | 426 | 32.8 |
| West Petauke | 1,498 | 203 | 13.6 |
| Chisomo | 3,016 | 552 | 18.3 |
| **Kafue Ecosystem GMAs** | | | |
| Mumbwa | 2,089 | 978 | 46.8 |
| Bilili Springs | 3,678 | 3,660 | 99.0 |
| Kafue Flats | 1,372 | 445 | 32.5 |
| Mufunta | 6,411 | 1,150 | 18.0 |
| Sichifulo | 3,600 | 645 | 18.0 |
| Namwala | 3,162 | 2,643 | 83.6 |
| Nkala | 202 | 68 | 33.6 |
| Kasonso Busanga | 7,780 | 213 | 5.0 |
| Mulobezi | 3,591 | 591 | 16.4 |

*Source*: Lindsey *et al*., 2013b[30]

### *ii) Illegal wildlife use*

Due to high demand for bush meat as is the case in many of African protected areas, poaching has not spared the wildlife in many protected areas in Zambia. Poaching is often non-selective thus resulting in harvesting of even productive members of wildlife populations.

[30]Lindsey, P., Nyirenda, V., Barnes, J., Becker, M., Tambling, C., Taylor, A & Watson, F (2013b): Zambian Game Management Areas; The reasons why they are not functioning as ecologically or economically productive buffer zones and what needs to change for them to fulfil that role.

Large mammals of size larger than common waterbuck (*Kobus ellipsiprymnus*) are most targeted due to the large amounts of bush meat they avail for commercial purposes. Of various methods used in poaching, snaring of wild animals still remains common in buffer zones around national parks (Lindsey et al., 2013b). The proximity of most protected areas to human settlements coupled with high unemployment, are some of the causes for this scourge. It has led to the decline of many wildlife species from these areas.

***iv)Habitat degradation***

Habitat degradation is another threat to mammal biodiversity. Conversion of wildlife habitats for cropping and livestock grazing including charcoal production have led to fragmentation of natural habitats meant for mammal biodiversity. Habitat destruction is exacerbated by shifting agriculture, burning for charcoal production, cutting for firewood for small-scale tobacco farming, and the development of mines in some GMAs (Simukonda, 2012)[31].

***iv) Mining activities***

Mining activities in certain protected areas such as in in Kafue NP, in Lochnivar and the exploration in the Lower Zambezi and Lukusuzi NPs have had negative effects on wildlife species and their habitats. In Lukusuzi National Park, for example, artisanal mining for aquamarine, tourmaline and red garnets have been taking place, which has disturbed wildlife habitats.

TheWildlife Act allows for granting of mining rights in NPs and GMAs as long as an Environmental Impact Assessment (EIA) which should take into account the need to conserve and protect biodiversity is carried out and approved by the Zambia Environmental Management Authority (ZEMA). However, information gathered revealed that about nine mines in Lukusuzi National Park and Kafue National Park were carrying out mining activities without mining licenses (OAG, 2014)[32]. This means that these mining activities were being conducted without any EIAs having been done. The impact of their activities can be noted in Figure 7 below – total land and wildlife habitat degradation.

[31]Simukonda, C (2012); 2011 Wet Season Survey of the African Elephant and other large herbivores in selected area of the Luangwa Valley, ZAWA, Chilanga.

[32] Office of the Auditor General Report, 2014. Zambia

**Figure 7:** Impacts of unlicensed mining activities in the Kafue National Park (*Source:* OAG, 2014)

***v) Late Wild fires***

Wild fires have been cited as one of the major factors affecting habitats and wildlife. However, little has been done in controlling fires which have been identified as a major threat to most protected areas in Zambia. For example, in the Kafue National Park, estimated areas burnt due to wild fires have increased by 46% from 2004 to 2008 (Table 8).

**Table 8:** Number of fires in the Kafue National Park and estimated areas burnt (hectares)

| Year | No. of fires detected | Estimated areas burnt (ha) |
|---|---|---|
| 2004 | 5,327 | 10,443 |
| 2005 | 5,736 | 13,800 |
| 2006 | 5,028 | 13,000 |
| 2007 | 5,618 | 14,792 |
| 2008 | 5,978 | 15,231 |

*Source*: Viljioen, 2009

***v) Diseases and pesticides***

Invertebrates have been documented to be impacted negatively by the use of non-targeted spraying of persistent organo-insecticides in the control of Trypanosomiasis (Julius *et al*., 2014)[33]. In 1987, an estimated 4,000 deaths of hippopotamus caused by anthrax (*Bacillus anthracis*) was reported in the Luangwa valley which also affected buffalo and elephant (Turnbull *et al*., 1991)[34] but the hippopotamus population appears to have recovered well from the outbreak following a peak population around 1986.

### 1.4.3 Trends and threats to birds

Zambia has around 757 (30% of total bird species in Africa) species of birds as of June 2013 showing an increase on the total number of 733 reported in the Fourth National Report (2009). As of 1999 only seven (7) species were listed as endangered while the current stocktaking reports indicate that this number has increased to 11 (NIRAS, 2015)).Over the past 15 years, a decline of around 35%[35] has been recorded in site occupancy (occupied areas of suitable habitat) in most important bird areas. Table 9 shows the key threats, proximate drivers and the primary indicator of the severity in each habitat type.

[33] Julius D. Elias, Jasper N. Ijumba and Florence A. Mamboya (2014) Effectiveness and Compatibility of Non - Tropical Bio-Monitoring Indices for Assessing Pollution in Tropical Rivers - A Review. International Journal of Ecosystem 4: 1 28 -134.

[34] Turnbull, P. C., Bell, R. H., Saigawa, K., Munyenyembe, F. E., Mulenga, C. K. and Makala, L. H. (1991). Anthrax in wildlife in the Luangwa valley, Zambia. The Veterinary Record 128: 399 – 403

[35] BirdWatch Zambia, Species Status and Trends report, 2012

**Table 9**: Threats to birds, drivers, severity and indicators

| THREAT | WETLAND HABITATS | | | WOODLAND HABITATS | | |
|---|---|---|---|---|---|---|
| | **DRIVER(S)** | **SEVERITY** | **INDICATOR** | **DRIVER(S)** | **SEVERITY** | **INDICATOR** |
| Habitat Loss | -Invasive plant infestations<br>-altered flood regimes (dams and water abstraction for hydropower and irrigation) | -HIGH | Reduction in both diversity and abundance | -Uncontrolled bush fires<br>-Deforestation and land clearance for settlements and agriculture | -HIGH | Reduction in both diversity and abundance |
| Hunting Pressure | -Recreation (birds as pets and illegal trade)<br>-Food insecurity in rural households | -HIGH | *Reduced species abundance(Shoebill[36], Crowned Crane and the White-headed Vulture)* | -Reduced species abundance and diversity | -HIGH | *Reduced species abundance* |
| Bird Food Shortage | -Over fishing by use of improper fishing methods | -MODERATE | *Reduction in species diversity* | -Over use of pesticides | -LOW | *Reduction in species diversity* |
| Droughts, floods and Temperature variation | -Long periods of dryness,<br>-floods and increased water retention | -MODERATE | *Reduction in both diversity and abundance* | -Long periods of dryness<br>-floods and increased water retention | -MODERATE | *Reduction in both diversity and abundance (Black-cheeked Lovebird)*[37]. |

*Source*: Adapted from BirdWatch Zambia, Species Status and Trends report, 2012.

