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Fifth National Report on the Implementation of the Convention on Biological Diversity

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Cover page

- African Elephant *(Loxidonta africana)* – one of the threatened species due to alarming rate of poaching
- Farmers attending a maize field which is the dominant crop in agro-ecosystem in the country (Same District, Kilimanjaro Region)
- Scenic view of a section of the Usangu wetland recovering from severe degradation following Government intervention to evict livestock and farmers who had invaded the wetland in 2007

PREFACE

Tanzania is one of mega-biodiversity rich countries globally. The country hosts six out of the 25 globally known biodiversity hotspots. The country has extensive diversity of species with at least 14,500 known and confirmed species and is among 15 countries globally with the highest number of endemic as well as threatened species. It accounts for more than one-third of total plant species in Africa and ranks twelfth globally in terms of bird species. The country has designated about 40% of its total surface area to forest, wildlife and marine protected areas. The country is a home to about 20% of Africa's large mammals.

This Fifth National Report on the Implementation of the Convention on Biological Diversity (CBD) has been prepared as an obligation to Article 26 of the Convention which requires Parties to prepare reports on measures taken to implement the Convention and the effectiveness of those measures in meeting the objectives of the Convention. The Report is also meant to fulfil commitment to Decision X/10 of the Conference of the Parties which re-emphasized on the urgency for and timely national reporting.

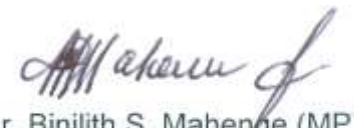
This Fifth National Report offers an update to the Fourth National Report that was prepared in 2009 and therefore covers a period of 5 years. The Report informs on the status of biodiversity resources in the country, the implications of current trends, initiatives undertaken, achievements and lessons learned in the course of implementing the Convention in the country. The Vice President's Office - Division of Environment spearheaded the preparation of the Report and throughout the process various stakeholders were involved.

The general trends of biodiversity in the country depict a situation of concern. Most of the ecosystems, be it terrestrial or aquatic, are deteriorating with decreasing capacity to provide essential services while a significant number of species are on the decline and some of them are even on the brink of extinction.

The Government has taken several actions to address loss of biodiversity, some of which include formulating, reviewing and/or mainstreaming of biodiversity issues into relevant national policies, strategies and legislation; expanding and managing network of protected areas; demarcating and protecting water catchment areas; promoting participatory management of biodiversity resources; and initiating programmes to protect threatened species such as black rhino and elephants.

In spite of the concerted efforts being made, Tanzania is faced with many challenges in biodiversity conservation. These include limited capacity in terms of financial resources and human resource base; inadequate capacity for research to generate reliable information and data; and limited public awareness on biodiversity issues.

Declining trends and loss of biodiversity threaten our very survival, and therefore is an issue of profound concern and utmost priority. Cognizant of this fact, commitment and efforts by all stakeholders is critical to ensure that biodiversity contributes in improving standard of living and benefits all. **Biodiversity is the common heritage for present and future generations, play your part.**



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We would like to express our gratitude to the members of the National Task Force and the Technical Review Panel for providing information that contributed in enriching the Report and for reviewing the Report. These include First Vice President's Office – Zanzibar; Ministries of Natural Resources and Tourism; Agriculture, Food Security and Cooperatives; Water; Livestock and Fisheries Development. Other include National Environment Management Council (NEMC); Sokoine University of Agriculture (SUA); University of Dar es Salaam; Tanzania Fisheries Research Institute (TAFIRI); Tanzania National Parks (TANAPA); Tanzania Forest Research Institute (TAFORI); Tanzania Wildlife Research Institute (TAWIRI); Tropical Pesticide Research Institute (TPRI); Commission for Science and Technology (COSTECH); and Institute of Marine Sciences (IMS) - Zanzibar.

We are also grateful to national and international non-governmental organizations for their inputs and participating in reviewing the Report.

We are particularly indebted to Ms. Angelina Madete, Deputy Permanent Secretary, Vice President's Office; and Dr. Julius Ningu, Director of Environment for providing leadership and overall guidance.

We would like also to express our appreciation to Mrs. Esther Makwaia, Assistant Director – Biodiversity Conservation, Vice President's Office who lead and coordinated the preparation of this Report. Furthermore, we would like extend our sincere gratitude to Mr. Thomas Bwana, Mr. Faraja Ngerageza, Mr. Julius Enock and Ms. Martha Ngalowera who formed the team of experts involved in drafting and synthesizing the Report.

Lastly but not least, we are grateful to the Global Environment Facility (GEF), United Nations Environment Programme (UNEP) and the Secretariat of the Convention on Biological Diversity for providing financial and technical support that facilitated the preparation and publication of this Report.

Sazi B. Salula
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EXECUTIVE SUMMARY

The Fifth National Report on Implementation of the Convention of Biological Diversity (CBD) informs and updates on status and trends of biodiversity, measures and initiatives undertaken by Tanzania in achieving the objectives of the Convention since the submission of the Fourth National Report in 2009.

AN UPDATE ON BIODIVERSITY STATUS, TRENDS, THREATS AND IMPLICATIONS FOR HUMAN WELL BEING

Importance of biodiversity

Biodiversity is critical to the national economy contributing more than three quarters of the national GDP and sustaining livelihoods of majority of Tanzanians. Agriculture, livestock, forestry, and fisheries together contribute over 65% of GDP and account for over 80% of total employment and over 60% of the total export earnings. Furthermore, forests provides for over 90% of energy consumption in the country while hydropower contributes about 37% of power supply in the country. The average Total Economic Value (TEV) of catchment forest reserves was established to be more than 17,250 USD/ha. On the other hand, tourism industry is now worth over US$1 billion annually.

Ecosystem diversity

Tanzania has lost at least one-third of important ecosystems over the past few decades undermining livelihoods of many people who depend directly on them. Forests occupy 55% of the total land area (about 48 million ha). Tanzania has lost about 38% of its forest cover at an annual rate of about 400,000 ha and if this rate escalates coupled with demographic and economic pressures, the country may deplete its forest cover in the next 50-80 years. More than half of inland water ecosystems (rivers, lakes and dams) have been degraded and are continuing to be threatened in terms of changed water regimes, pollution and conflicts over resource use. Similarly, signs of environmental degradation and decline in coastal and marine biodiversity are becoming more obvious with the country losing about 44,000 ha of mangroves over the last 30 years (1980-2010).

The designated forest and wildlife protected areas surpass the international target (2020 Aichi Targets). However, marine protected area is lagging behind. The aim of Government plans is to gradually expand these areas to attain national target that is set at 10% by the year 2020. About 40% of the total land area has been designated as forest and wildlife protected areas exceeding the international target of 17%. Tanzania has a total territorial sea of 32,000 km^2 of which the gazetted Marine Protected Areas (MPAs) is 2,173 km^2 that is about 6.5% of the territorial sea.

Species diversity

There is lack of information and data to generate reliable trends on the status of species diversity in the country. However, there are multiple indicators

suggesting overall declining trends for a significant number of species. The flora and fauna of Tanzania is extremely diverse with at least 14,500 known and confirmed species, out of which, more than half of them (54%) constitute plant species. The country has between 400-3,000 endemic species. Of the endemic species, the proportion of threatened species is highest for mammals and cycads while the highest number of threatened endemic species is found in amphibians (Figure A).

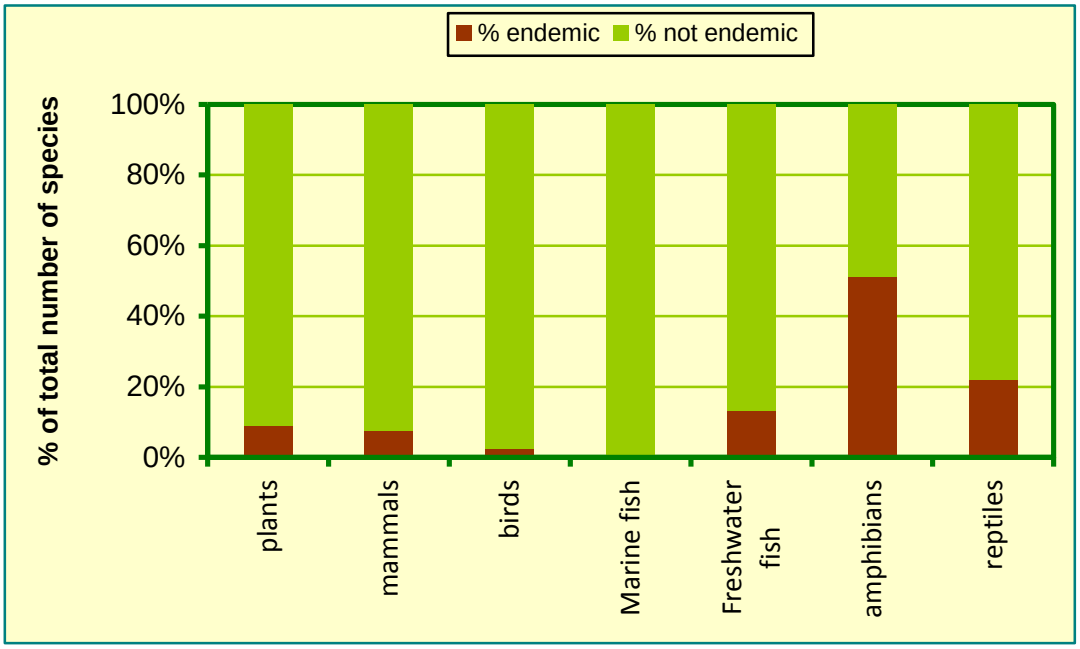

Figure A: Approximate proportions of endemic species for some of the major taxonomic groups

The number of threatened species in the country has almost tripled over the last decade which can be linked to habitat loss, fragmentation and degradation as well as climate change impacts. There are 914 threatened species recorded in Tanzania (accounting for about 4% of threatened species globally) and the country is among 15 countries globally with the highest number of threatened species. The proportion of threatened species is highest for plants and amphibians while the highest number of threatened species is found in plants (more than 375 species) (Figure B).

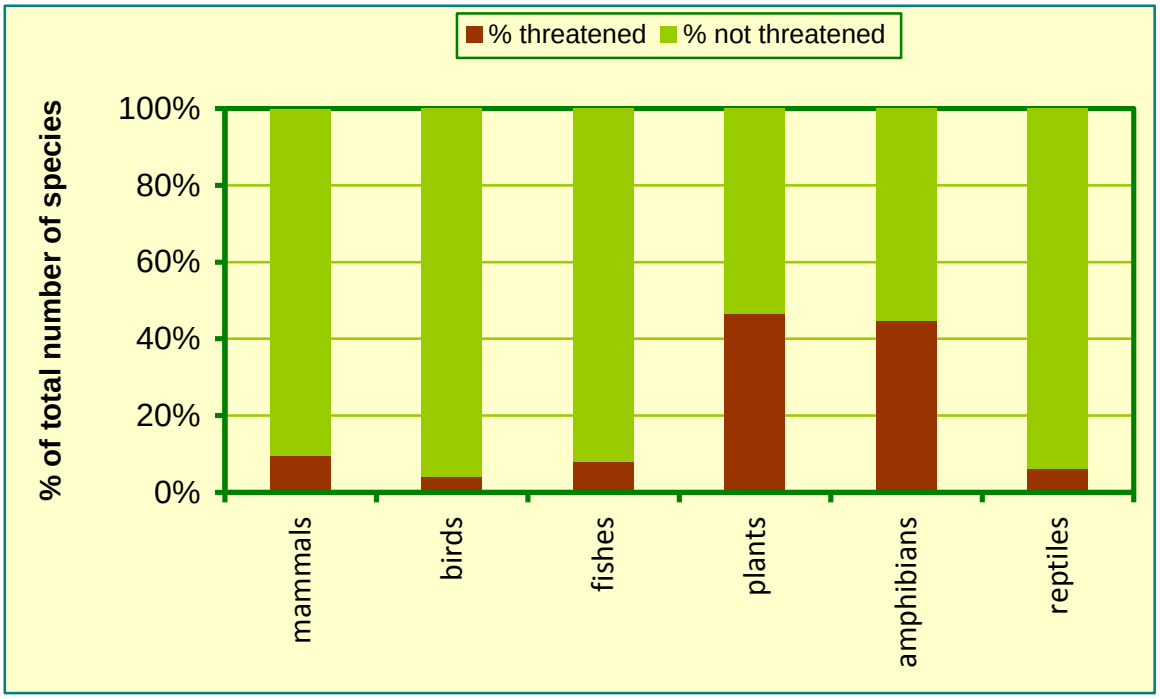

Figure B: Proportion of threatened species for major taxonomic groups based on the IUCN Red List

Genetic diversity

Genetic diversity seems to be declining in natural ecosystems as well as in agricultural and livestock production systems. The extent of such decline and its overall impact have not been documented. Comparatively, significant progress has been made for ex-situ conservation of plant and crop genetic resources than for livestock. A total number of 1,729 crop germplasm are conserved nationally while a total of 4,430 germplasm collected in the country are conserved in international gene banks. More than 95% of the conserved germplasm nationally are landraces or traditional cultivars while about 3% are materials collected from the wild. In contrary, conservation of animal genetic resources in Tanzania is done at a very limited scale both *in-situ* and *ex-situ* resulting into extinction of some breeds.

Main threats to biodiversity

Tanzania is experiencing increasing threat on biodiversity as a result of a number of drivers and pressures associated with anthropogenic activities. Main threats include:

i) Habitat conversion, loss, degradation and fragmentation in terrestrial, freshwater and marine environments;
ii) Over-exploitation of particular species of wildlife, tree species and aquatic biodiversity;
iii) Invasive alien species in terrestrial, freshwater and marine environments;
iv) Environmental pollution or contamination; and
v) Climate change.

Impacts of changes in biodiversity

Continued biodiversity loss, unsustainable utilization and associated degradation of a wide range of ecosystem services amounts to at least five percent (5%) of the national GDP and affects most severely the poor communities who depend most directly on their immediate environment for survival. Unreliable power supply due to drought resulting in decreased water levels in dams used for hydropower was estimated to cost about US$ 330 million annually (about 2% of the national GDP) in 2006. Conflict between humans and wildlife due to human encroachment in wildlife habitat is an increasing problem with records (by the end of 2009) showing that elephants kill approximately 40-50 people and injuring 30-40 people each year across the country.

THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY

National biodiversity targets

Tanzania is still in the process of developing comprehensive national biodiversity targets in line with the 2020 Aichi Targets. Tanzania is in the process of revising and updating the National Biodiversity Strategy and Action Plan (NBSAP) (2001), which is expected to set and realign national biodiversity targets to the Aichi Biodiversity Targets of the Strategic Plan for Biodiversity (2011-2020). One of the national biodiversity target is to increase area covered under marine protected areas from 6.5% (2011) to 10% by 2020. In spite of scarce formal national targets, implementation of relevant policies, strategies and plans does contribute towards achieving the various Aichi Targets.

Implementation of the Convention and related Outcomes

There has been continued efforts in implementing the Convention towards increasing protection of biodiversity and related ecosystems through restoration of priority ecosystems aiming at reducing loss of biodiversity and improving livelihoods of the population particularly the poor. Over the past 5 years, a number of sectoral policies and legislation have been reviewed aiming at, among others, accommodating environmental challenges in areas of agriculture, mining, livestock, irrigation, water resources, wildlife, biotechnology and public health. Participatory resource management is being promoted through which, more than 30,000 km^2 of wildlife protected areas (or about 8% of the wildlife protected areas), 4.15 million ha of forest (or about 9% of the forest area) and 2,500 km^2 of marine waters are being managed, and thus contributing in addressing both biodiversity conservation and livelihood needs. Other initiatives include tree planting campaign whereby each District is required to plant and maintain at least 1.5 million trees per year; and promotion of alternative energy sources to help curb massive deforestation since more than 90% of national energy consumption depend on biomass energy (fuel wood and charcoal). Further, traditional forest management practices are being promoted which involve fallowing the land for a period of time and then utilizing later for grazing and firewood collection particularly during dry seasons.

Despite considerable efforts and measures instituted to meet obligations of the Convention, competing development needs taking into consideration limited economic capacity have hindered its full implementation. Some of the obstacles include the following:

i) Inadequate resources to fully implement obligations of the Convention;
ii) Inadequate mainstreaming of biodiversity issues in sectors and Local Government plans and budgets;
iii) Limited capacity for research and generation of accurate information and data as well as value of biodiversity;
iv) Low level of awareness of the public on importance of conserving biodiversity; and
v) Inadequate participation of communities in biodiversity conservation.

Mainstreaming biodiversity into relevant national policies, strategies, plans and programmes

In order to ensure meaningful and effective biodiversity conservation, there has been continued emphasis to mainstream biodiversity conservation into relevant national development and planning frameworks, sectoral policies and strategies, and activities of non-state actors. The Government has established environmental units in all Sector Ministries and continues to designate Environmental Management Officers at all levels of Local Government Authorities. A Special Environmental Police Unit has been established in the Tanzania Police Force in order to strengthen environmental enforcement. Biodiversity conservation has been mainstreamed explicitly or implicitly in a number of national development frameworks including Tanzania Development Vision 2025; National Strategy for Growth and Reduction of Poverty (NSGRP) (2010-2015); and National Environmental Action Plan (NEAP) (2013-2018). Relevant sectors have also taken various measures to mainstream biodiversity into their policies, strategies and plans. Such measures include the following:

i) The national education curriculum has integrated biodiversity knowledge in the teaching and learning processes;
ii) Participatory management of wildlife, forest and marine areas is being promoted considerably and has helped addressing both the need for biodiversity conservation and as a means to sustain livelihoods particularly of poor communities;
iii) The use of alternative energy sources such as biogas, briquettes, solar, wind and hydropower are being encouraged to minimize the use of charcoal and firewood (which constitute more than 90% of the national energy consumption) to protect massive deforestation;
iv) Promoting agro-forestry and organic farming;
v) Intensifying plant genetic conservation.

Other players including business and industry as well as Non-Governmental Organizations (NGOs) have also been instrumental in advocating environmental management issues. The Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA) has formed a committee responsible for promoting integration of

environmental issues into company policies and awareness raising of the business community on environmental issues.

PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE RELEVANT 2015 TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS

Implementation of the National Biodiversity Strategy and Action Plan (2001)

Although implementation of the National Biodiversity Strategy and Action Plan (NBSAP) had some success, its full implementation was hindered mainly by limited resources. Tanzania formulated its first National Biodiversity Strategy and Action Plan (NBSAP) in 2001. In general, 28.6% of the priority actions in the NBSAP have been fully achieved, 23.8% substantially achieved, 42.9% achieved to a limited extent, and 4.7% not achieved (Figure C). Some of the notable accomplishments include the following:

i) Review and update of relevant legislation particularly those addressing wildlife and water resources.
ii) Preparation of a number of regulations, guidelines and manuals covering biosafety, solid waste management and hazardous waste management;
iii) Improving institutional enforcement capacity in Sector Ministries, Local Government Authorities and Tanzania Police Force;
iv) Designation and upgrading of more wildlife protected areas;
v) State of environment reporting which helps in establishing status and trends in environmental change including biodiversity; and
vi) Public awareness through different pathways such as print and electronic media.

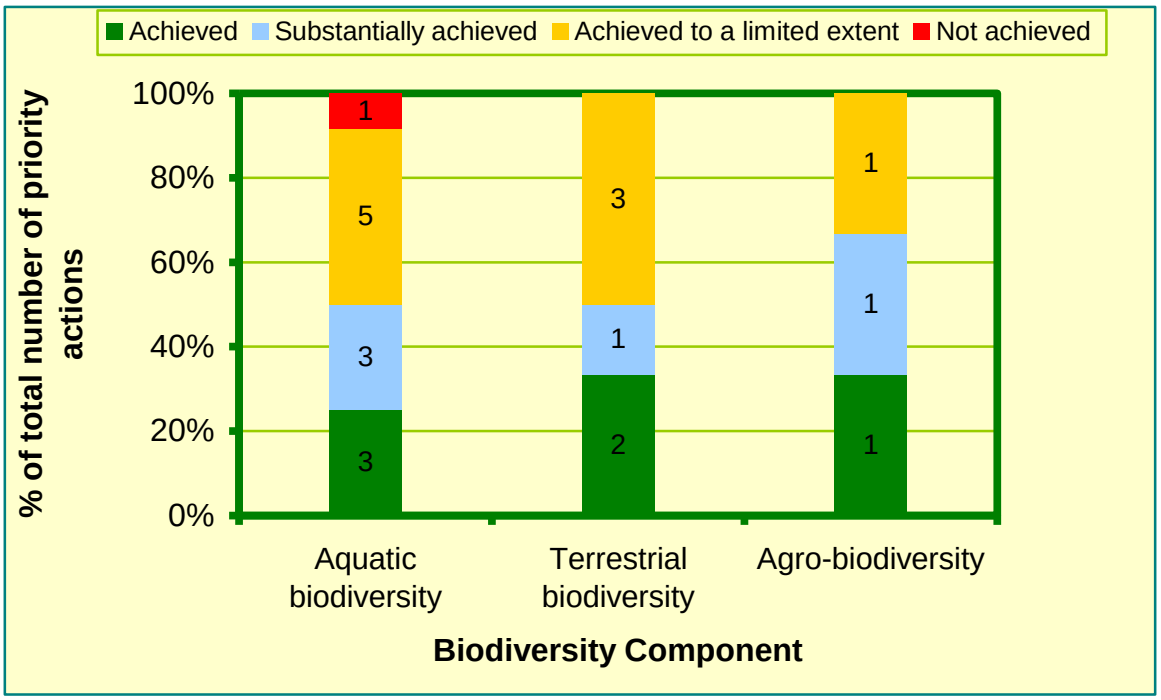

Figure C: Analysis of extent of implementation of the NBSAP (2001)

Contribution towards achievement of Millenium Development Goals (MDGs)

Tanzania has made considerable efforts towards conservation of forest, wildlife habitat and marine environment; combating land degradation; and protection and conservation of water catchments which contribute towards achieving MDGs particularly Goal 7 on environmental sustainability. The Government has implemented various policies, legislation, programmes, plans and strategies related to environmental conservation and sustainable development which have contributed in improving state of environment as well as biodiversity. Other initiatives include mainstreaming of environment into national development frameworks as well as national policies, strategies and plans; and promoting participatory resource management in forest, wildlife an marine areas.

Lessons learned from the implementation of the Convention

The implementation of the Convention in the country, over the years, has helped appreciate the value of biodiversity which serves as the backbone of the national economy and therefore its protection and conservation is of utmost priority. Since ratification of the CBD Convention, Tanzania has learnt a number of lessons including the following:

i) For effective implementation of the convention cooperation among key stakeholders is important;
ii) Mainstreaming of biodiversity into other sectors requires institutional change which takes time and requires vision and persistence;
iii) Influencing environmental policy implementation requires flexibility and cannot be a tightly managed process;
iv) Investing and maintaining collaborative partnerships among multiple stakeholders is key towards achieving biodiversity goal;
v) Inadequate communication, education and public awareness and limited enforcement is putting more pressure on biodiversity;
vi) Promotion of alternative livelihood activities can greatly enhance protection of biodiversity and ecosystem services by reducing harvesting pressure. However, adoption is slow due to the cultural and social beliefs; and
vii) Inadequate reliable data and information limits the understanding on status and trends of biodiversity.

CONTENTS

PREFACE ..... **i**

ACKNOWLEDGEMENT ..... **ii**

EXECUTIVE SUMMARY ..... **iii**

ACRONYMS ..... **xii**

1.0 INTRODUCTION **1**
1.1 Background 1
1.2 Biophysical and Socio-economic Setting 1
1.3 Objectives of the Report 3

PART I: AN UPDATE ON BIODIVERSITY STATUS, TRENDS, AND THREATS AND IMPLICATIONS FOR HUMAN WELL BEING **4**

2.0 Importance of biodiversity in Tanzania **4**

3.0 Major changes in the status and trends of biodiversity in Tanzania **9**
3.1 Ecosystem diversity 9
3.1.1 Terrestrial ecosystems *10*
3.1.2 Inland water ecosystems (lakes, rivers, dams and wetlands) *12*
3.1.3 Coastal and marine ecosystems *13*
3.2 Species diversity 15
3.3 Genetic Diversity 19

4.0 Main threats to biodiversity **20**

5.0 Impacts of changes in biodiversity **31**

PART II: .... THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY **33**

6.0 National biodiversity targets **33**

7.0 Updating of the National Biodiversity Strategy and Action Plan **33**

8.0 Actions Taken to Implement the Convention and Related Outcomes **34**
8.1 Initiatives undertaken 34
8.2 Obstacles to implementation of the Convention 38

9.0 Mainstreaming biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes **39**
9.1 Institutional set up for environmental management 39
9.2 Mainstreaming of biodiversity in national strategies and plans 39
9.3 Mainstreaming of biodiversity in various sectors 40
9.4 Mainstreaming of biodiversity in various cross-cutting sectors 42
9.5 Mainstreaming of biodiversity by other players 42

10.0 Implementation of the National Biodiversity Strategy and Action Plan (NBSAP) 43

PART III: ..... PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE RELEVANT 2015 TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS 48

11.0 Progress towards implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets 48

12.0 Contribution of actions to implement the Convention towards the achievement of the Millennium Development Goals 56

13.0 Lessons learned from the Implementation of the Convention in Tanzania 58

REFERENCES 59

ANNEXES AND APPENDICES 61

APPENDIX I : INFORMATION CONCERNING THE REPORTING PARTY AND PREPARATION OF THE FIFTH NATIONAL REPORT 62

APPENDIX II: FURTHER SOURCES OF INFORMATION 64

ACRONYMS

ABS	Access and Benefit Sharing
BMU	Beach Management Unit
CBD	Convention on Biological Diversity
CBFM	Community Based Forests Management
CBO	Community Based Organization
CFMA	Collaborative Fisheries Management Area
COSTECH	Tanzania Commission for Science and Technology
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
FAO	United Nations Food and Agriculture Organization
FSDP	Fisheries Sector Development Programme
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMP	General Management Plan
HEC	Human Elephant Conflicts
IBAs	Important Bird Areas
IMS	Institute of Marine Sciences
IPMP	Integrated Pest Management Plan
IUCN	International Union for Conservation of Nature
JET	Journalist Environmental Association of Tanzania
JFM	Joint Forest Management
LEAT	Lawyers Environmental Action Team
LPG	Liquefied Petroleum Gas
LVEMP	Lake Victoria Environmental Management Programme
MDGs	Millenium Development Goals
MEAs	Multilateral Environmental Agreements
MLFD	Ministry of Livestock and Fisheries Development
MNRT	Ministry of Natural Resources and Tourism
MPA	Marine Protected Area
NAFORMA	National Forest Resources Assessment and Monitoring
NBS	National Bureau of Statistics
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environmental Action Plan
NEMC	National Environment Management Council
NERA	National Environmental Research Agenda
NGO	Non Government Organization
NPGRC	National Plant Genetic Resources Centre
NSGRP	National Strategy for Growth and Reduction of Poverty
PA	Protected Areas
PFM	Participatory Forest Management
REA	Rural Energy Agency
REDD	Reduced Emissions from Deforestation and Forest Degradation
RGZ	Revolutionary Government of Zanzibar
SAN	Sustainable Agriculture Network
SEA	Strategic Environmental Assessment
SEAP	Sectoral Environmental Action Plan
SIDO	Small Industry Development Organization
SLM	Sustainable Land Management
SUA	Sokoine University of Agriculture
TAFIRI	Tanzania Fisheries Research Institute
TAFORI	Tanzania Forest Research Institute
TANAPA	Tanzania National Parks

TanBIF	Tanzania Biodiversity Information Facility
TaTEDO	Tanzania Traditional Energy Development and Environmental Organization
TAWIRI	Tanzania Wildlife Research Institute
TCCIA	Tanzania Chamber of Commerce Industry and Agriculture
TEV	Total Economic Value
TFCG	Tanzania Forest Conservation Group
TFS	Tanzania Forest Services
TPRI	Tropical Pesticides Research Institute
TWPF	Tanzania Wildlife Protection Fund
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNCCD	United Nations Convention to Combat Desertification
URT	United Republic of Tanzania
USAID	United States Agency for International Development
USD	United States Dollar
VPO	Vice President's Office
WIOMSA	Western Indian Ocean Marine Science Association
WMA	Wildlife Management Area

1.0 INTRODUCTION

1.1 Background

The Convention on Biological Diversity (CBD) was adopted in May, 1992 and Tanzania ratified in March, 1996. The objective of the Convention is to promote the conservation of biological diversity; sustainable use of its components; and the fair and equitable sharing arising out of the utilization of genetic resources.

Article 6 of the Convention requires Parties to develop a National Biodiversity Strategy and Action Plan (NBSAP) to serve as the overall framework for national implementation of the objectives of the Convention, through action for the conservation and sustainable use of biodiversity. Tanzania formulated her initial NBSAP in 2001, and at the time of reporting, the country was in the process of reviewing and updating it.

Further, Article 26 of the Convention requires Parties to prepare reports on measures taken to implement the Convention and the effectiveness of those measures in meeting the objectives of the Convention. Tanzania has submitted four national reports so far, the last one was submitted in 2009. Therefore, this Fifth National Report reviews and updates the Fourth National Report (2009). The Fifth Report focuses on the implementation of the Strategic Plan for Biodiversity 2011-2020, and progress toward the Aichi Biodiversity Targets.

1.2 Biophysical and Socio-economic Setting

Tanzania is located in Eastern Africa, between Latitude 1º and 12º South and Longitude 29º and 41º East. It is bordered by Kenya and Uganda to the North; Rwanda, Burundi and Democratic Republic of Congo to the West; Zambia and Malawi to the South West; Mozambique to the South; and Indian Ocean to the East (Figure 1). It is constituted by Tanzania Mainland and Zanzibar with a total area of 945,087 km^2 comprised of land area of 883,749 km^2 (881,289 km^2 mainland and 2,460 km^2 Zanzibar Islands), plus 59,050 km^2 inland water bodies. Table 1 summarizes some of the socio-economic features of the country.

Figure 1: The map of Tanzania showing regional and international boundaries
(Source: URT, 2014)

Table 1: Some of the socio-economic features of Tanzania

Population	
Total population (2012)	44.9 million
Rural population	31.8 million (73.3%)
Urban population	13.1 million (26.7%)
Average population density	51 persons per km^2
Population below the basic needs poverty line (2007)	33.6%
Land use	
Arable land	44 million ha
Land area under cultivation	10.1 million ha (23%)
Land used for livestock production	26 million ha
Energy	
Woodfuel contribution to total energy consumption	90%
Hydropower contribution to total power supply	37%
Water	
Renewable surface water resources	89 km^3 per year or 2,700 m^3 of water per capita
Renewable groundwater resources	40 km^3 per year
Waste management	
Households in urban and rural areas using pit latrines	90%
Urban population have access to sewerage systems	10-15 %
Average proportion of solid wastes collected daily in urban areas	50%
Natural gas	
Total reserve (2013)	42.7 trillion cubic feet
Current production (Million Standard Cubic Feet per Day)	103

(Source: URT, 2014)

1.3 Objectives of the Report

The purpose of this Report is to inform and update on status and trends of biodiversity, measures and initiatives undertaken and their effectiveness in achieving the objectives of the Convention on Biological Diversity (CBD) for a period of 5 years since the submission of the Fourth National Report in 2009. More importantly, it serves as an important tool for biodiversity planning at the national level.