[36] Mullers and Reid, 2011
[37] BirdWatch Zambia (BWZ) 2012

### 1.4.4 Trends and threats to aquatic systems and fish

According to the recent Catch Assessment Surveys for for Itezhi-tezhi, Lusiwashi, Kariba, Upper Zambezi, Tanganyika, Mweru Wantipa, Mweru Luapula and Bangweulu fishery areas (Department of Fisheries, 2015)[38], the CPUE for *kapenta* on Lake Kariba showed a decline from 177 to 72 kg/boat/night while effort had increased tremendously; commercial *kapenta* was no longer taking place on Lake Tanganyika with increased operational costs cited as the major reason; and overall, the total fish catches increased by slightly over 7% from 75,187 MT recorded in 2013 to 80,826 MT in 2014 mainly attributed to increase in fish catches on the Bangweulu, Mweru Luapula and Tanganyika fishery areas. The least contributors to the national catch over the same period were Lower Zambezi (476 MT), Lusiwashi (833 MT), and Chambeshi (945 MT). Complete production data for the period 1954 to 2014 were available for the Kafue fishery and trends for this fishery are shown in Figure 8. For this fishery, total production peaked in the 1980s and started to decline in the 1990s before decreasing to the lowest levels in the post-1990s.. Recent fish biodiversity studies were confined to the Zambezi Basin and Lake Tanganyika. As a result, it is difficult to assess the trends in fish biodiversity at the national level while the threats reported are for specific areas where the current studies have been confined.

The following are the key threats and drivers to aquatic systems and fish biodiversity noted since the Fourth National report.

***i) Habitat modification***

Habitat modification for aquatic ecosystems arise mainly from damming of rivers, siltation and introduction of exotic organisms. The damming of rivers relating to the construction of hydroelectric power stations has, significantly changed the fish fauna of the Middle Zambezi Basin. The Middle Zambezi has been completely changed by the construction of two great reservoirs, Lakes Kariba and Cabora Bassa.

The planned construction of dams at Devil's and Batoka Gorges, as well as some sites below Cabora Bassa, could destroy the last remaining riverine habitats and fishes of the Lower Zambezi. As the need for electricity increases, the demand for the construction of additional hydroelectricity projects increases. Currently plans are underwayfor establishing hydroelectric projects along the Kalungwish River. This is an area where the biodiversity of the river system is not well known.

***ii) Invasive alien species***

Aquatic weeds like the water hyacinth (*Eichhornia crassipes*), Kariba weed (*Salvinia molesta*) and carpet weed (*Azolla filiculoides*) continue to cause problems in many rivers systems. This can be noticed in the Maramba River in Mosi-Oa-Tunya National Park, the Kafue River in the Kafue National Park and Zambezi River in Lower Zambezi National Park. Cray fish have been recorded as being on the increase in the Kafue fishery posing a threat to the other aquatic organisms in the fishery requiring better monitoring of the fishery for biodiversity conservation and fish production purposes.

[38] Department of Fisheries (2015). 2014 fisheries statistics: Annual report. Chilanga.

**iii) Poor a*quaculture practices***

The exotic Nile tilapia (*Oreochromis niloticus*) escaped from aquaculture into the Kafue River in the 1980s (Schwanck, 1995)[39] and in 2008 this species was distributed throughout the Kafue River between Itezhi-tezhi and Kafue Gorge dams and is as now common as the native *O. andersonii* (Deines *et al*., 2012). Clearly this exotic species is increasing at a faster rate and may well out-dominate or replace the native tilapia in the Kafue fishery in future.

### 1.4.5 Trends and threats to invertebrates and their habitats

The IUCN red list data of 2014 records 14 invertebrate species as threatened in Zambia of which majority are fresh water molluscs. The following are the key threats and drivers identified for invertebrates and their associated habitats that were not reported in the Fourth National Report.

***i)Pollution***

Freshwater systems have been shown to be particularly vulnerable, as discharges tend to spread rapidly here than in other ecosystems. Studies on the Kafue ecosystem (Chama and Siachoono 2015)[40] indicate that effluents from the mines affected the diversity of butterflies, dragonflies and other benthonic invertebrates by significant levels with increasing redox, electrical conductivity and turbidity.

Although this fact may need further investigations, North-western province which has become a hive of mining activities is also a centre of endemism for most odonatan species in Zambia. Therefore, particular attention should be directed to conducting impact assessments for infrastructure and mining developments in these areas to safeguard the invertebrate diversity.

***ii) Overexploitation of edible invertebrates (Caterpillar worm)***

Recent reports indicate that the quantities of caterpillar worm in Mpika, Chinsali and central Zambia have significantly reduced between 2008 and 2013. There could be several factors attributed to this reduction. With minimal barriers to entry into both the collection and trade of the worm, coupled with increasing incidence of poverty in landscapes where the worms are found, there is a general increasing trend of overexploitation and a decline in selective harvesting (Akpalu, 2007;)[41]. If sustainable measures are not put in place, this trend may lead to depletion of the regeneration base of the worm consequently creating an imbalance in the ecological equation of nature and deprive communities of a rich source of cheap animal protein.

***iii) Uncontrolled fires***

Frequent uncontrolled fires impact on all groups of insects and soil invertebrates. For instance, the species range restricted to *Acinogrion rarum* known to exist in Makutu and Mafinga

[39] Schwanck, E.J. (1995). The introduced *Oreochromis niloticus* is spreading on the Kafue floodplain. Hydrobiologia 315: 143 – 147.

[40] Chama, L. & Siachoono, S. (2015). Effectiveness of birds, butterflies, dragonflies, damselflies and invertebrates as indicators of freshwater ecological integrity. Geophysical Research Vol. 17, EGU2015-13383, 2015.

[41] Wisdom Akpalu, Edwin Muchapondwa & Precious Zikhali (2007) Can the restrictive harvest period policy conserve mopane worms in Southern Africa? A bio-economic modelling approach. Working Paper Number 65. Center for Environmental Economics and Policy in Africa (CEEPA), University of Pretoria

mountains is threatened by uncontrolled fires.