Specific objectives of the Report are to:

i) Highlight contributions of biodiversity and ecosystem services to human well-being and socio-economic development in the country;
ii) Assess the status and trends of, and threats to, and the implications of changes in biodiversity;
iii) Assess the implementation of the NBSAP (2001) focusing on actions taken, outcomes and the extent to which the related objectives and targets have been met;
iv) Describe how mainstreaming of biodiversity has been addressed; and
v) Highlight the extent to which the targets of the Millenium Development Goals (MDGs) and the Aichi Biodiversity Targets have been achieved.

PART I: AN UPDATE ON BIODIVERSITY STATUS, TRENDS, AND THREATS AND IMPLICATIONS FOR HUMAN WELL BEING

2.0 Importance of biodiversity in Tanzania

Tanzania is endowed with vast biodiversity assets that have the potential to contribute to the economy and to support human wellbeing. The need to care about the biodiversity is a prime necessity because of the Tanzania's heavy dependency on her capital of natural resources. Tanzania is one of the twelve-megadiverse countries of the world, and the nation's biological diversity has important economic, technological and social implications. Agriculture, Livestock, Forestry, and Fisheries together contribute over 65% of GDP and account for over 80% of total employment and over 60% of the total export earnings. The society's dependency on biodiversity for socio-economic development in Tanzania is underscored by the rendered ecological services, source of food and medicines, source of building materials and energy as well as perpetuation of nature as decomposers of organic wastes and enrichment of soils and aquatic environment. Thus the conservation of biodiversity in Tanzania is vital to humanity's economic and social development of the country.

Tanzania is greatly benefiting from biodiversity, including in attracting tourism, and as a source of food, medicines, building materials and energy, and as decomposers of organic wastes and soil conditions. Moreover, many commercial enterprises are an offspring of these biological services, including food processing plants , furniture and pulp enterprises, pharmaceutical industry, agro industry and hotel industry.

The extensive national parks, 'the Eastern Arc' mountains, wetlands, coastal forests, marine and fresh water systems as outstanding reservoirs of plant and animal species make Tanzania one of the world's greatest reservoirs of biodiversity. Tanzania is also home to 31 endemic species of amphibians, 18 endemic species of lizards, 9 species of snakes, 10 bird species, 40% of the world's wild coffee varieties, and about 80% of the famous African violet flowers. It is a custodian of world heritage in the form of game reserves and national parks. The Selous Game Reserve, the Ngorongoro Crater and Serengeti National Park are World Heritage Sites. Lake Manyara National Park, the Ngorongoro Crater and Serengeti National Park have been designated as biosphere reserves.

Forestry

The forestry sector has a very important role to play in Tanzania's economy covering more than half of the total landmass, the country's forests contain such a high level of biologically diverse resources that makes Tanzania one of the richest countries in terms of biodiversity in the world. In 2003, the Ministry of Natural Resources and Tourism conducted an economic analysis of the catchment forest reserves in Tanzania, by monetizing a full set of forest benefits accrued from these forest areas. The results show a significantly higher economic value of natural forests. The average actual Total Economic Value (TEV) accounts to about 17,250 USD per hectare. This makes forestry one of the major contributors to human well being and

economic growth of the country. For example, by March, 2013, Tanzania Forest Services (TFS) collected about 33 billion shillings of the targeted 58 billion shillings for the financial year 2012/13 while the Tanzania Forest Fund by March 2013 collected revenues of about 2 billion shillings of the targeted 3.5 billion shillings for the year 2012/2013. Inaddition to that, the Government collected 24 billion shillings by May, 2011.

As a testimony for this, forests provide more than 90 percent of the energy resources, support the development of other important sectors (such as agriculture and tourism) through provision of water resources and catchments, maintain hydrological balance and soil protection, recycle atmospheric gases, provide construction materials and employment sources. Employment is provided through forest industries, forest plantations, government forest administration and self-employment in forest-related activities. Trade in forest products has recently increased, and the sector's contribution to total trade has more than doubled.

Forests are important assets in Tanzania, offering numerous goods and services in the national economy, to society at large, and to local livelihoods. Forests and woodlands are recognized as an important resource base for Tanzania's social and economic development, and for provision of many basic benefits and opportunities to rural and urban communities. Values of forest goods and services, however, are often underestimated, wrongly attributed to other sectors, or entirely omitted. These include:- non-marketed timber; non-timber forest products; forest products harvested illegally (possibly up to 80 percent of all forest harvesting); tourism and recreational services; and ecosystem services such as positive influences of forests on agricultural production, water quantity and quality, energy sources, carbon storage, and biodiversity protection. **Box 1** presents a case study demonstrating ecosystem valuation of land resources in Tabora Region.

Mangrove forests

Mangrove forests are the dominant coastal ecosystem in Tanzania where approximately 150,000 people earn their livings from mangrove resources. Mangroves provide ecological services such as nursery areas for fish and prawns, roosting areas for birds and coastal protection. Mangrove forest also protect sea pollution by absorbing heavy metals that could affect human health through consumption of sea foods. Mangroves are a traded commodity and its poles are exported and used locally as a building material and are also used to make fish traps. Boat-making is a common use, in particular for the construction of dhow (traditional wooden boat) ribs and rails, and to a lesser extent keels. Mangrove wood is used for fuel to commercially produce salt and lime and process fish. Charcoal-making is widely practiced through the Ruvu and Wami Deltas. Through utilization of these forests communities around them are benefiting in sustaining their livelihoods and hence contributing to improved life standards and poverty reduction.

Box 1: The value of land resources in Tabora Region

Tabora Region is located in the Central Western part of Tanzania with an estimated population of 2.4 million in 2010, most of whom live in rural areas and depend on land resources for their livelihoods. About 76% of the population are farmers and agriculture is the largest single sector in the economy, directly producing about 80 percent of Tabora Region's wealth. Woodland is the natural vegetation over most of the region and despite clearances over many years, still covers 58% of Tabora's land surface.

The values of the land resources of Tabora region and the main ecosystems services they generate were assessed in 2013 in order to understand the value of land resources and contribution that they make to socio-economic development by providing evidence for Tabora Region. The summary results of the analysis is presented in the Table below.

Land cover type	Area (ha)	Provisioning services (USD per year)	Water regulation (USD per year)	Tourism, cultural and aesthetic values (USD per year)	Carbon sequestration total stock value (USD)
Bushland	432,968	34,637,440	12,989,040	5,195,616	618,278,304
Cultivated land	892,502	280,245,628		10,710,024	1,137,940,050
Grassland	201,518	53,978,035	6,045,040	2,418,216	287,767,704
Permanent swamp	146,798	29,359,600	88,078,800	1,761,576	149,733,960
Seasonally inundated swamp	1,445,539	338,256,126	578,215,600	17,346,468	1,474,449,780
Plantation forest	633	101,280	31,650	7,596	1,291,320
Thicket	94,434	7,554,720	2,833,020	1,133,208	134,851,752
Woodland	4,407,791	705,246,560	220,389,550	53,893,492	8,991,893,640
Other, water, urban	20,932				
TOTAL	7,643,115	1,449,379,389	908,582,700	91,466,196	**12,796,206,510**

The results of the analysis are startling, with the three ecosystem service categories of provisioning services, water regulation and cultural and aesthetic values together generating an annual flow of ecosystem services worth close to USD 2.5 billion and the total stock value of the carbon sequestrated in the biomass and soils of the different land cover categories being estimated to be worth close to USD 13 billion.

The analysis also emphasizes the importance and value of land resources in the livelihoods of the vast majority of people living in Tabora. It can be deduced that through understanding economic value of ecosystems, their sustainable management should be of high priority. In this regard, promotion of the widely accepted ecosystem approach is necessary for sustaining livelihoods and welfare of the population in Tanzania, majority of whom are poor.

(Source: VPO, 2014)

Montane forests

The montane forests which are located in the mountainous areas cover about 2 million hectares of land (or about 4% of the total forests cover). These forests have a great importance in supporting livelihoods and contributing to socio-economic development of the country. **Box 2** is a case study of the Eastern Arc Mountains showing how important these forests are to the country.

Box 2: Ecosystem services provided by the Eastern Arc Mountains

The Eastern Arc Mountains is one of the global biodiversity hotspots constituting an estimated 1,500 of different endemic species and providing significant ecosystem services that support the livelihood of many people as highlighted in this case study.

Water: A number of major rivers have their sources and catchments in the Eastern Arc Mountains, e.g. Sigi, Wami, Ruvu, Kilombero, parts of Pangani, and part of the Great and Little Ruaha. At least 10 % of the total population of Tanzania, and perhaps as many as 25%, get their water from these rivers. For example, more than 3.5 million people living in the City of Dar es salaam get water from this ecosystem.

Hydroelectric power: Hydropower is the major source of commercial electricity in Tanzania. The four major hydropower plants that use Eastern Arc water are Kihansi, Kidatu, part of Mtera and part of Pangani Falls. Hydropower has been estimated as 62 percent of the total electricity supply of Tanzania (559 MW of 892 MW). It is estimated that around 50 percent of Tanzanians' electricity is provided by water flowing from the Eastern Arc Mountain forests. The forests are particularly valuable in maintaining water flow in the dry season and hence allowing the hydro-electrical facilities to continue generating power.

Agriculture: The forested Eastern Arc Mountains maintain a suitable microclimate for growing vegetables, spices and fruits. There is a major export from the mountains to Dar es Salaam and other cities of: bananas, potatoes, peas, leeks, tomatoes, pears, apples, plums, strawberries, cardamom and cinnamon. This provides a contribution to local livelihoods. Large agricultural irrigation schemes, such as Illovo and Mtibwa Sugar Company and various rice schemes rely on water from the Eastern Arc Mountains. This supports about 1,500,000 people living around the Eastern Arc Mountains.

Biodiversity and non-timber forest products: The biodiversity of the Eastern Arc Mountains is of great value locally for mitigating the impacts of rural poverty. Forest and woodland products such as firewood, construction materials, medicinal herbs, wild fruits and other food materials account for about 40% of total household consumption in some adjacent forest communities in the Eastern Arc Mountains. Apart from these ecosystem services the Eastern Arc Mountains serve as a net global carbon sinks for the green house gases where about 100 million tons of carbon are stored and hence contributing to mitigation of impacts of climate change. Forest products from the Eastern Arc Mountains are estimated to generate about US$ 150 million of value per annum to people and communities in the vicinity of the mountains. It is estimated that water, hydropower and non-timber forest products of the Eastern Arc Mountain forests generate over US$ 175 million every year for the people of Tanzania.

Scenic view of a section of the Eastern Arc Mountains

Wildlife

Tanzania is home to 364 species of mammals and 1,046 species of birds. It also supports 178 species of amphibians and 290 reptile species (IUCN Redlist 2013), some of which are endemic. In order to ensure that these species are adequately protected the country has gazetted over 30 per cent of its land area (ca. 945,000

Km^2) as wildlife protected areas. Tanzania's wildlife protected areas network includes 16 national parks, Ngorongoro Conservation Area, 28 Game Reserves, 42 Game Controlled Areas, 38 Wildlife Management Areas and 4 Ramsar Sites (Table 2). Four Protected areas are inscribed into UNESCO's World Heritage Sites and three into Biosphere Reserve. Ngorongoro Conservation Area and Serengeti National Park are Biosphere Reserves and World Heritage Sites. Other protected areas with World Heritage Sites status are Kilimanjaro National Park and Selous Game Reserve while Lake Manyara National Park is a Biosphere Reserve.

Table 2: Categories of protected areas under wildlife conservation

Category	Number	Area (km^2)	Percentage of Tanzania's total area
National Parks	16	57,365.05	6.07
Ngorongoro Conservation Area	1	8,292.00	0.89
Game Reserves	28	114,782.47	12.14
Game Controlled Areas	42	58,565.02	6.20
Wildlife Management Areas	38	29,518.40	3.12
Ramsar Sites	4	48,684.00	5.13
Total	**129**	**317,207.00**	**33.56**

Source: MNRT (2013b)

Tanzania's wildlife resources contribute significantly to the wellbeing of the Tanzanians and the national income through consumptive and non-consumptive utilization. Photographic tourism is a form of non-consumptive wildlife utilization conducted in all categories of protected areas. However, non-consumptive utilization is not allowed in Ngorongoro Conservation Area and national parks. In 2012/13 the Ngorongoro Conservation Area Authority earned about Tshs 47 billion (equivalent to USD 29.4 million) from 507,984 tourists who visited the area. On the same note, by March 2013, Tanzania National Parks Authority (TANAPA) generated about Tshs 105 billion (equivalent to about USD 65.6 million) from 750,977 tourists who visited the national parks, an increase of 11.7% of revenues collected in a year before. Between 2009 and 2013, the Government earned USD 73 million from trophy hunting, USD 233,247 from live trade animals and USD 11.8 million from photographic tourism (Table 3). These revenues were collected from game reserves, game controlled areas and Wildlife Management Areas, where both consumptive and non-consumptive are allowed.

Part of revenues generated from different forms of wildlife utilization are disbursed to communities to improve their living conditions. For example, between 2006 and 2012, some Tshs 1.7181 billion (equivalent to about USD 1.1 million) from hunting revenues were disbursed to 72 villages that have contributed their land to Wildlife Management Areas. Between 2002 and 2012, forty seven (47) District Councils bordering the hunting blocks earned Tshs. 6.8 billion (equivalent to about USD 4.25 million), which is 25% of hunting revenues.

Table 3: Trend of revenues accrued from Trophy hunting, live animal trade and photographic tourism (2009-2014)

Source of Revenues	2009/10	2010/11	2011/12	2012/13
Trophy hunting (USD)	18,444,881	23,536,347.00	15,062,217.75	15,971,430.93
Live animal trade (TZS)	172,046,203	137,866,585.06	26,469,234.15	151,354,374.82
Photographic tourism	USD: 2,706,603	2,863,287.24	2,080,978.00	3,904,808.35
	TZS: 261,639,400	44,638,750.00	74,289,980.00	5,307,565

Source: MNRT (2013b)

Fisheries

The fisheries sector is among the important economic sub sectors of the economy in Tanzania. The sector provides substantial employment, income, livelihood, foreign earnings and revenue to the country. The industry employs more than 4 million people engaged in fisheries and fisheries related activities while more than 400,000 fisheries operators are directly employed in the sector. In 2009 the fisheries sector contributed 1.3% to GDP, the per capita fish consumption is 8.0 kilogram and about 30% of animal protein consumption in Tanzania is from fish (National Economic Survey, 2009). In 2012, the sector contribution to GDP was 1.6% (NBS,2012). The Government has also been collecting revenues accrued from utilization of fisheries resources thereby contributing to the socio-economic development. For example in 2010/2011, the Government collected about 10 billion shillings from the sector (MLFD, 2011/12) . In 2011/2012, the Government collected about 13 billion (MLFD, 2012/13). All these shows how the sector is contributing to the government's efforts of collecting revenues from a wide pool of biodiversity resources that the country possess.

3.0 Major changes in the status and trends of biodiversity in Tanzania

3.1 Ecosystem diversity

Natural ecosystems in Tanzania can be categorized into three major types namely, terrestrial ecosystem, inland water ecosystem (lakes, rivers, dams and wetlands) and coastal and marine ecosystem. Significant progress has been made in protecting some of these ecosystems. About 40% of the total land area in Tanzania is somehow protected (or conserved) where wildlife protected areas cover at least 34% of the total land area, forest reserves cover around 15% and marine protected area cover about 0.2%. Comparatively, terrestrial ecosystems have the highest protection while the coastal and marine environment have the least protection (Figure 2).