The IUCN lists one species of butterfly as endangered, *Acrea acrita ambigua*. This species is characteristic of grassland of Kataba area near Mulobezi GMA with not many threats except the frequent forest fires that destroy the larvae(NIRAS, 2015).

***Trends and threats to agrobiodiversity***

Although Zambia has not officially sanctioned the growing of GMOs, the country continues to be under threat from importation of agricultural products, e.g., fruits and vegetables, which pose a health risk to the population in the long-term. There is also mounting pressure from seed companies to introduce genetically modified seed varieties. It has also been observed that more and more land continues to be taken up by cash crops (monocrops) such as cotton, tobacco and hybrid maize, thereby reducing the land area under traditional crops and by implication on-farm genetic diversity (NIRAS, 2015)[42]. Landraces are desirable for their special characteristics such as storability, taste, resistance to drought and pests. There has been an increasing trend among small-scale and emergent farmers growing maize to use hybrid seed. For example, the area under hybrid maize production has exceeded the area under local maize varieties and continues to increase since 2006 (GRZ Crop forecasting surveys).

### *Climate change - Future scenario crosscutting threat*

Although IPCC scenarios project that southern Africa will experience a declining trend in rainfall during the 21st century, there has been little consistent change (trend) in annual rainfall in Zambia; however inter-seasonal and intra-seasonal variability in annual rainfall remains high and this is likely to continue during most of this century. Studies (Couroche Kalantary, 2010)[43] indicate that Zambia's fish are in danger. Water levels are predicted to lower down in rivers and lakes, subsequently affecting the fishing industry. Some fish species such as the breams and sardines, which are the most vulnerable ones, might not survive the environmental change. Some communities also depend on various animals as a source of nutrition. For example, puku, lechwe and waterbucks will impact their surrounding communities when their migrating behaviors will alter due to the changes in rainfall frequencies. Also, higher temperatures and droughts will prevent the forests from regenerating properly. All these indications point to the need for urgent attention to be paid to climate change for biodiversity conservation.

[42] Based on expert observations from the Ministry of Agriculture and Livestock

[43] Couroche Kalantary, 2010. Climate Change in Zambia: Impacts and Adaptation. Global Majority E-Journal, Vol. 1, No. 2, pp. 85-96

# CHAPTER 2
# CURRENT STATUS OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION AND THE MAINSTREAMING OF BIODIVERSITY

## 2.1 Country Biodiversity Targets and Actions Taken

Zambia's 1999 National Biodiversity Strategy and Action Plan (NBSAP) set out a total of 14 targets (Table 10). However, the implementation of the Strategy towards the set targets encountered a number of problems, notably: (a) lack of a monitoring framework to assess changes in the baselines; (b) inadequate a coordination framework to streamline implementationand (c) absence of a financing framework with clear commitments from both the Zambian Government and external sources.. The draft monitoring plan developed by Guveya *et al.* (2001)[44] was never fully developed or adopted. A cursory review of achievements towards the set targets under the 1999 NBSAP shows very weak direct results (Table 10, column 4). Most of the actions taken could broadly be classified as means rather than ends in meeting the set targets. In other cases, there were no direct actions taken and hence there were no data available (Table 10).

**Table 11**: Biodiversity Targets under the 1999 NBSAP and Achievements

| 1<br>Goal | 2<br>Objective | 3<br>Expected Outcomes/Targets | 4<br>Achievements To Date (Actions taken) |
|---|---|---|---|
| 1. Ensure the conservation of a full range of Zambia's natural ecosystems through a network of protected areas of viable size. | 1.1 To assess the coverage of Zambia's ecosystems in the existing protected areas network in order to ensure inclusion of all of Zambia's major ecosystems. | Report on the adequacy of the coverage of the existing protected areas network and identification of unprotected areas that need to be gazetted as PAs. | - Undertook reclassification of Zambia's PA system which identified gaps in species representation in the wildlife protected areas and recommended for additional types of protected areas(e.g. community parks, community protected forest areas).<br>- Completion of the National Forest Inventory (ILUA) in 2014<br>- Completion of the national aerial wildlife survey in 2013 |
| | 1.2 To modify the existing protected areas network to include representative areas of viable size of all of Zambia's major ecosystems. | New areas for inclusion in the protected areas network identified and new protected areas gazetted. | - Creation of Lusaka National Park bringing the total number of parks to 20.<br>- Game Management Areas (GMAs) rose from 33 to 36 by 2014. |
| | 1.3 To enhance the effective participation of the stakeholders in the management of the Protected Area (PA) network. | Local and broad participation in the protection and management of the PA network in place. | - Creation of community parks (.e.g., Simalaha Community Conservancy in Mwandi District, Western Province)<br>- Involvement of the private sector in the effective |

[44] Guveya, E., M. Kokwe and E. Hachileka. 2001. Zambia NBSAP Monitoring System (A. Moiseev, ed.). Report on a workshop held at the Holiday Inn, Zambia. 21-24 May, 2001.

| | | | |
|---|---|---|---|
| | | | management of national parks (e.g., Liuwa and Kasanka National Parks) |
| 2. Conservation of the genetic diversity of Zambia's crops and livestock. | 2.1 To conserve the genetic diversity of traditional crop varieties and their wild relatives. | Genetic diversity **o**f traditional cr**o**p varieties and their wild relatives conserved. | No data |
| | 2.2 To conserve the genetic diversity of traditional livestock breeds. | The conservation of genetic diversity of traditional livestock breeds. | No data |
| 3. Improve the legal and institutional framework and human resources to implement the strategies for conservation of biodiversity, sustainable use and equitable sharing of benefits fr**o**m biodiversity. | 3.1 To strengthen and develop appropriate legal and institutional framew**o**rks for the management of biodiversity in Zambia's PAs. | Establishment of enabling institutional and legal framework for sustainable biodiversity management | - Formalization of the National Tree Planting Programme<br>- Development of the new Forest Policy (2014)<br>- Completion of the National REDD+ Strategy<br>- Launch of the Lake Tanganyika Integrated Management Project to promote sustainable management of the lake and natural resources in the basin<br>- Revision of the Wildlife Act and Policy<br>- Completion of the national aerial wildlife survey and inventory (2013)<br>- Implementation of the Kavango-Zambezi Transfrontier Area (KAZA) to protect wildlife migratory corridors and populations in Angola, Botswana, Namibia, Zambia and Zimbabwe<br>- Enactment of a new Environmental Management Act which emphasizes enforcement of EIAs, SEAs, wetland protection and regulation of mining in protected areas<br>- Amendment of Fisheries Act of 2009 to provide for co-management<br>- Enactment of new Fisheries Act of 2011 promulgating restrictions in fishing methods, special fish management areas, and aquaculture. |
| | 3.2 To develop a co-ordination mechanism among institutions responsible for biodiversity management | The establishment and implementation of a coordination mechanism among institutions responsible for biodiversity management. | No data. |
| | 3.3 To improve Biodiversity knowledge in Zambia | Increased knowledge of biodiversity among the stakeholders. | No data |

| | | | |
|---|---|---|---|
| 4. Sustainable use and Managementof Biological Resources. | 4.1 To develop and implement local management systems that promote sustainable use of biological resources. | The establishment of management systems that promote sustainable use of biological resources and their implementation. | No notable action during the current reporting period.. |
| | 4.2 To establish the sustainable maximum yields of biological resources and design and implement a system of monitoring their utilization and management. | An established and fully functional monitoring system. | No data |
| 5. Develop an appropriate legal and institutional framework and the needed human resources to minimise the risks of GMOs. | 5.1 To establish an appropriate institutional framework for bio-safety. | Appropriate institutional framework for bio-safety established. | - Development of Biosafety Act in 2007 and Biosafety Regulations in 2010 promulgating protection of local biodiversity and safety.<br>- Establishment of a National GMO Detection Laboratory. |
| | 5.2 To develop adequate human resources for bio-safety. | Adequate human resources for bi**o**-safety are developed and put in place. | No data |
| 6. Ensure the equi**t**able sharing of benefits from th**e** use of Zambia's biological resources. | 6.1 To develop and adopt a legal and institutional f**r**amework, which will ensure that benefits are shared equitably. | Equitable sharing of benefits. | - No notable action during the current reporting period Institutionalization of |
| | 6.2 To create and strengthen community based natural resources management institutions. | The effective management and utilisation of natural resources by traditional establishments and local communities. | No notable action during the current reporting period but notable action not reported in the fourth national report include:<br>- Formation of the Zambia Natural Resources Consultative Forum (ZNRCF) (currently very weak and not fully functional)<br>- Formation of the Zambia CBNRM Forum (currently very active)<br>- Formation of the Zambia Climate Change Network (ZCCN) anchored on strong community advocacy and engagement (currently very active) |

## 2.2 Revision and Update of the 1999 NBSAP

Revision of the 1999 NBSAP is currently ongoing and involves nine (9) steps as follows:

1. Scoping – gathering of baseline data;
2. Stocktaking and status assessment;
3. Thematic analysis;
4. Identification of major strategies;

5. Setting national targets, principles and priorities;
6. Development of the revised National Biodiversity Strategy and Action Plan and formulation Fifth National Report;
7. Development of implementation plans;
8. Assessment of institutional arrangements; and
9. Assessment of resource needs.

### 2.2.1 Scoping- gathering of baseline data

The gathering of baseline data on Zambia's biodiversity assets will entail a detailed literature review synthesizing both old and new studies on biodiversity in Zambia and focus on the following aspects:

- Type and distribution of key species and their habitats;
- Type and distribution of key natural and semi-natural ecosystems (e.g., forests, wetlands, grasslands, mountains).
- Type and distribution of key modified ecosystems (e.g., agriculture, plantations)

The output will be a synthesis of updated data on Zambia's biodiversity and ecosystems.

### 2.2.2 Stocktaking and status assessment

The review of the Country Study undertaken in Zambia in 1998, and accompanying stocktaking reports, which led to the formulation of the 1999 NBSAP, were reviewed as an initial step in the stocktaking and status assessment. For each key biodiversity asset, the following attributes will be assessed:

- The ecological status (e.g., ecosystems integrity, species diversity and genetic diversity, etc.)
- The threat status (e.g., invasive species, fragmentation, pollution, climate change vulnerability, rate of loss, etc.)
- The protection and conservation status (e.g., degree of protection, harvest limits, restoration for resilience opportunity, etc.)

The output of the stocktaking and assessment provided detailed information on the status of different biodiversity components including threats, opportunities and unmet needs.

### 2.2.3 Thematic analysis

Key thematic analysis will focus on the following five themes:

- Comprehensive protected area assessment;
- Comprehensive climate resilience assessment;
- Ecosystem services valuation and mainstreaming assessment;
- Natural resource management assessment; and
- Enabling policy environment assessment.

The output involved detailed thematic reports on protected areas, climate resilience, ecosystem services valuation and mainstreaming, natural resource management, and enabling policy environment – highlighting opportunities and gaps.

### 2.2.4 Identification of major strategies

This will entail development of:

- Comprehensive protected area strategies;
- Climate resilience and restoration strategies;
- Mainstreaming strategies;
- Natural resource management strategies; and
- Enabling policy environment strategies.

The output will include detailed thematic strategies on protected areas, climate resilience and ecosystem restoration, mainstreaming, natural resource management, and enabling policy environment – to feed into the setting of national targets, principles and priorities and subsequent development of the Strategy and Action Plan.

### 2.2.5 Setting National Targets, Principles and Priorities

Using results from the stocktaking and status assessment, the developed thematic strategies, the guidance given by the COP 10 directive through the Aichi Biodiversity Targets, a review of national policy goals, and stakeholder consultations, this step will involve a process of *building consensus on national biodiversity targets and priorities* for the period leading up to 2020 in line with the recently adopted CBD Strategic Plan (2011-2020) and its associated Aichi targets and indicators.

### 2.2.6 Development of the Revised National Biodiversity Strategy and Action Plan and Fifth National Report

Based on national acceptance and endorsement of the outputs from the stocktaking and assessment, identified strategies, the set national targets and principles, the draft NBSAP will be developed. The draft NBSAP will be subjected to local, sub-national, expert and national level consultations. Based on stakeholder feedback, scientific and expert peer review, and close client consultation, a final NBSAP shall be prepared.

### 2.2.7 Development of Implementation Plans

In consultation with key stakeholders and drawing from the draft revised NBSAP's strategies and actions, we will develop appropriate implementation plans that take into account, among other things, human and technological needs, communication, capacity-building and outreach. We note the urgent need for resource mobilization for effective implementation of the revised NBSAP. The output from this step is an implementation plan with clear implementation arrangements adapted to Zambia's institutional environment and economic realities.

### 2.2.8 Assessment of Institutional Arrangements

A robust institutional arrangement is needed for the effective implementation of the NBSAP. Based on lessons learned from implementation of the 1999 NBSAP and through stakeholder consultations and the identified suitable implementation plan, an institutional arrangement option that is acceptable to the stakeholders, and within the Government's means and capacity shall be recommended. In addition, a monitoring and reporting and information exchange framework shall be recommended.