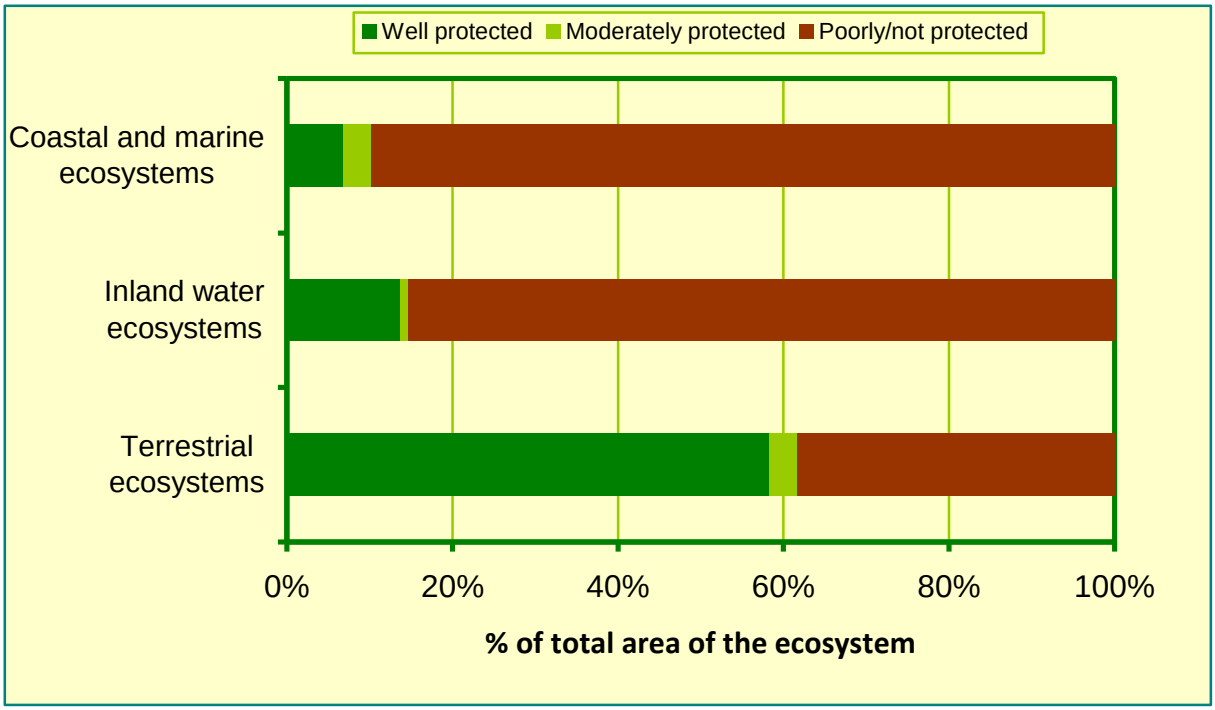

Figure 2: Protection level of different ecosystems in Tanzania

3.1.1 Terrestrial ecosystems

Land use change: Much of the available information on terrestrial ecosystems relates to forests which occupy 55% of the total land area (equivalent to about 48 million ha), of which 93% is covered by woodlands and only 3% is covered by other forest ecosystems including coastal forests, humid montane forest and plantations (URT, 2014). Between 1990 and 2010 (a span of 20 years), Tanzania lost about 38% of its forest cover due to changes in land use (Figure 3). It is estimated that the annual loss of forest area is approximately 1% equivalent to 400,000 ha of forest cover per annum for Tanzania Mainland and 500 ha for Zanzibar (URT, 2014; and RGZ, 2013). If this rate escalates coupled with demographic and economic pressures, it is forecasted that Tanzania will deplete its forest cover in the next 50-80 years (Devisscher, 2010). The main threats for deforestation include settlement and agricultural expansion, charcoal and fuel wood production, overgrazing, uncontrolled fires, shifting cultivation and illegal logging.

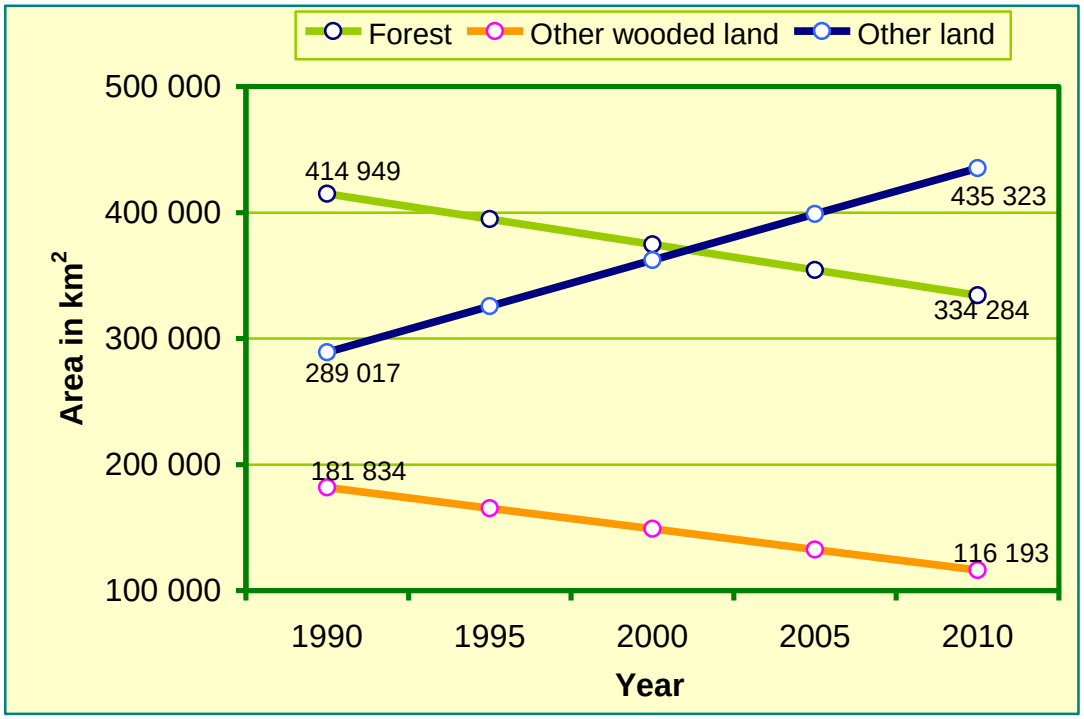

Figure 3: Trends of various land cover in Tanzania, 1990-2010 (Source: Modified from URT, 2014)

Woodlands: The major forest ecosystems in the country include miombo woodlands and *Acacia-commiphora* woodlands. Miombo is a vernacular word that has been adopted by ecologists to describe those woodland ecosystems dominated by trees in the genera *Brachystegia, Julbernardia* and *Isoberlinia*. Miombo woodlands covering more than 20 million ha or about 40% of Tanzania's land area are also experiencing continued deforestation. It has been estimated that 13% of Tanzania's miombo woodlands have been lost since the 1990s (USAID, 2012). The woodlands are threatened by clearing land for agriculture, extraction of wood to make charcoal and uncontrolled wild fires. On the other hand, *Acacia-commiphora* woodlands cover much of northern and central Tanzania, extending around the eastern margins of Lake Victoria. The world's most spectacular migration of large mammals that occurs in the Serengeti National Park each year, traverses the wide-sweeping grasslands and associated *Acacia-Commiphora* woodlands. The main threats include expansion of pastoralism and agricultural land as well as extraction of fuelwood and charcoal.

Montane forests: The montane forests which are located in the mountainous areas cover about 2 million hectares of land (or about 4% of the total forest cover). The Eastern Arc Mountains, with one of the highest concentrations of endemic species in the world, has lost 25% of forest area since 1955. Similarly, fire and forest clearance have resulted into loss of about one-third of the forest cover on Mount Kilimanjaro (about 41 km^2) during the past 70 years (USAID, 2012). This loss is mainly due to expansion of intensive crop cultivation, livestock grazing and landslides due to logging on steep slopes.

Agricultural ecosystems: Tanzania is endowed with about 44 million hectares of arable land, out of which only 24% is under crop production (URT, 2014). It is

estimated that about 80% of the cultivated land consists of traditional subsistence farming systems in which there is considerable diversity of crops and species grown and sizeable variety in the ways in which they are grown. The most favourable conditions for agricultural biodiversity is considered to occur under extensive and/or traditional agricultural management. For instance, the Chagga homegardens on the slopes of Mount Kilimanjaro includes four strata of vegetation (forest trees, banana, coffee, and vegetables) and supports more than 520 vascular plant species and 25 varieties of bananas. In order to meet the increased demand for food for the escalating population (projected to increase from 44.9 million people (2012) to 59.8 million by 2025), more land will be converted to agriculture, and agricultural intensification will increase, thereby increasing the pressure on biodiversity in natural ecosystems. Therefore, the major threat on agricultural biodiversity results from changes and intensity of farming which generate changes in agricultural landscapes.

3.1.2 Inland water ecosystems (lakes, rivers, dams and wetlands)

Inland water ecosystems occupy about 20% of the total land area. They are comprised of wetlands (10%) including those of international importance - Ramsar sites (5.5%); freshwater lakes (6.1%); and rivers and their catchment areas. Tanzania has over 2,810 rivers, 2,325 springs, 440 lakes and dams, and 22,379 deep boreholes (VPO, 2011). Although land degradation and over-harvesting of terrestrial resources is a concern in many areas in the country, it is freshwater ecosystems that are under most pressure. Consequently, these ecosystems have been significantly degraded mainly due to anthropogenic activities.

Wetlands: There are about 115 different wetlands ecosystems occupying 10% of the total land area harbouring over 650 associated species, such as molluscs, crustaceans, echinoderms and fish. The major wetlands include Kilombero, Malagarasi-Muyovosi, Rufiji-Mafia, Lake Natron and Ihefu. In terms of their distribution, 60% extend over village land while the remaining 40% is located over public land. It is estimated that 90% of the wetlands are under increasing pressure and in the process of losing many of their important functions, with serious consequences in the form of changed water regimes, pollution, significant conflicts over resource use and loss of livelihood opportunities. The situation is aggravated by the encroachment of about 50% of wetland ecosystems, which ought to risk half of Tanzania's 'natural water storage capacity'. The situation is further complicated with changes in the water cycle caused by deforestation and erosion in the catchment areas.

Lakes: Tanzania comprises a chain of freshwater and alkaline lakes located mainly on the Rift Valley covering a total area of 54,337 km^2 (or about 6.1% of the total country's surface area). The major ones include Nyasa, Tanganyika and Victoria. These lakes are threatened by overfishing, pollution, eutrophication, increased sedimentation resulting from deforestation, predation and competition from introduced alien species which has already led to significant loss of jobs, livelihoods and food security. For instance, introduction of the Nile perch *(Lates niloticus)* and Nile tilapia *(Oreochromis niloticus)* has contributed to decline or probable extinction of an estimated 200 species of fish that formerly provided the main source of income and protein to many lakeside communities in the Lake Victoria Basin.

Rivers: Majority of the river ecosystems are not protected with few exceptions such as those under protected montane forests and Ramsar sites. The major ones include Rufiji, Ruvu, Pangani, Malagarasi and Mara. It has been found that in the past decade or two, the ecological integrity of many river systems in Tanzania has decreased. It is evident that most of the highly polluted rivers have adjacent land uses associated with high concentration of industries, populated unplanned settlements, agriculture and other socio-economic activities. Such rivers are located mainly in major cities and towns. In addition, fragmentation of habitats and diversion of water resources for development of hydropower (currently contributing about 37% of power supply in the country) presents additional threat to biodiversity of inland water ecosystems since all major river systems are or will be dammed by one or more hydropower projects.

Dams: There are over 85,000 ha of dams in Tanzania. The major ones include two large reservoirs of Mtera (610 km^2) and Nyumba ya Mungu (180 km^2). Three medium–large dams include Hombolo (1,537 km^2), Kidatu (10 km^2) and Pangani plus many small dams and reservoirs. Almost all the dams are not protected except for the partial protection provided to the Nyumba ya Mungu dam as a Game Controlled Area. These dams provide hydropower as well as habitats for various wildlife. The dynamics of flora and fauna is a function of the fluctuation of water in the dam. For example, Mtera dam is an important habitat for a variety of water birds including Great White Egrets, Marabou Stork, White-faced Ducks. Nyumba ya Mungu is an important breeding site for certain fish and bird species. Important birds are White Breast Comorant, Kittliz, Sandplover, Gull-billed Tern and African Skimmer.

3.1.3 Coastal and marine ecosystems

Coastal and marine ecosystems occupy an area of about 241,500 km^2 or about 20% of total land area of the country. Signs of environmental degradation and decline in coastal and marine resources and biodiversity, are becoming more obvious. This is evidenced by declining yields of fish, deteriorating conditions of coral reefs, and continuing reduction in area coverage for mangroves and coastal forests. A wide range of important and valued species are found along the coast, including an estimated 150 species of corals in 13 families; 8,000 species of invertebrates; 1,000 species of fish; 5 species of marine turtles, 428 species of seaweeds and 44 species of marine birds.

Mangroves: All mangrove forests in Tanzania are gazetted as forest reserves and occupy about 0.3% of the forest cover in the country. Generally, there is lack of recent and reliable information to help generate reliable trends of coverage of mangroves. Available information indicate that Tanzania has lost about 44,000 ha of mangroves over the last 30 years (1980-2010) (or equivalent to about 28.9% of the 1980 coverage area) (Figure 4). Besides a decrease in the area coverage of mangroves, there is also considerable decrease in the density, height and canopy cover of the mangroves within the forests. For instance, mangrove ecosystems in Zanzibar cover a total of 18,000 hectares with about half of it considered as degraded (RGZ, 2013).

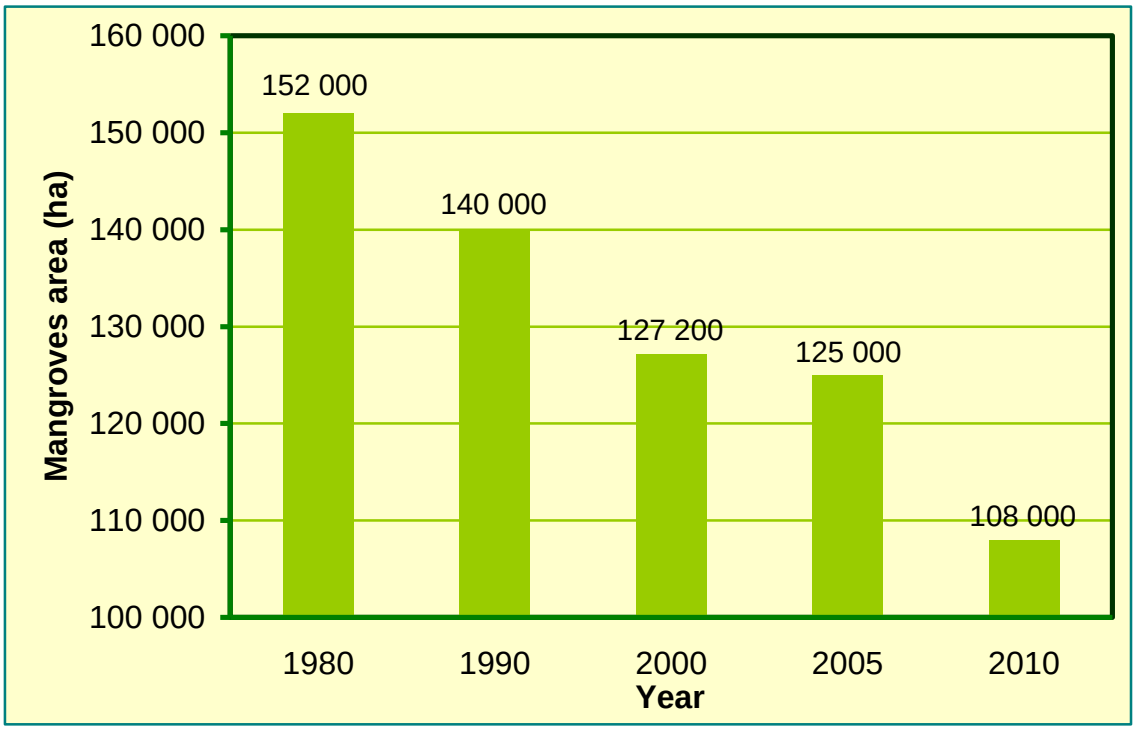

Figure 4: Status and trends of mangroves coverage area, 1980-2010 (Source: Modified from FAO, 2007)

Coral reefs: Coral reefs are located along 600 km of the country's continental shelf, covering an area of about 3,500 km^2 (or about 11% of the total area of territorial sea). It is estimated that a sustainable yield harvest of 15 tons of fish can be obtained per km^2 of coralline areas in depth of less than 30m. These reefs have been partially to severely degraded. The most degraded coral reefs are those found in shallow waters (1-10 m), especially near urban centres which is contributed by over exploitation, sedimentation and pollution from land-based sources.

Seagrass beds: The area covered by seagrass beds and the relative species densities in Tanzania are not known. However, there are indications of declining trends in coverage area whose rate of loss is considered to be comparable to that of mangroves.

Sea weeds: The area covered by sea weeds is not known. Presence of many rocky shores provide stable substrata for seaweed attachment, especially for macrophytic seaweeds such as *Sargassum*. Although seawater temperatures in Tanzania's marine waters show a relatively low level of fluctuation throughout the year, the temperature drop by only a few degrees during the coolest months of May to August, seems to make a difference. Some seaweed species show their strongest presence (and highest standing crops) during these relatively cooler months (e.g. *Colpomenia sinuosa* and *Hydroclathrus clathratus*). Seaweed provides an alternative source of income to local communities. They are used for food, soap making and medicinal purposes. Coastal seaweed aquaculture is one of the major sources of livelihood for a significant proportion of the coastal population, majority of whom are women. For instance, it contributes about 25% to Zanzibar's GDP. Tanzania produces about

12,500 tonnes of dry seaweed per annum. Seaweed species farmed in Tanzania include *Kappaphycus alvarezii, K. Striatum* and *Eucheuma denticulatum*.

3.2 Species diversity

Species represent an important component of biodiversity. The flora and fauna of Tanzania is extremely diverse with at least total of 14,336 known and confirmed species (COSTECH, 2012) (Figure 5) and ranking among the top five African mega-diverse countries. For instance, it accounts for more than one-third of the total plant species in Africa, ranks 12th globally in terms of number of birds species and accounts for about 20% of species of Africa's large mammal population. Of the total number of species existing in the country, more than half of them (54%) constitute plant species. Notably, over 25 % of all plant species are used as wild-harvested medicinal plants (Nahashon, 2013).

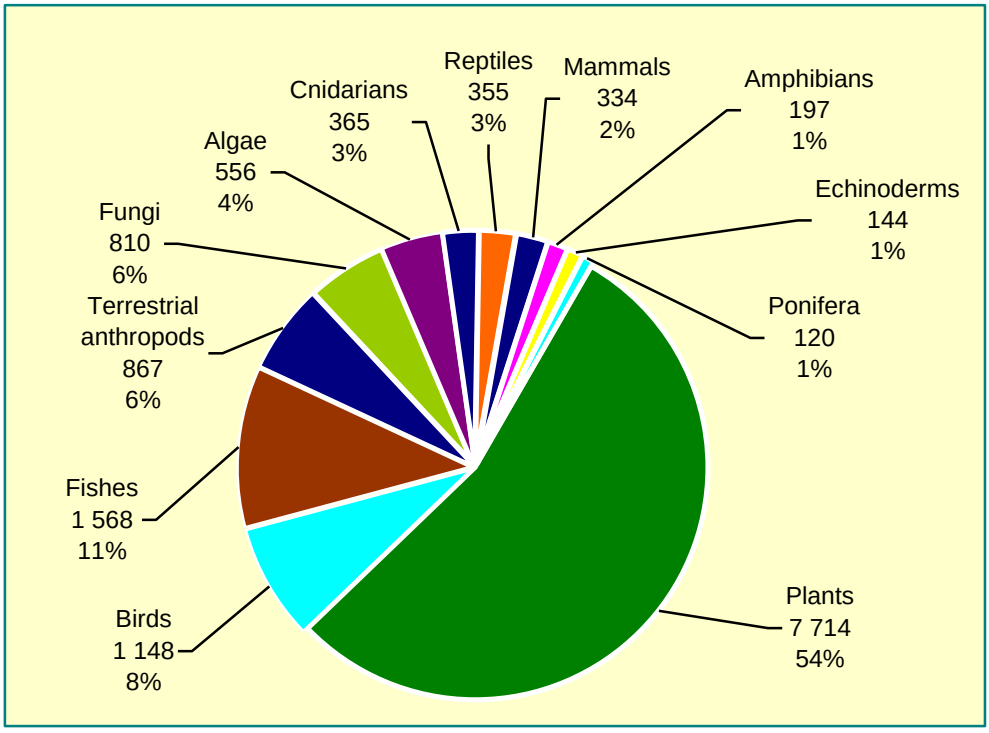

Figure 5: Number of some of the known and confirmed species for major taxonomic groups in Tanzania (Source: COSTECH, 2012)

Endemic species

The exact number of endemic species in the country is not known. However, available information indicates endemic species to be ranging between 400-3,000 species (USAID, 2012; SAN, 2013; Birdlife International, 2014; and URT, 2014). The richness of the country in endemic species can be attributed to the complex topographical conditions and biological isolations in some areas resulting in unique microclimate and distinct ecological conditions that had supported the presence of the many endemic species. The proportion of threatened endemic species is highest for amphibians and reptiles while the highest number of threatened species is found

in plants (more than 1,122 species or about 11% of total plant species) (Figure 6). It should be noted that there is general lack of information on conservation status of species in the country, particularly for marine species and invertebrates.

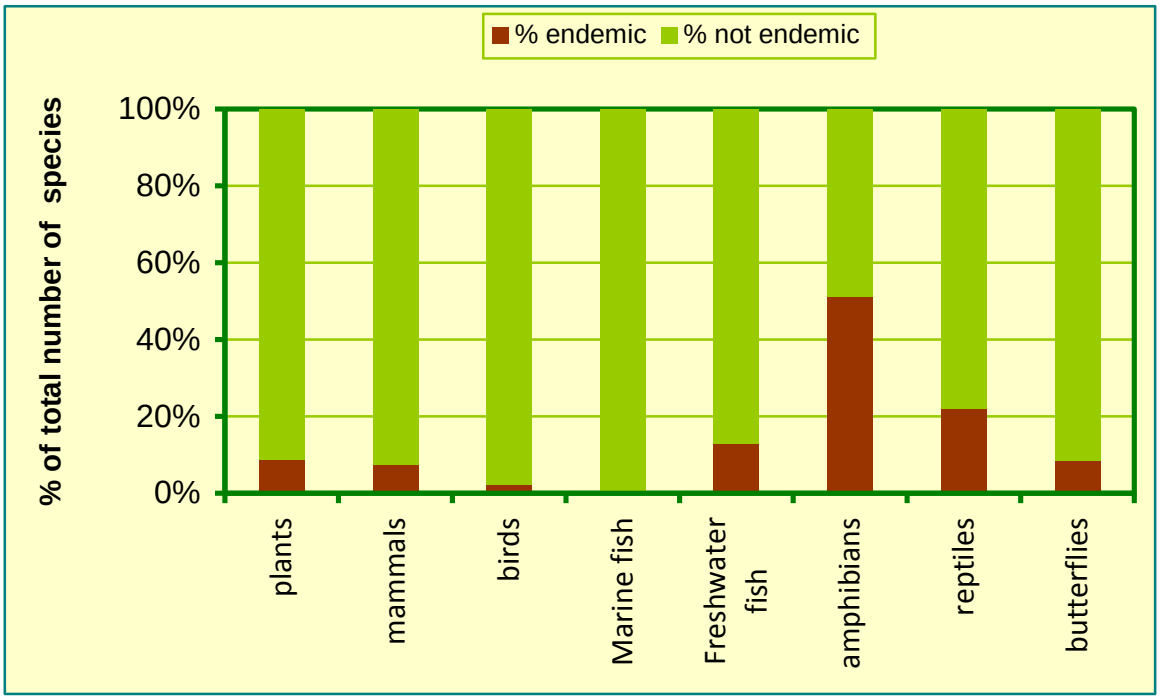

Figure 6: Proportion of endemic species for some of the major taxonomic groups (IUCN Red List, 2013)

Threatened species

The 2013 IUCN RedList indicate that there are 914 threatened species recorded in Tanzania (accounting for about 4% of threatened species globally). Tanzania is among 15 countries globally with the highest number of threatened species. The trend in recorded number of threatened species in the country, indicates a dramatic increase of almost 3-fold compared to those recorded in the year 2000 (Figure 7). This may be associated with climate change, increased ecosystem-wide deterioration, fragmentation and degradation. A quick assessment of the threatened species indicate that one in ten mammal species is threatened; one in twenty five birds species is threatened; one in thirteen fish species is threatened; one in two plant species is threatened; one in two amphibian species is threatened; and one in sixteen reptiles species is threatened (Figure 8). The proportion of threatened species is highest for plants and amphibians while the highest number of threatened species is found in plants (more than 375). Of the endemic species, the proportion of threatened species is highest for mammals and cycads while the highest number of threatened endemic species is found in amphibians (Figure 9). It should be noted that there is general lack of information conservation status of species in the country, particularly for marine species and invertebrates.

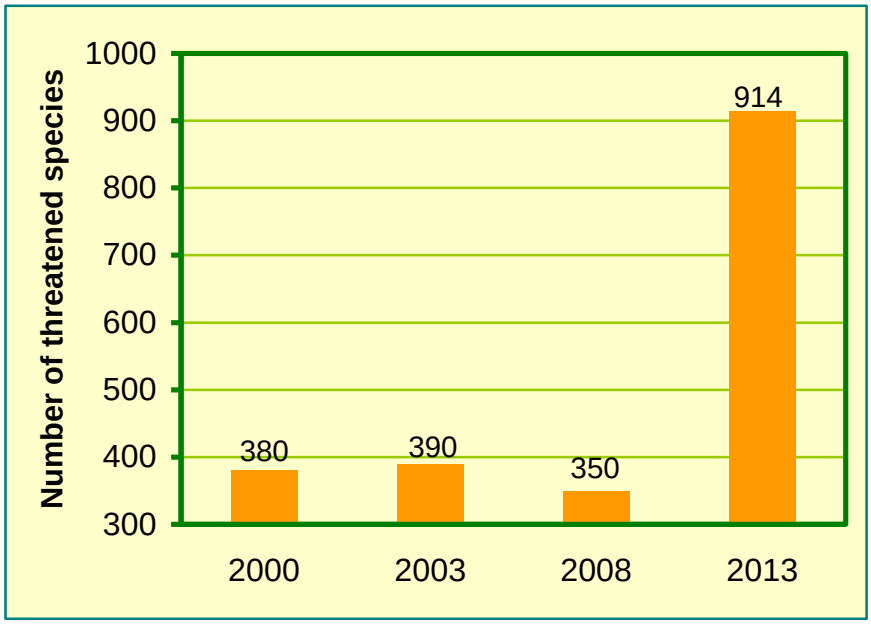

Figure 7: Trend of threatened species in Tanzania, 2000-2013 (Modified from IUCN RedList, 2013)

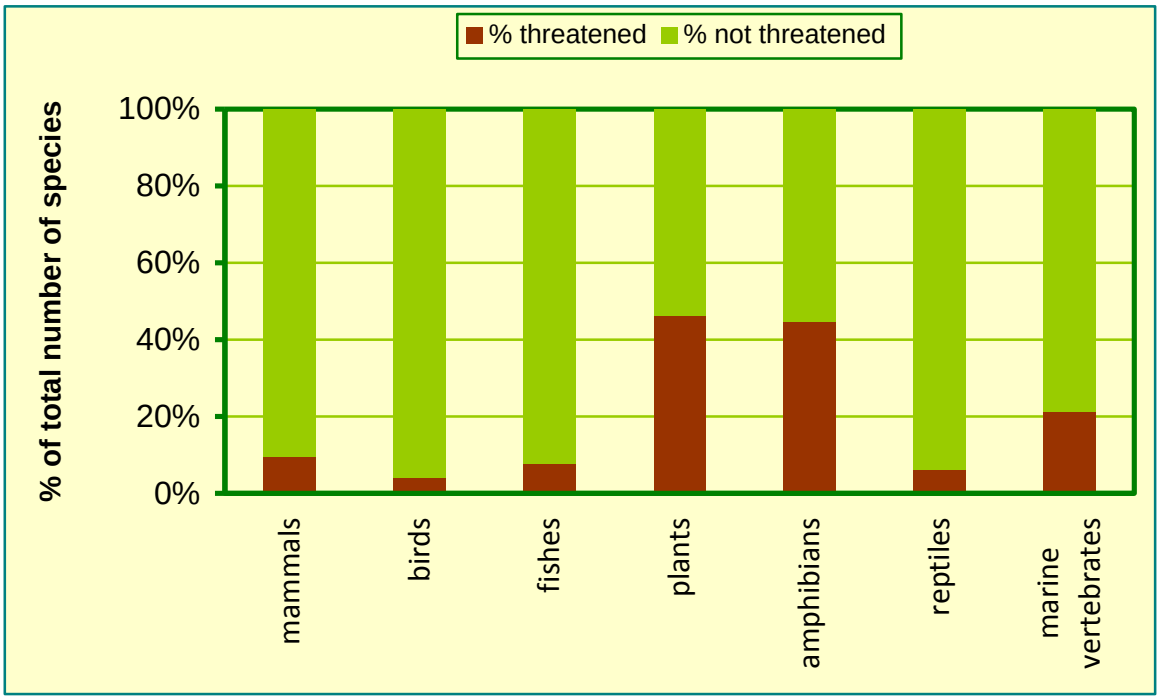

Figure 8: Proportion of threatened species for major taxonomic groups (Source: IUCN Red List, 2013)

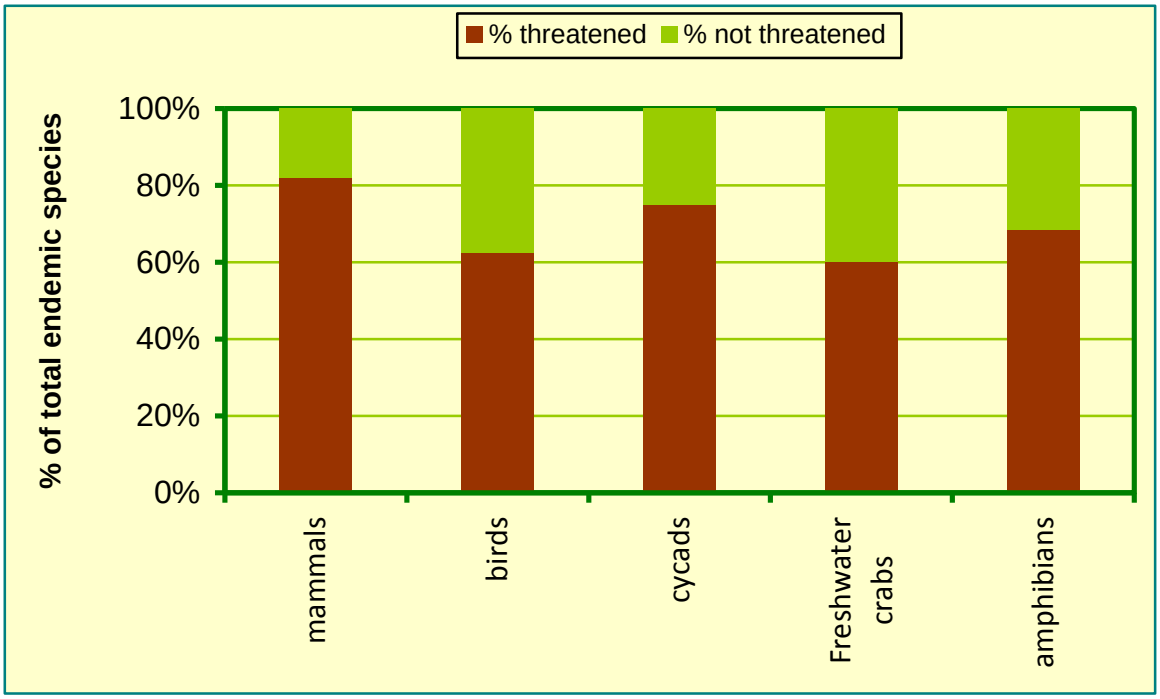

Figure 9: Proportion of threatened endemic species for major taxonomic groups (IUCN Red List, 2013)

Based on analysis of threatened species in the country taking into account ecological, economic and social significance, species of concern include, but not limited to:

- Black Rhinoceros *(Diceros Bicornis)* and elephants *(Loxidonta africana)* which are endangered due to poaching. Other keystone species of critical importance include Chimpanzee *(Pan troglodytes)*, Colobus monkeys (e.g. *Procolobus gordonorum* and *Procolobus kirkii*), Mangabey monkeys (e.g. *Rungwecebus kipunji*, *Cercocebus sanjei*), lion *(Panthera leo)*, leopard *(Panthera pardus)*, cheetah *(Acinonyx jubatus)*, and African wild dog *(Lycaon pictus)*;
- High-value timber Species (e.g. *Afzelia spp, Pterocarpus spp., Diospyros mespiliformis)*
- Some of the marine species including prawns *(Metapenaeus monocerus, Penaeus indicus, P. monodon);* tuna; Dugong and marine turtles

Chimpanzee - in Gombe National Park – is one of the endangered species.