### 2.2.9 Assessment of resource needs

Resource needs entail financial, human and material resources required to effectively implement the NBSAP. Assessment of financial resources needed shall be based on the identified key priorities to be financed. Potential financing sources (including through mainstreaming) at national, bilateral and multilateral levels shall be identified. Based on the results of institutional arrangements assessment, human and technological resource needs including capacity building and outreach mechanisms shall be recommended for effective implementation of the revised NBSAP. The Biodiversity Finance Initiative (BIOFIN), for which Zambia is a pilot country, will help strengthen the financing framework for the revised NBSAP.

## 2.3 Mainstreaming of Biodiversity into Relevant Sectoral and Cross Sectoral Strategies, Plans and Programmes

Between 1999 and 2014, Zambia has undertaken a number of Policy, Legal and Regulatory (PLR) reforms, all supportive of biodiversity conservation in the country. Table 11provides a summary of such efforts. In terms of PLR reform and development, Zambia has made significant strides towards achievements of its set targets to establish an enabling institutional and legal framework for sustainable biodiversity management and an appropriate institutional framework for biosafety (Table 11). Among the key achievements was the enactment of the Environmental Management Act (EMA) in 2011. The EMA is the parent environmental legislation regulating environmental issues in the country with strict requirements for Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) for any large scale development projects.

**Table 12**: Zambia's efforts towards mainstreaming biodiversity in the relevant Policy, Legal and Regulatory frameworks.

| Type of Instrument | Name | Relevant Sections Incorporating Biodiversity |
|---|---|---|
| **Acts** | Environmental Management Act (2011) | - *Principles governing environmental management, Section 6(e):* Equitable access to environmental resources shall be promoted and the functional integrity of ecosystems shall be taken into account to ensure the sustainability of the ecosystems and to prevent adverse effects;<br>- *Conservation of biological diversity, Section 26(1):* The Minister shall strive to attain the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of biological resources;<br>- *Conservation of biological diversity in-situ, Section 27(1):* The Minister may, in consultation with the Agency and the appropriate authorities, make regulations providing for *in-situ* conservation of biological diversity.<br>- *Conservation of biological diversity ex-situ, Section 28(1):* The Minister may, in consultation with the Agency and the appropriate authorities, make regulations with respect to *ex-situ* conservation of biological diversity;<br>- *Environmental Impact Assessment, Section 29(1):* Need for EIA for any project that may have an effect on the environment; and<br>- *Duty to inform Agency of intention to develop, Section 36 (3b) and (3c): a*n extension or alteration of an existing industrial facility or plant, agricultural scheme, business or any other undertaking shall be deemed to be new if the extension will alter the ecosystem or alter the biodiversity regime. |
| | Forest Bill (2014) | - *Establishment of national forests, local forests, botanical reserves, private forests, community forests and jointly managed forests, Part III, Sections (10), (17), (24), (26), (29) and (36), respectively:* All these provisions promulgate sustainable utilization and conservation of forest biodiversity;<br>- *Declaration of protected flora and recovery plans for protected flora, Part V, Sections (47) and (48), respectively:* The Bill allows for the Minister to declare any rare or endangered flora as protected and acquire any category of land for the recovery of such flora. |
| | Water Resources Management Act (2011) | - *Water Resources Management Authority (WRMA) and functions, Part II, Section (8):* The Act obliges the WRMA, in considering, formulating and implementing any proposal for the use, management, development or exploration of any water to have a plan that contains measures to avert environmental degradation and to take into account regulations, standards and guidelines issued by, or under, the Environmental Management Act, 2011; and<br>- *Catchment Councils, Sub-catchment Councils, Water Users Associations and their functions, Part III, Section 18(1):* The Act urges the Authority through the Catchment Councils to ensure catchment protection, resource quality monitoring and evaluation and to implement regulations and guidelines on catchment protection to conserve water resources and biodiversity. |
| | Fisheries Act (2011) | - *General principle, Section 12(i):* the need to preserve biodiversity in fishery waters; and<br>- *Management plans, Section 28(4a):* before preparing a management plan, the Director of Fisheries shall consult with any Government or other relevant authority concerned with general conservation and biodiversity matters. |
| | Mines and Minerals Development Act (2012) | Despite being a recent piece of legislation, the Act fails to recognize the important role of biodiversity conservation and allows for mineral development in protected areas. However, the Act mentions the importance of forest nurseries or plantations and of national forests or local forests and advises developers to take this into account and have written consent and be in compliance with the relevant provisions of the Forest Act in the management of these resources. |

| | | |
|---|---|---|
| | Biosafety Act (2007) | *Relevant specific objectives:*<br>- Regulate the research, development, application, import, export, transit, contained use, release or placing on the market of any genetically modified organism whether intended for use as a pharmaceutical, food, feed or processing, or a product of a genetically modified organism;<br>- Ensure that any activity involving the use of any genetically modified organism or a product of a genetically modified organism prevents any socio¬ economic impact or harm to human and animal health or any damage to the environment, non-genetically modified crops and biological diversity; and<br>- Set and implement standards for the assessment, evaluation and management of any potential risk involving the use of any genetically modified organism or product of a genetically modified organism. |
| **Policies** | National Policy on Environment (2007) | *Relevant Specific Objectives:*<br>- To promote the sound protection and management of Zambia's environmental and natural resources in their entirety, balancing the needs for social and economic development and environmental integrity to the maximum extent possible, while keeping adverse activities to the minimum;<br>- To ensure broad-based environmental awareness and commitment to enforce environmental laws and to the promotion of environmental accountability;<br>- To build individual and institutional capacities to sustain the environment;<br>- To regulate and enforce environmental laws; and<br>- To promote the development of sustainable industrial and commercial processes having full regard for environmental integrity. |
| | National Forest Policy (2014) | *Relevant Specific Objectives:*<br>- To ensure the integrity, productivity and the development potential of the forest resources;<br>- To ensure adequate protection of forests, by empowering local communities and promoting the development and use of wood, non-wood forest products and services;<br>- To ensure sustainable management of forest ecosystems and biodiversity through the application of both scientific and local knowledge;<br>- To improve the role of forests in the provision of ecosystem services and abatement of climate change; and<br>- To ensure the establishment and sustainable management of forest resources for wood fuel production. |
| | National Agriculture Policy (2013) | *Relevant Specific Objectives:*<br>- To promote the sustainable management and use of natural resources; and<br>- To mainstream environment and Climate Change in the agricultural sector. |
| | Draft National Policy on Climate Change (2012) | *Relevant Specific Objectives:*<br>- Provide a conducive and enabling policy framework and a concerted programme of action to minimize the impacts of climate change, based on existing sectoral policies and strategic plans;<br>- Provide a coordinated approach and overall guidance to the implementation of climate change activities including climate change adaptation and mitigation programmes, awareness creation, education, capacity building, technology development and transfer, and financing, among others;<br>- Put in place robust adaptation and mitigation measures needed to minimize risks associated with climate change and maximize opportunities as well as monitoring, verification and reporting systems;<br>- Promote multi-communication and dissemination pathways and enhance awareness and understanding of climate change and its impacts;<br>- Promote development pathways that generate co-benefits and provide incentives for addressing climate change more effectively;<br>- Promote Zambia's effective participation in the global climate change negotiations;<br>- Promote investment to achieve climate-resilient and low emission development;<br>- Promote and support research on climate change and variability; and<br>- Establish a long term institutional arrangement for implementation of climate change actions. |