3.3 Genetic Diversity

Landraces and traditional cultivars are used extensively in Tanzania due to the limited acceptance and supply of commercial seed of improved cultivars. Some of the old cultivars still used in crop production include maize cultivars *Katumani* and *UCA (Ukiriguru Composite A)* which were released in the late 1950s and 1966, respectively. It is estimated that currently only 10% of the total cultivated land is planted with certified seeds of improved cultivars, the rest of the area is planted with farm saved seeds of improved cultivars, traditional cultivars and landraces (URT, 2009). A number of threatened species and/or landraces within species were identified, including landraces of staple crops such as maize, finger and pearl millets and yams, and local vegetable species. Indigenous crop species such as *Cordyla africana*, *C. densiflora*, *Strychnos cocculoides*, *S. spinosa*, *Ximenia americana*, members of the family *Orchidaceae*, arrow root *(Tacca pinnatifida)* are in threat of extinction. Species under threat include also those used for medicinal purposes, timber and fuel wood, a number of which are close to extinction due to over harvesting, deforestation and climate change.

A number of indigenous tree species including agro-forestry species have been massively exploited for various uses such as sawn timber, construction and carvings. As a result, these species are threatened with extinction because of their low regeneration rate which include *Milicia excelsa*, *Pterocarpus angolensis, Afzelia quanzensis* and *Dalbergia melanoxylon*.

The country ranks third, in terms of cattle population in Africa, after Sudan and Ethiopia. About 90% of the livestock population is of indigenous types, which are known for their low genetic potential in milk and meat production.

Significant progress has been made in *ex situ* conservation particularly of crops than livestock. A total number of 1,729 crop germplasm are conserved at the National

Plant Genetic Resources Centre (NPGRC) while a total of 4,430 germplasm collected in the country are conserved in international gene banks. More than 95% of the germplasm conserved at the NPGRC are landraces or traditional cultivars while about 3% are materials collected from the wild. In contrary, conservation of animal genetic resources in Tanzania is done at a very limited scale both *in-situ* and *ex-situ*. This has led to some breeds such as *Jiddu* cattle to extinct (MLFD, 2013). In addition, the existence of cattle strains such as *Chagga, Mkalama dun* and *Mpwapwa* are endangered due to their small population.

4.0 Main threats to biodiversity

Despite the biodiversity richness, like many other countries, Tanzania is experiencing increasing threat on biodiversity due to a number of natural and human drivers. The main threat to biodiversity are habitat loss and destruction, over-exploitation of plant and animal species; the introduction of non-native species; pollution and climate change. Human activities such as: poaching; deforestation; bottom trawling in the oceans and unsustainable fishing practices; the damming and dredging of streams, rivers, and lakes; and the draining and degradation of wetlands, estuaries, and mangroves are responsible. These activities are aggregated by economic growth, population growth, poverty, global trade in plant and animal species and climate change.

a) Conversion, loss, degradation and fragmentation of natural habitats

Natural habitats in Tanzania are in serious threat by conversion to other land uses such as settlements, agriculture and grazing. Other serious threats to habitats includes deforestation, coral destruction, habitat degradation due to fires (Figure 10), unplanned land use, unmanaged natural resource extraction, increased bush meat trade and the building of roads and other infrastructures. All these threats build their foundation on the rapidly increasing human population.

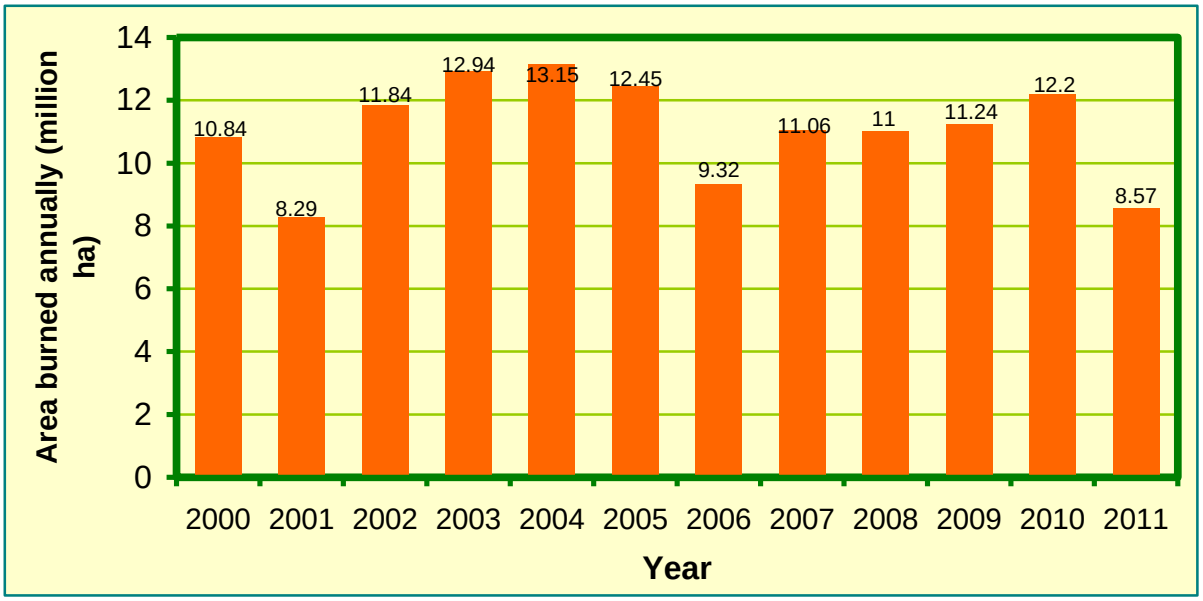

Figure 10: Trend of annually burned area in Tanzania from 2000-2011 (MNRT, 2012)

Terrestrial habitats: Habitat loss is attributed to human pressure that convert the habitats into other land uses. There is an increasing demand for land for crop production to feed the fast growing population both in the rural and urban areas. This goes hand in hand with the increasing demand for grazing land and feeds for the growing number of livestock. The human population increased almost four times from 12.3 mill in 1967 to 44.9 million in 2012 (Figure 11) (URT, 2012a) while the number of cattle and goats between 1961 and 2008 increased almost three times from 8 to 21.3 million and 4.5 to 15.2 million respectively (Figure 12) (URT,2011a).

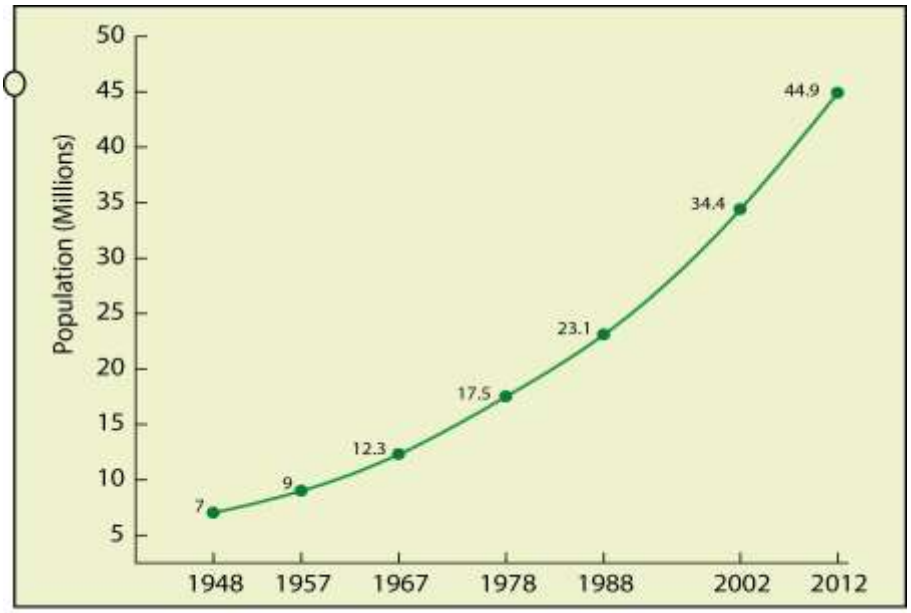

Figure 11: Human population trend (URT, 2012a)

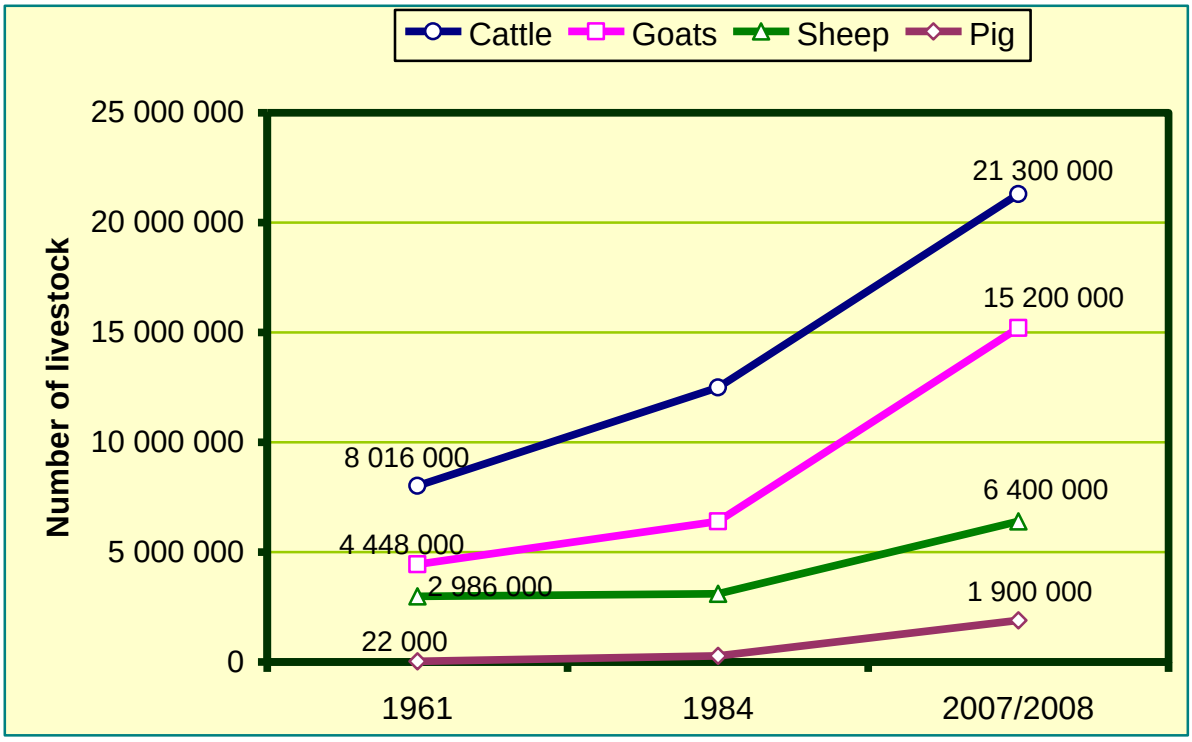

Figure 12: Livestock population trend (URT, 2011a)

Expansion of agricultural and grazing land coupled with unsustainable agricultural practices has fragmented the habitats and hence pose a great threat to the biodiversity. Agricultural expansion has made farmers and livestock to encroach into protected areas creating serious pressure to wildlife resources. In many parts of Tanzania wildlife and forest habitats have been converted into grazing lands and or agricultural lands.

Livestock grazing in degraded area adding pressure to biodiversity

Kalunga Forest is highly degraded due to harvesting of firewood and expansion of agricultural land

One type of habitat which is under very serious threat to loss of biodiversity are the wildlife corridors. Wildlife corridor referred herein, are an unprotected area (an area with no legally protected status, or an Open Area, or a Game Controlled Area)

between two or more protected areas (National Parks, Game Reserves, Forest Reserves, Nature Reserves and the Ngorongoro Conservation Area) through which animals are known or believed to move and are connected by (or can potentially be re-connected by) natural vegetation such as forest or grassland (TAWIRI, 2009). Wildlife corridors face an intense pressure of being converted into other land forms. Based on the deterioration status and urgency for conservation measures the wildlife corridors are categorised with respect to estimated time remaining before it loses its ability to support wildlife as a corridor (i.e being closed). The proportion of corridors that are in **extreme** (probably less than 1 year remaining or already closed), **critical** (probably less than 3 years remaining) or **moderate** (less than 20 years remaining) conditions are indicated in Figure 13.

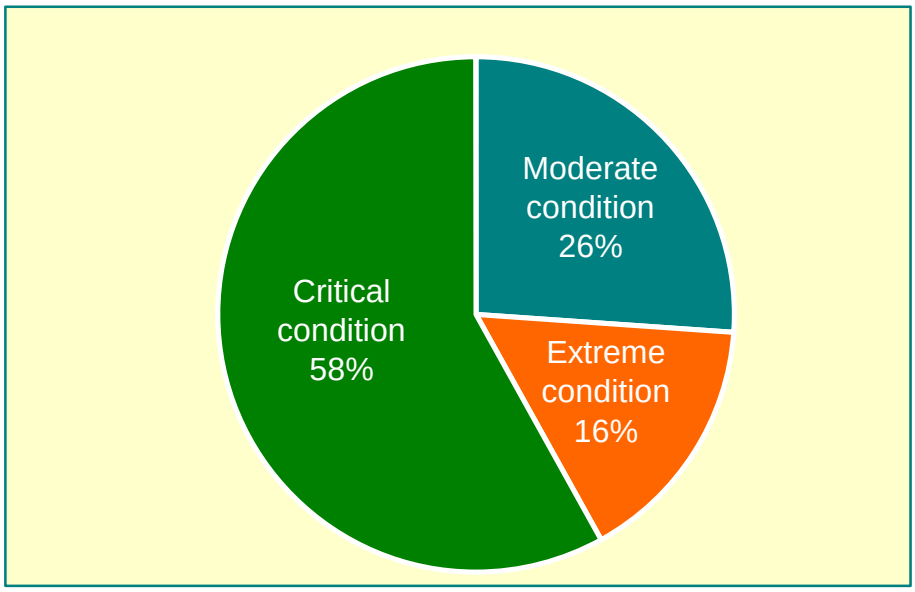

Figure 13: Status of wildlife corridors in the country (Source: modified from TAWIRI, 2009)

Coastal and marine habitats: Habitats in marine ecosystems are facing serious threats due to mangrove destruction, coral destruction, dynamite fishing and illegal fishnets. is one of the escalating problems in the fishing industry in Tanzania. The practice is extremely destructive to the surrounding ecosystem, as the explosion often destroys the underlying habitat (such as coral reefs) that supports the fish. The underwater shock waves produced by the explosion stun the fish, rupturing their swim bladders and causing some fish to float to the surface, being scooped up by waiting nets while many others simply sink to the ocean floor. By far, the use of dynamite is the most destructive for type of fishing practice. Each blast of dynamite instantly kills all fish and most other living organisms within a 15 to 20 meter radius and completely destroys the reef habitat itself within a radius of several meters of the dynamite blast. The damage to the coral reef structures is devastating and in many cases permanent. One blast can lead to killing of fish weighing a total of up to 400 kg.

Illegal small-mesh seine netting in Mafia Island, Tanzania.

Dynamite fisher waiting to collect illegal catch

Inland water habitats: The major threats to freshwater habitats and biodiversity in the country is related to declining water levels due to reduced rainfall and increased evaporation, decline in fish species diversity due to over-exploitation of the fish stocks, illegal fishing, introduction exotic fish and species especially Nile perch and water hyacinth; pollution and eutrophication due to nutrients enrichment especially phosphorus and nitrogen.

b) Over-exploitation of particular species

There has been a growing demand for some plant and animal products, mainly recognised to be of high value. Ivory, horns, game meat and skins are some of the animal products driving to loss of animal biodiversity. There are also markets for some fish, bird and reptile species in various countries. As demand for these species increases, smuggling increases simultaneously, leading to over-utilization and eventually disappearance. Hardwood demand for timber and other uses increases pressure and illegal harvesting of hardwood tree species.

Terrestrial ecosystems

Wildlife: Despite the country's richness in wildlife biodiversity, wildlife is under tremendous pressure from unsustainable exploitation of the animal species . The key species that are under this pressure include the larger carnivores such as lions, leopards, cheetahs, wild dogs and the herbivores group includes population of elephants, Giraffe *(Giraffa camelopardalis)*, zebra *(Equus burchelli)*, buffalo *(Syncerus caffer)*, antelopes, wildebeest *(Connochaetus taurinus)*, and black rhinoceros. Out of these species, rhinocerous and elephants are the most highly endangered due to poaching. For example, elephant population in Selous Game Reserve and Mikumi National Park is decreasing in an alarming rate. Statistics indicates that, elephant numbers had decreased to 43,552 in 2009 from 74,900 in 2006. Studies show that about 54% of elephant deaths in the country are due to poaching, followed by natural factors (27%) and Human-Elephant Conflicts – HEC (9%) (Figure 14). The highest number of elephant death by poaching was in Serengeti National Park (Figure 15). The fast growing trade for ivory in Asian markets has been one of the major reasons for the increasing incidences of elephant poaching in Tanzania. Recent DNA tests for jewellery and ornaments in Asia showed that about 50% of tusks tested came from Tanzania (TANAPA, 2011).

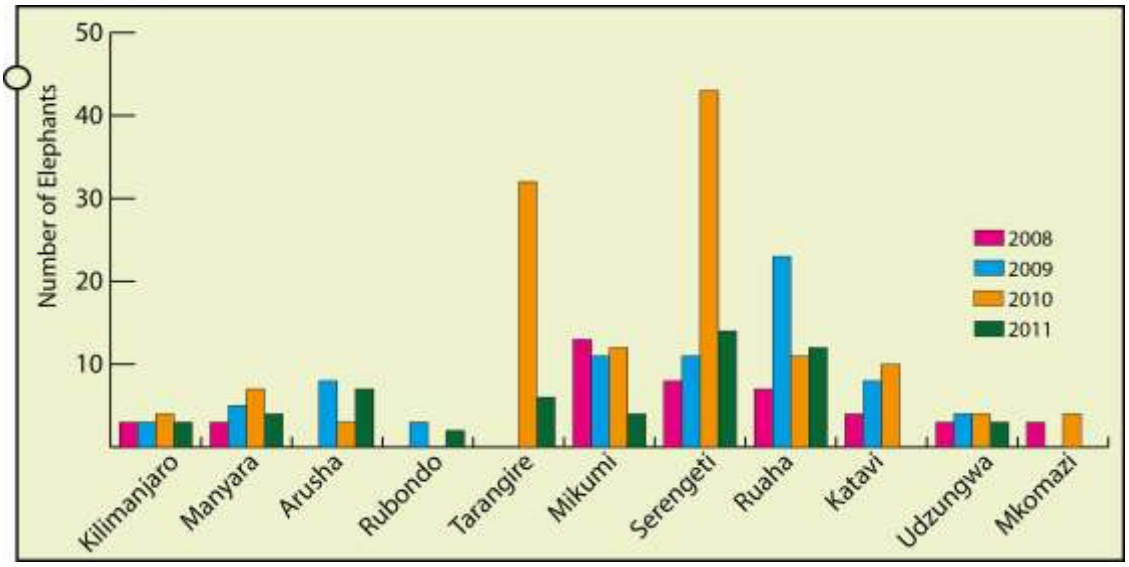

Figure 14: Elephants death in Tanzania national parks 2008-2011 (Source: Kiwango, 2011)

According to TAWIRI (2011), Tanzania loses about 10,000 elephants annually at an alarming rate of 12.5%, which is far greater than replacement through reproduction. At this rate, if mitigation measures are not taken, the last of the country's elephant will be shot out in 10 years. Among the causes of elephant death, poaching is the leading and is done brutally by using heavy weapons (Figure 15).

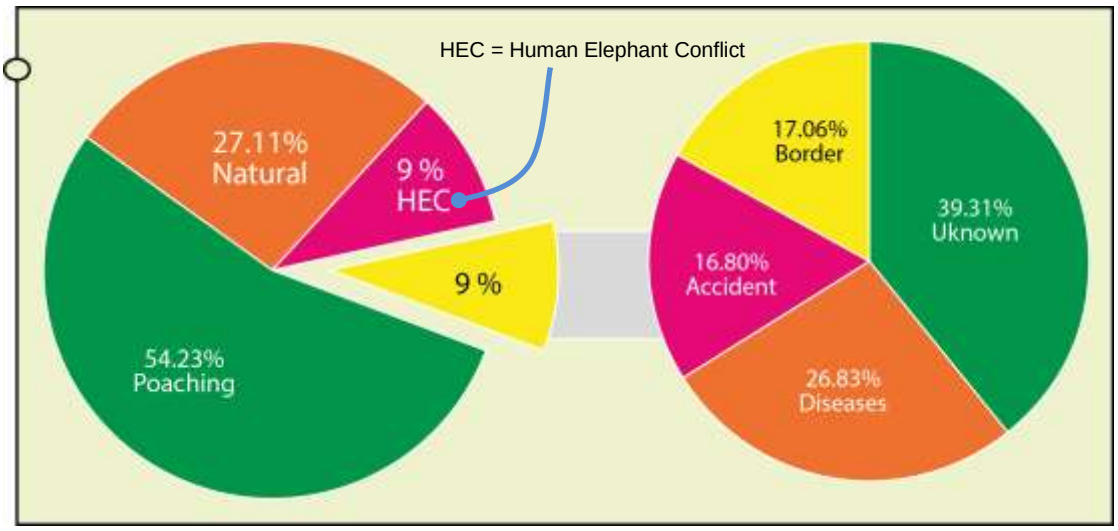

Figure 15: Causes (%) of elephant deaths inside the National Parks (Source: Modified from Kiwango, 2011)

Wildlife poaching for meat is also a widespread problem affecting many ecosystems. Recent studies showed an average of 2,078 tons of illegal bush meat is being confiscated yearly. In Serengeti National Park alone, 82,000 kg of wildlife meat is consumed per week and total of 43,618 wildebeests are hunted per year. An

average of 1500 culprits is arrested every year for poaching with an average of 50 snares for every poacher entering in the park.

Forest: Despite the fact that a considerable area of land in Tanzania is protected, forest resources are encountering tremendous pressure due inadequate alternative sources of energy for cooking and lighting, and land for cultivation, timber, and production of charcoal. Significant area of forests is destructed every year to meet the demand of fuel wood (charcoal and firewood) and timber. There is a decreasing trend in net forest cover as a result of increasing forest clearance to meet this demand.

Illegal hardwood timber confiscated in Uvinza

Charcoal in a whole sale market along one of the major highways

Inadequate access to modern medicine, for various reasons has contributed towards the use of traditional medicines mainly from plant origin. This has lead to over utilization of some plants for medicinal purposes. *Carissa spinarum* (Murigariga) is an example of one of the medicinal plant species facing a tremendous pressure due to its high demand. For example, in August, 2010, tens of thousands of people visited Samunge Village in Loliondo Division Arusha Region to receive treatment from a herbal drink extracted from a plant locally known as Murigariga *(Carissa spinarum/edulis)*. In this case, to supply the tens of thousands of people who visited Samunge village with the drink, a huge amount of the plant had to be harvested.

Coastal and marine ecosystem: Coastal and marine ecosystem is under constant threat attributed to unsustainable use of the resources. Environmental degradation, as well as a decline in aquatic natural resources and biodiversity, are becoming more obvious. This is evidenced by declining yields of fish, deteriorating conditions of coral reefs, and continuing reduction in area coverage for mangroves and coastal forests.

Inland water ecosystems: In Lake Victoria, for example, there is a serious decline in fish stock due to overexploitation. In 2011, the total available stock of Nile perch in Tanzania part of Lake Victoria was estimated at 165,439 tonnes while the annual quantity of removal of Nile perch is estimated to be 101,298 tonnes (URT, 2013b). The overexploitation is a result of high demand of the boom of fish factories and

increase of market forces for Nile perch. Fish species in Lake Victoria population is likewise affected by illegal fishing, overexploitation, and introduction of Nile perch and water hyacinth. About 56 native species in the Tanzania side of Lake Victoria are considered extinct (Figure 16). Illegal fishing in lake Victoria increasing, for example in financial year 2010/2011 and 2011/2012 the use of different types of illegal gears in Lake Victoria, increased from 6,415 to 146, 657 respectively. The use of Beach seines specifically had an acute increment of 368% from 394 to 145,302.

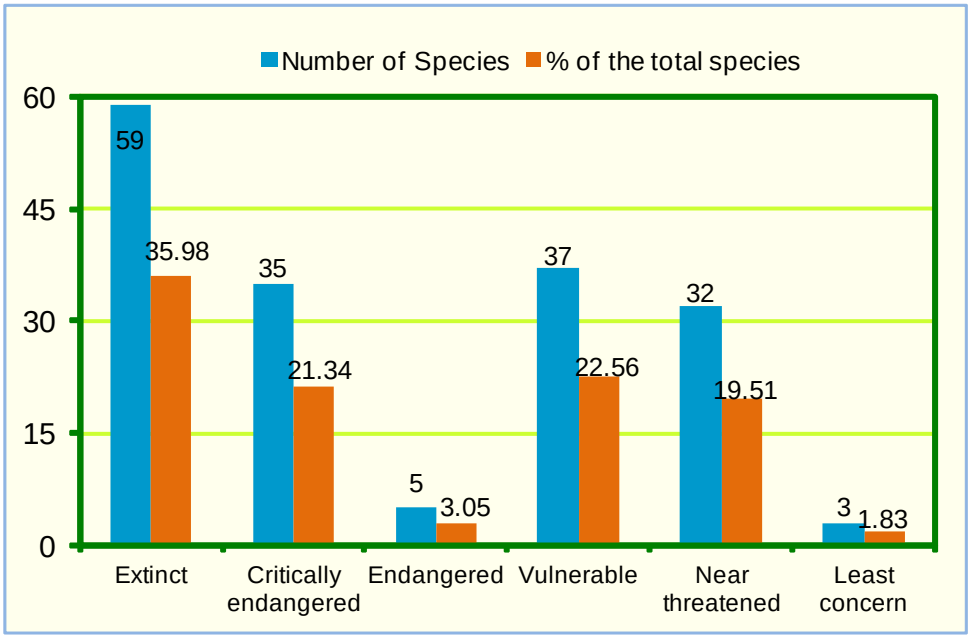

Figure 16: Proportion of threatened species in Lake Victoria (Source: modified from URT, 2013b)

c) Invasive non-native species that harm native ecosystems or species

Tanzania has 67 reported Invasive Alien Species (IAS) of different categories including plant pathogens, pests, aquatic and terrestrial weeds, animals and trees (URT, 2014), the occurrence of the IAS has severe effect to the habitat and native species through replacement of the native species and colonizing and hence degrading the habitats.

Terrestrial habitat: Protected areas or reserves constitute about 40% of the land area in the country. Several invasive species, mostly trees and weeds, have been observed in protected areas, including *Datura stramonium* and *Argemone mexicana (Mexican poppy)* (URT, 2014). These IAS have the colonized grazing lands, displace some palatable plant species and impede free movement of wildlife and hence severely degrade wildlife habitats. In forest ecosystem various IAS exists mostly trees and shrubs, including *Maesopsis eminii, Cedrella odorata* and *Senna spectabilis*. For instance, in Kimboza Catchment Forest (Morogoro Region), *Cedrella odorata* has colonized a large part of the forest, crowding out native species and almost replacing the indigenous tree species. Similarly, Amani Nature Reserve is threatened by more than 10 other IAS.

Inland water habitat: The introduction of the Nile Perch *(Lates niloticus)* in Lake Victoria is believed to have led to the disappearance of several indigenous *cichlid* species mainly of *haplochromines* (LVEMP, 2005). The introduced tilapiine species particularly *Oreochromis niloticus* and *O. leucostictus* eliminated the native tilapiine species as a result of trophic interactions. Initially, Nile perch population increased very gradually in the Kenyan, Ugandan and Tanzanian waters of Lake Victoria. The fishery exploded at different times in each country between mid 1970's and mid 1980's. Being a arnivorous fish, the Nile perch made the smaller native fish its prey. As the population of the Nile perch grew, the populations of the other species plummeted. The Nile perch quickly ascended to become the dominant species in the lake by a wide margin.

A massive decline in the diversity and abundance of *haplochromines* in the lake was demonstrated by the HEST (*Haplochromine Survey Team*) in Mwanza Gulf and linked to the establishment of the Nile perch in the gulf. It is estimated that about 200 species of *haplochromines* in Lake Victoria were decimated through predation by Nile perch. Presence of the predator in the lake seriously affected the diversity and abundance of other native fishes. Though still present in some satellite lakes in the Lake Victoria basin where Nile perch is absent, *O. esculentus* virtually disappeared from the main lake. Riverine native fishes such as *L. victorianus*, *B. dockmac*, *B. altianalis* and *S. mystus* occur in Lake Victoria only in small populations close to the river inflows and outflows. It is believed that Nile perch drove them from the main lake mainly through competitive exclusion.

The growth of the Nile perch fishery in Lake Victoria has negatively contributed to decimation of a spectacular endemic species flock of haplochromines, whose trophic diversity *(phytoplanktivores, detritivores, zooplanktivores, insectivores, molluscivores, piscivores, egg-eaters, etc.)* contributed to high trophic efficiency and ecological balance in Lake Victoria. Subsequent absence of the *haplochromine* algal grazers in the lake exacerbated the accumulation of phytobiomass. The intense decomposition of the phytobiomass causes serious oxygen deficits in nearshore bays and gulfs such Murchison, Napoleon, Winum and Mwanza, which are some of the most productive zones of Lake Victoria. Competitive displacement of other fishes especially the native predators *(B. docmac, C. gariepinus, B altianalis, P. aethiopicus)* from the lake by Nile perch would have upset the ecological efficiency of the ecosystem even more. It is, therefore, difficult to predict the ecological/evolutionary sustainability of the three species' (Nile tilapia, Nile perch, dagaa) commercial fishery of Lake Victoria.

Water hyacinth has also invaded Lake Victoria starting early 1990's reaching peak at 4,081 ha in March 1998 declining to 117 ha in April 2001 following interventions by the LVEMP (LVEMP, 2001). Until 2010, the coverage of water hyacinth remained in the range of 518 ha on the Tanzanian section of the Lake. The invasion of water hyacinths in the lake is linked to the reduction in fish in the lake through de-oxygenation of water and reduction of nutrients in sheltered bays which are breeding and nursery grounds for fish, particularly tilapia.