| | | |
|---|---|---|
| | Mining Policy (2013) | *Relevant Specific Objectives:*<br>- Achieve a socially and internationally acceptable balance between mining and the biophysical environment and to ensure that acceptable standards of health, safety and environmental protection are observed by all participants in the mining sector. |
| | Water Policy (2010) | |
| | Energy Policy (2008) | *Relevant Policy Measures:*<br>- Provide appropriate financial and fiscal instruments for stimulating the production and use of biomass. |
| | Fisheries Policy (2011) | |
| **Plans/Strategies** | National Climate Change Response Strategy (2012) | *Relevant Specific Objectives:*<br>- Enhancing sustainable agricultural production and food security;<br>- Sustainable water resource management;<br>- Protecting health from climate change and climate variability;<br>- Developing sustainable land use systems;<br>- Climate-proofing infrastructure;<br>- Developing a less-carbon intensive transport system;<br>- Ensuring the resiliency of the energy systems to climatic shocks;<br>- Investing in/developing less carbon-intensive energy systems; and<br>- Mainstreaming: Climate Screening and Proofing carried out in all relevant sectors. |
| | National Agriculture Investment Plan (2013) | *Key Components:*<br>- To improve land-use planning and enhance community participation in integrated land-use systems (land administration and management);<br>- Efficient water use and management;<br>- Promotion of afforestation, community woodlots and agroforestry;<br>- Promotion of efficient energy use from natural resources;<br>- Sustainable capture fisheries management; and<br>- Promotion of sustainable crop and livestock production. |
| | Integrated Water Resources Management Implementation Plan (2008) | *Relevant Specific Objectives:*<br>- Integrated management of all the resources in the catchment areas;<br>- Improved water resources planning and management;<br>- Improved water use and allocation efficiency;<br>- Increased access to safe water supply and sanitation to the urban, peri-urban and rural population;<br>- Provision of adequate, safe and cost effective water supply and sanitation services with due regard to environmental protection; and<br>- Monitoring and evaluation of performance of the programmes and projects in order to determine their environmental impacts. |
| **Programmes** | National Adaptation Programme of Action on Climate Change (2007) | The aim of the programme is to improve the conservation of biodiversity to mitigate the impacts of climate change and promote resilience among local communities and businesses. |
| | Lake Tanganyika Integrated Management Programme (LTIMP) (2009) | The LTIMP is aimed at realizing effective and sustainable management of Lake Tanganyika and other natural resources within the basin with the end objective of contributing to sustainable conservation of the biodiversity of the lake basin as a trans-border natural resource. |
| | National Tree Planting Programme (2013) | The aim of the programme is to plant a total of 2,000 ha of exotic tree plantation, as well as community woodlots, in each of the 10 provinces. Additional objectives include improving protection of ecosystem services such as watershed management and biodiversity conservation through reduced pressure on indigenous forests. |

# CHAPTE III

# PROGRESS TOWARDS THE 2010 AICHI BIODIVERSITY TARGETS AND POST 2015 TARGETS SUSTAINABLE DEVELOPMENT GOALS

## 3.1 Progress Towards the 2010 Aichi Targets

The progress towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets began in earnest in Zambia in December 2014 due to administrative challenges that Government faced as a result of the restructuring of some Ministries, including the one responsible for the CBD which took quite long following the change of government in 2011. However, even before the cpommencement of revision of the 1999 NBSAP, some activities and projects which have been undertaken have made contribution towards meeting some of the Aighi Biodiversity Targets. The matrix below attempts to show the progress made in achieving some of these targets.

## 3.2 Table on Progress Towards Meeting the Aichi Biodiversity Targets

| Aichi Targets | Actions Taken to Achieve Aichi Targets | Outcomes Achieved | Level of Progress Made (high, medium or low, or using percentage or traffic light) | Indicators used for assessment | Cases or success stories |
|---|---|---|---|---|---|
| **1.** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. | Several awareness activities over the years, including in process of reviewing NBSAP | Increased levels of awreness and increased coverage by media | High<br><br>medium | • Level of awareness among key stakeholders (Government, TAs, Business, Local communities, etc.) of the values of biodiversity and steps taken to conserve and use it sustainably<br>• Actual change in human behaviour towards biodiversity conservation | Symposium on successes and lessons learnt in conservation in Zambia over 50 years since independence, May 2015, University of Zambia, Lusaka |
| **2.** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as | No much work done | | Low<br><br>Low | • Specific chapters within the SeNDP integrating biodiversity values.<br>• Number of provincial and | |

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| appropriate, and reporting systems. | Procinces and districts include biodiversity in their local development plans | Local plans which include biodiversity consrvation | medium | district development plans integrating biodiversity values<br>• Number of planning processes incorporated into the national planning and budgeting system including reporting mechanisms | |
| 3.By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions | Incentives for wildlife conservation among communitities | Community Resource Boards through which communities participate in wildlife conservation and receive benefits | Medium | • No. of CRBs established in GMAs<br>• Increase in level of community involvement in conservation activities | Mechanism for benefit sharing with communities through CRBS in GMAs from revenue from hunting concessions and other sources of incomes |
| 4.By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits. | Not much work done on this | Not yet | low | Established and updated baselines for sustainable production and utilization of fisheries, forests and wildlife | Not yet |
| 5. By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced | Afforestation, reforestation and promotion of regeneration | On-going | medium | % reduction in the rates of deforestation | REDD+ Strategy which has been developed will contribute to this |
| 6. By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on | Regulation of fishing gear used, fish bans to promote fish to spawn | On-going | medium | % reduction in unsustainable and illegal fishing practices | • Re-stocking of fish species<br>• promotion of cage fish farming in selected fisheries |

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| threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits | | | | | |
| **7.** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity | • Climate smart agriculture is promoted<br>• Conservation farming is ongoing<br>• Cage fish farmining to restock depleted water bodies<br>• Protected area system | Almost 40% of total area under Protected area systm | High | • At least 50% of area (ha) under agriculture sustainably managed.<br>• At least 90% of area (ha) under aquaculture sustainably managed.<br>• At least 65% of area (ha) under national and local forest reserves sustainably managed.<br>• At least 80% of forest area (ha) under national parks sustainably managed.<br>• At least 50% of forest area (ha) under Game Management Areas sustainably managed.<br>• At least 80% of forest area (ha) under forest concessions sustainably managed.<br>• At least 40% of forest area (ha) under open areas sustainably managed | Exceeding global targets on conservation targets in the country |
| 8.By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity | Regulating and monitoring of effluents and discharge from activities | Standards in place | medium | % reduction in effluent loads from industry (baselines to be obtained from ZEMA). | |
| 9. By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways | Projects on IAS implemented | Methods of eradictating IAS established | low | Measures put in place for the control/eradication of invasive species | Lochinvar and Victoria Falls National Parks |

| | | | | | |
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| 10. By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning | N/A Zambia has no coast or sea | N/A | N/A | N/A | N/A |
| 11. By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes | Almost 40% of country's total land area is in protected areas | 20 National Parks and 490 Forest Reserves and other protected areas | High | • Rationalized PA system at landscape level in the nation.<br>• No. of new PAs that have been considered representative and included in the national PA system | Exceeding the 17% global target |
| **12.** By 2020 the extinction of known populations of threatened species have been secured and are increasing has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained | Identificastion of species that are threatened<br><br>Population surveys and other assessments of species | Population statistics of threatened species | medium | • Kafue lechwe- current population of ~30,000 secured and increased by 30%<br>• Rhino – current population of 42 secured and increased by 21%<br>• Shoebill<br>• Wattled crane<br>• Mopane and teak | Establishment of a new Lusaka National Park stocked with species including endangered ones |
| 13. By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity. | Research in genetic diversity cultivated crops | Establishment of no. of wild relatives of cultivated crops | Medium | • Number of crops including wild relatives and livestock genetic resources maintained and sustainably utilized<br>• Policy measures have been put in place to reduce genetic erosion and safeguard plant and animal genetic and promote their sustainable utilization | • Establishment of the National Biosafety Agency<br>• Zambia Africulture Research Institute |

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| **14.** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable | Assessment of status of selected ecosystems, especially water bodies | Identification of water bodies that are threatened | low | • There are no deforestation and forest degradation activities taking place in Kaleni Hills – the Zambezi source.<br>• Government has taken deliberate and documented actions to curtail deforestation and forest degradation in the Kafue ecosystem.<br>• Luangwa River is maintained as a free-flowing river from source to the delta without developmental activities that jeopardise its integrity | Kafue and Zambezi River catchment areas identified as threatened |
| 15. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. | Undertaking Integrated Landuse Assessment (ILUA-II)<br><br>Promotion of regeneration of natural forests | Identification of status of forest ecosystems and status of degradation | Medium | • % reduction in emissions from deforestation (verifiable GHG emissions from deforestation);<br>• conservation of forest carbon stocks (verifiable carbon figures from forest conservation);<br>• sustainable management of forests (evidence of SFM and benefits); and<br>• enhancement of forest carbon stocks (evidence of carbon stocks from reforestation/ afforestation/assisted natural regeneration) | REDD+ Strategy developed |
| 16.By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation | Undertaking consultations to accede to the Nagoya Protocol | Five out of ten provinces consulted at time of this report | Medium | Benefit sharing mechanisms defined/ redefined in the relevant sectors and are being enforced. | Expect to accede to the Nagoya Protocol by 2016 |

| | | | | | |
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| **17.** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan. | Reviewing the NBSAP already underway | Several consultations undertaken, stocktaking done and target setting underway | High | Submission of the NBSAP to the CBD Secretariat by 2015 | NBSAP expected to be finalized before end of 2015 |

### 3.3 Revising of the NBSAP of 1999

Government, through the Ministry of Lands, Natural Resources and Environmental Protection commenced the process of revising the NABSAP of 1999 with an inception workshop in December 2014 involving several stakeholders from all the ten regions. Stakeholders represented included local communities and other special interest groups. The meeting was focused on how the revision of the 1999 NBSAP will be updated in line with the Global CBD Strategic Plan and its Aichi Targets. Part of the first outputs of the updating of the 1999 NBSAP process is the stocktaking assessment exercise whose initial results are reflected in this report. The following are the key steps in line with the CBD guidance that have been proposed for updating the 1999 Zambian NBSAP.

Figure 9 below illustrates the process to be followed in reviewing, updating and revising the 1999 NBSAP. The steps include: Scoping - gathering of baseline information; Stocktaking and status assessment; Conducting thematic analyses; Identifying national targets, principles and priorities of the Strategy; Developing the Strategy and Action Plan as well as the Fifth National Report; Assessing institutional arrangements and development of framework for monitoring, reporting and data sharing; and assessing resource needs. The steps have been explained in detail in **Section 2.2**.

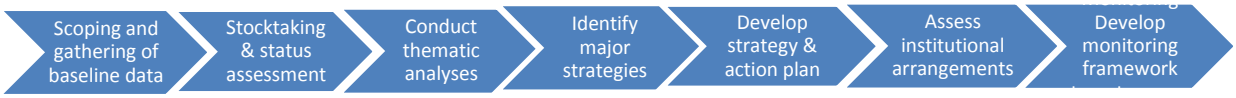


**Figure 9:** NBSAP revision framework and step-wise process

### 3.4 Lessons Learned from the Implementation of the Convention

The key lessons learned in the implementation of the convention are as flows:

a) The 1999 NBSAP was not implemented in a systematic manner and this needs to be addressed in the revised NBSAP by ensuring that, besides an Action Plan, an Implementation Plan and a Monitoring Framework against which progress in the recommended actions are clearly monitored are put in place.

b) The current NBSAP was implemented by largely through sector and project-based activities with limited coordination for synergies and to avoid overlaps. For example, the integrated land use assessment did not pay attention to collecting information on biodiversity components of the plant species when it was very well placed to do so. This calls for a well-coordinated institutional arrangement for the implementation of biodiversity actions to achieve cost effectiveness and efficiency in conserving biodiversity.

c) The state of the biodiversity information base in Zambia has not improved much from the 1999 stock assessment that came up with the species and ecosystems lists and status and therefore has very outdated baseline data for monitoring the status and trends of the biodiversity components. This calls for long term investment in a well-coordinated and mainstreamed biodiversity monitoring system. The Convention on Biological Diversity should rally behind and support resource poor countries like Zambia in setting up and institutionalizing such systems as opposed to piecemeal support at times of reviewing global data on biodiversity or meeting global agendas that come up time and again.

d) Zambia is a huge country endowed with natural resources in which biodiversity is embedded. Taking into account the resource base the country has to share between human development activities and conservation activities, the need for a rationalization of the protected areas system remains imperative. There is need to revisit the reclassification efforts as the previous efforts did not fully meet the original objective for rationalization of the Zambian Protected Areas network, especially in the forest sector. A rationalized network has better chances for conservation and monitoring.

e) Biodiversity components have intricate relationships to livelihoods and national economic development. Therefore, conservation efforts need to take into consideration how biodiversity conservation can contribute to livelihoods while at the same time developing mechanisms for communities and other stakeholders (including the private sector) who benefit from the environmental services and goods to also contribute to its conservation. This should be at the core of conservation efforts in Zambia.

## ANNEX 1: INFORMATION CONCERNING REPORTING PARTY AND PROCESS IN THE PREPARATION OF THE NATIONAL REPORT

### *A. Reporting Party*

| | |
|---|---|
| Contracting Party | ZAMBIA |
| **NATIONAL FOCAL POINT** | |
| Full name of the institution | **Ministry of of Lands, Natural Resources and Envirionmental Protection** |
| Name and title of contact officer | **Mr. Ephraim Mwepya Shitima, A/Chief Natural Resources Management Officer** |
| Mailing address | **P.O. Box 50964, Lusaka 10101, Zambia** |
| Telephone | **+260-211-252589** |
| Fax | **+260-211-252589** |
| E-mail | *emshitima40@gmail.com, mwepyashitima40@gmail.com* |
| **CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)** | |
| Full name of the institution | **Ministry of Lands, Natural Resources and Environemntal Protection** |
| Name and title of contact officer | **Barnaby Bwalya Mulenga, Permanent Secretary** |
| Mailing address | **P.O. Box 50694, Lusaka 10101, Zambia** |
| Telephone | **Telephone: +260-211-252-228/252-323/252320** |
| Fax | **Tele-Fax: +260-211-250-120** |
| E-mail | **Ps@mlnrep.org.zm** |
| **SUBMISSION** | |
| Signature of officer responsible for submitting national report | |
| Date of submission | **30th June 2015** |

***B. Process of preparation of national report***

The preparation of the report followed a participatory and consultative approach. The Ministry closely collaborated with other stakeholders through a Consultant who worked with a selected core team. Emphasis was placed on stakeholder consultation and involvement in the process of developing the national report to harness the knowledge and expertise in the sector. The methodology to prepare the report involved:

**a)** **Literature Review:** This involved reviewing all relevant documents related to the implementation of the Convention and included the Sixth National Development Plan (SNDP) as revised in R-SNDP, National Biodiversity Strategy and Action Plan (NBSAP), National Policy on Environment (NPE), Millennium Ecosystem Assessment (MA) Report, sector policy documents, case studies and project progress reports.

**b)** **Field Work:** The aim of this process was to get the information from the stakeholders and determine the situation in the field with regard to the implementation of the CBD. The field work process included visitng selected regiona and project sites.

## ANNEX 2: CRITICAL MAMMAL SPECIES IN ZAMBIA AND THEIR STATUS

| Common Name | Scientific Name | Conservation Status | |
|---|---|---|---|
| | | Zambian Criteria | IUCN Criteria |
| Pangolin | *Manis temminick* | Rare | Threatened |
| Aardwolf | *Proteles cristatus* | Rare | Threatened |
| Aardvark | *Orycteropus afer* | Rare | Rare |
| African Elephant | *Loxodonta africana* | Endangered | Endangered |
| Black Rhinoceros | *Diceros bicornis* | Endangered | Critically Endangered |
| White Rhinoceros | *Ceratotherium simum* | Endangered | Endangered |
| Giraffe | *Giraffa camelopardalis* | Threatened | Threatened |
| Springhare | *Pedetes capensis* | Vulnerable | Vulnerable |
| Blue Monkey | *Cercopithecus mitis* | Rare | Vulnerable |
| Wild dog | *Lycaon pictus* | Endangered | Endangered |
| Hyena | *Crocuta crocuta* | Vulnerable | Vulnerable |
| Serval cat | *Leptairulus serval* | Vulnerable | Vulnerable |
| Caracal | *Caracal caracal* | Vulnerable | Vulnerable |
| Cheetah | *Acinonyx jubatus* | Endangered | Endangered |
| Leopard | *Panthera pardus* | Vulnerable | Vulnerable |
| Lion | *Panthera leo* | Vulnerable | Vulnerable |
| Sitatunga | *Tragelaphus strepsiceros* | Vulnerable | Vulnerable |
| Eland | *Tragelaphus oryx* | Vulnerable | Vulnerable |
| Blue duiker | *Cephalophus monticola* | Rare | Vulnerable |
| Yellow-backed duiker | *Cephalophus silvicutor* | Threatened | Threatened |
| Puku | *Kobus vardoni* | Threatened | Threatened |
| Red Lechwe | *Kobus leche leche* | Threatened | Threatened |
| Roan antelope | *Hippotragus equinus* | Threatened | Threatened |
| Sable antelope | *Hippotragus niger* | Vulnerable | Vulnerable |

## ANNEX 3: CULTIVATED CROPS AND THEIR WILD RELATIVES AND OCCURRENCE AND DISTRIBUTION IN ZAMBIA

| Crop | Crop Wild Relative | Occurrence/Distribution |
|---|---|---|
| 1. Amaranth | Amaranthus spp. | Country wide |
| 2. Cleome | Cleome spp | Country wide |
| 3. Sweet potato | Ipomoea spp. | Country wide |
| 4. Cucumber | Cucumis ficifolius | Northern Province |
| 5. Cucumber | Cucumis hirsutus. | Kasama, Malole, Kitwe |
| 6. Cucumber | Cucumis zeyheri | Mazabuka |
| 7. Legenaria | Legenariabreviflora | Northern &Luapula Provinces |
| 8. Legenaria | Legenariasphaerica | Luapula, Northern, Eastern & Southern provinces |
| 9. Viciafaba | Viciapaucifolia | C/belt, northern, Lusaka & southern provinces |
| 10. Cowpea | Unguiculata (L) Wasp var. spontanea | Chama |
| 11. Cowpea | Unguiculata (L) Wasp subsp. Dekindtiana | Chipata, Lusaka, Mongu&Monze |
| 12. Livingstone potato | Plectranthus spp. | Prevalent in Northern, Central and C/belt provinces |
| 13. Hibiscus sp. | Hibiscus acetosella | Lukulu&Shangombo |
| 14. Rice | Oryza barthii | Barotse flood plains, Kafue National Park &Namwala |
| 15. Rice | Oryza brachyantha | Mporokoso& Mweru-wa-Ntipa |
| 16. Rice | Oryza longistaminata | Chipata, Kaoma, Kasama, Kafue, Kawambwa& Mansa |
| 17. Rice | Oryza punctata | Northern |

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