Coastal and marine habitat: Ballast water and its associated sediments has been identified as an important route for the introduction of marine invasive alien species.

In Tanzania, a total of 5 introduced species and 3 cryptogenic species have been recorded (ASCLME, 2012). Of the introduced species, 3 are cultured and have not necessarily formed naturalized populations. These include one oyster species and two macro-algal species. Although these have potential to form wild populations and should be monitored, the more serious concern in Tanzanian waters is the introduction of the Asian Mussel *Musculista senhousia*. No information is currently available on the severity or extent of the invasion, which has potential to severely alter the benthic environments.

d) Environmental pollution or contamination

Many types of human-caused pollution are a threat natural habitats or species. The release of excessive amounts of nitrates and phosphates from sewage and agricultural run-off; persistent organic pollutants; pharmaceuticals used for people and in livestock production that are toxic to wildlife; heavy metals; herbicides and pesticides; and plastics are evident. The main sources of freshwater pollution are sedimentation, agricultural runoff, domestic and industrial effluents.

Eutrophication is one of the most prevalent phenomena in Tanzania whereby lakes and river waters have become increasingly rich in plant biomass as a result of the enhanced input of plant nutrients mainly nitrogen and phosphorus.

Improper use of pesticides in agriculture is a serious emerging problem for species survival and water quality in freshwater bodies. Pollutants from mining and industrial activities (such as lead, cadmium, iron and copper), spillage of oil due to marine accidents and leakage from reservoir tanks and organic wastes from leaking sewage systems, can accumulate in rivers and other freshwater bodies and affect water quality and species survival. waste disposal in natural habitat like fresh and sea water, contaminates the habitats and harms the inhabitant species.

e) Climate change

Severe droughts as a consequence of climate change has exerted pressure on biodiversity and ecosystems. Frequent and severe prolonged droughts experienced in country has lead to drying of water bodies like rivers, charco dams, dams, lakes and wetlands, consequently contributing to the loss of biodiversity in such areas. Loss of wildlife and livestock grazing land and shrinkage of water body habitats for animals has also been the case.

Terrestrial habitat

Wildlife: The impact of climate change on large mammals population and distribution pattern is evident in national parks and other protected areas. This impact is most evident in Katavi National Park where during the dry seasons large mammals especially hippopotamus, crocodiles, buffalos and elephants crowd in few remaining water ponds along Katuma River. In dry season of 2010 for example, a total count of about 880 hippopotamus were observed in a small Sitalike pool of about 600 m^2. This serious shortage of water causes considerable competition among water dwellers like hippopotamus, crocodiles and between water dwellers and other

animals causing considerable hippopotamus and buffalo mortalities (Figure 17). By altering wildlife distribution patterns, climate change has brought some species into conflict with human activities, particularly amongst migratory species, which use a network of sites, and may constrain their ability to adapt to changes. Conversely, anthropogenic factors are likely to exacerbate the impacts of climate change on wildlife, e.g. increased water abstraction for rice irrigation upstream Katuma River has already contributed significantly to water shortage for wild animals in Katavi National Park (Elisa *et al*, 2011).

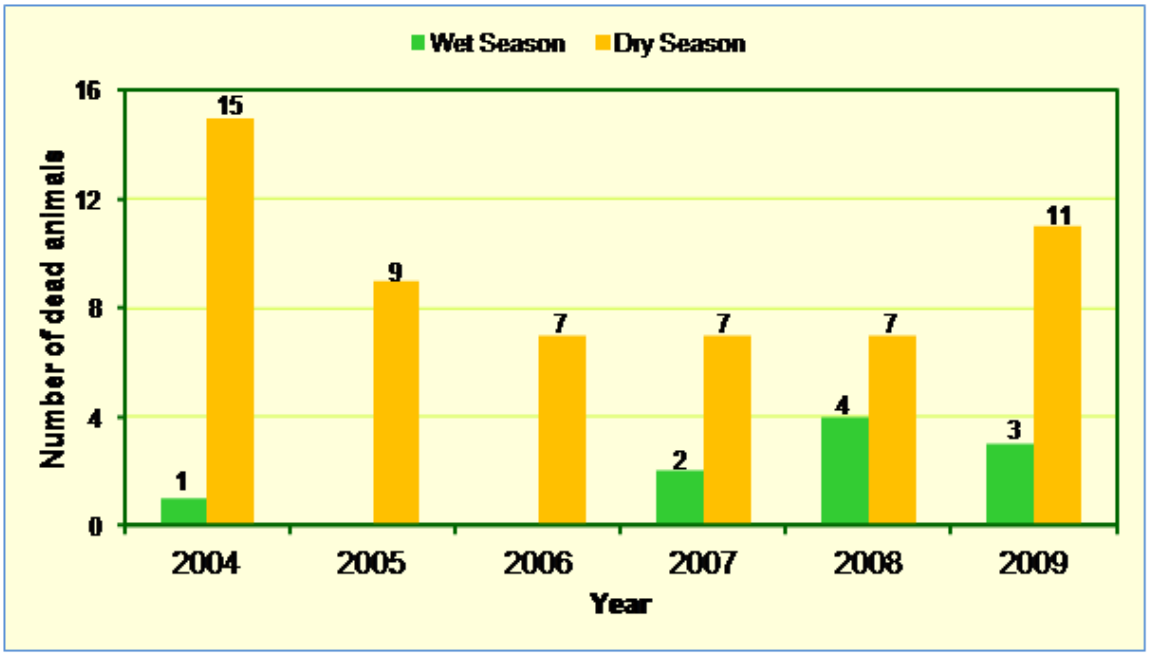

Figure 17: Comparison of number of dead animals counted along Katuma River between dry and wet seasons (Source: Elisa *et al*, 2011)

Forest: In some cases forests has been transformed from their natural states to other forms. For example, subtropical dry forests and subtropical moist forests life zone change to tropical very dry forests, tropical dry forest and tropical moist forest and subtropical thorny woodland (*Acacia-Commiphora* woodlands). Severe and recurrent drought as a result of climate change can result in destruction of forests and forest resources. Due to climate change effects, pastoralists and farmers are forced to migrate into virgin forests and other lands.

Inland water habitat: There has been a 68 percent decrease in dry season flow in Mara River since 1972 suggesting possible collapse of the herbivore population dependent on water from Mara River in the Serengeti Ecosystem (URT, 2014). It is reported that annual flows in the Kilombero/Rufiji Rivers have decreased by 8 percent while water levels of Lake Victoria, Lake Tanganyika, Lake Manyara and Lake Jipe have been reported to drop in recent years. The impacts of the variability in flow are diverse including floods in basins that experience increase in runoff. For example, the 2010 floods in Kilosa and other parts of the country. In areas with a decrease in flow, there has been an alteration in availability of water for various uses, resulting into water-use conflicts.

Coastal and marine habitat: The coastal and marine environment is characterized by a wide diversity of habitats including coral reefs, seagrass beds and mangrove forests, which support a wide spectrum of biodiversity. These habitats help to buffer strong waves which in turn help to control the erosion of the coast. Coastal erosion is one of the major problems currently facing Tanzania. Several factors, including sea level rise, geology, and rapid coastal population growth accompanied by rapid increase of human activities that interfere with natural processes, have been linked to the problem. On other hand, coral reefs are highly vulnerable to climate change induced stresses that have led to substantial coral mortality over large spatial scales. Such climate change impacts have the potential to lead to declines in marine fish production and compromise the livelihoods of fisheries dependent communities. In addition, sea water intrusion into freshwater wells has been experienced especially in coastal areas due to sea level rise which is associated with climate change. Such areas include Bagamoyo, Pangani and Zanzibar.

5.0 Impacts of changes in biodiversity

a) Loss of ecosystem goods and services

The goods and services biodiversity provides are vital to sustaining well-being, and to future economic and social development. The benefits provided by biodiversity among others include food, water, timber, air purification, soil formation and pollination. Loss of biodiversity due to human activities results in altered capacity of healthy ecosystems to deliver this wide range of goods and services including food, fuelwood, water, timber and stabilization of climate.

b) Increased conservation costs

The increase in poaching incidences has forced the government to incur enormous amounts of funds in recent years to address this problem. In its efforts to combat the escalating poaching problem, in 2013 the Government launched a special anti-poaching operation known as "*Operesheni Tokomeza Ujangili*" to crack down on poachers, dealers and traders in ivory and other elephant products. In this operation, a number of players were involved including the defence forces, police, game rangers and Local Government Authorities.

c) Economic loss

Deforestation (particularly in watersheds and water sources), has further knock-on effects due to reduced water flows and subsequent interrupted power generation in hydroelectric schemes such as Mtera and Kihansi. In 2006, it was estimated that the economic costs associated with unreliable power supply amounted to about US$ 330 million representing about 2% of GDP, with increasing trend of water shortage in the dams the cost might be increasing (URT, 2014).

Impacts due to deterioration of aquatic systems in freshwater, coastal and marine, or wetlands, include decrease in productivity, reduction in fish yields and biodiversity, water shortage and increase in potential health risks such as vector-borne diseases. Studies quantifying the overall value of such losses countrywide are limited.

However, these losses can be inferred from the figures, which highlight the services provided by wetlands. Available data indicate that at some localities e.g. Nyumba ya Mungu, 92% to 95% of the households derive their income and food from the wetland resources (URT, 2014). Considering the rate of degradation of aquatic systems in Tanzania, it is convincing that both economic and ecological values of most of these systems will be or has already been reduced, with subsequent effect on livelihoods of local communities and their environment. Loss or degradation of the aquatic systems may imply high costs to the people in obtaining the goods and/or services that might be lost.

d) Human-animal conflict

Conflict between humans and wildlife is an increasing problem that can be attributed to human encroachment into wildlife habitat and prolonged drought forcing wildlife to move out of their habitat in search of water and grazing land. It often leads to human mortality and injuries, damage to crops and livelihoods and to negative attitudes towards wildlife. Although the most serious damage to crops and food supplies is caused by insects, rodents, birds, primates and wild pigs, most concern focuses on the larger species such as elephants, buffalo, Hippopotamus, Nile crocodile and larger carnivores, whose actions are often much more dramatic and potentially injurious to humans. Of these, the African Elephant is perceived as the most serious cause of human-wildlife conflict. For example, by the end of 2009, records show that elephants killed approximately 40–50 people every year and further injured 30-40 people each year across the country (TAWIRI, 2010) (Figure 18).

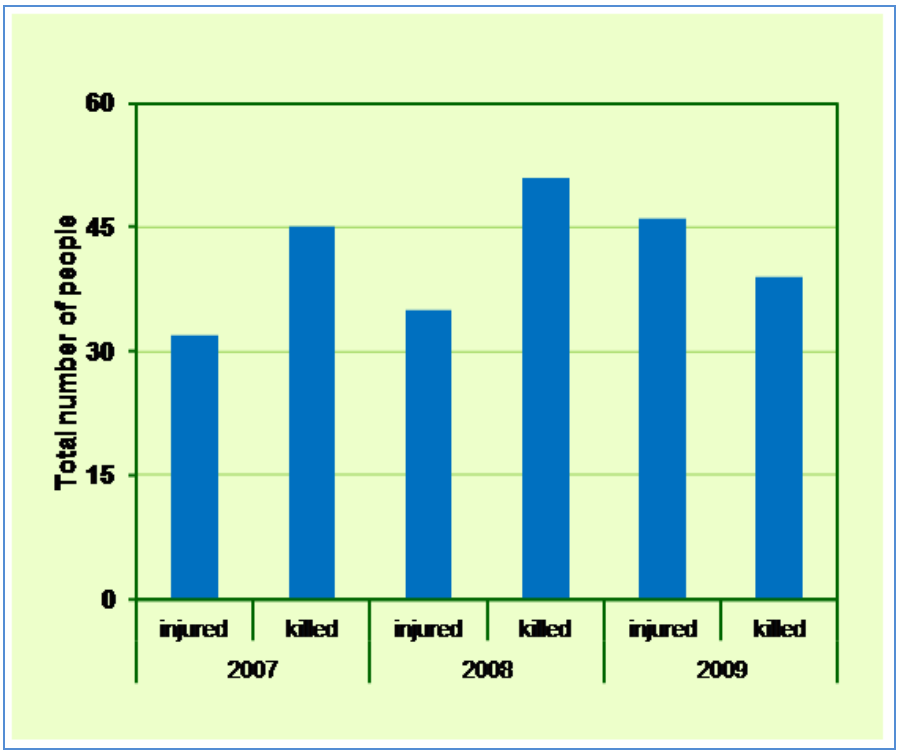

Figure 18: Reported human mortality and injuries caused by elephants, 2007-2009 as a result of human-elephant conflict (Source: TAWIRI, 2010).

PART II: THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY

6.0 National biodiversity targets

The initial NBSAP was developed in 2001, almost 10 years earlier than the Aichi Biodiversity Targets of the Strategic Plan for Biodiversity (2011-2020), and therefore lags behind in terms of addressing and integrating emerging biodiversity issues at both national and international levels. At the time of preparing this 5th National Report, Tanzania was in the process of revising the NBSAP (2001), which is expected to be completed by the end of August 2014. Consequently, the revised NBSAP is expected to review, set and update national biodiversity targets. However, in implementation of specific Programme of Work and sectoral policies and plans, the Government has set some national targets which are in line with the 2020 Aichi Targets as indicated in Table 3.

Table 3: National biodiversity targets of relevance to the Aichi Targets

Aichi Target	National target	Source
Target 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 landscapes and seascapes.	Increase area covered by marine protected areas from 6.5% (2011) to 10% by 2020	Action Plan for Implementing the Convention of Biological Diversity's Programme of Work on Protected Areas (2014)

7.0 Updating of the National Biodiversity Strategy and Action Plan

The updated NBSAP will take into account the fact that Tanzania is extremely rich in terms of biodiversity while majority of her population lives in poverty. Consequently, biodiversity provides considerable benefits to a significant proportion of the population and to the national economy and therefore needs to be conserved and managed judicially to ensure that these benefits can be maintained and distributed fairly. The updated Strategy will also be guided by the Aichi Targets of the Strategic Plan for Biodiversity (2011-2020) in setting national targets, priorities and objectives. In order to ensure meaningful and effective biodiversity conservation, the revised NBSAP will emphasize on mainstreaming and integrating biodiversity conservation priorities into relevant national policies and strategies. This is of utmost importance

to help recognize and account the full value of biodiversity across relevant sectors such as agriculture, fisheries, forestry, tourism, wildlife and mining. The updated NBSAP will rely on vast experience and success of the country over the years in mainstreaming environmental issues into national development policies and strategies.

Identification of national targets will be done by a diverse of stakeholders through consultations. The aim is to ensure that the proposed national targets can be achieved within the Government capacity.

8.0 Actions Taken to Implement the Convention and Related Outcomes

8.1 Initiatives undertaken

Tanzania is committed to and has taken a number of measures towards conservation of biological diversity. These measures are guided by the National Environmental Policy (1997) and the Environmental Management Act (2004) complemented by sectoral policies and legislation as well as Multilateral Environmental Agreements (MEAs). These policies, legal and institutional frameworks provide for various development opportunities and challenges to the rural and urban local government authorities. Prior to the preparation of the Fourth Report on the Implementation of CBD (2009), there have been several policies, legislation, strategies and action plans that have been supporting implementation of the Convention in particular conservation of biodiversity. However, there has been new development or progress in further developing policies, legislation and strategies since then. These new initiatives include development and implementation of Agricultural and Livestock Policy, 2013; National Biotechnology Policy, 2010; National Irrigation Policy, 2010; Mineral Policy of Tanzania, 2009; Water Resource Management Act of 2009; Water Supply and Sanitation Act of 2009; Mining Act of 2010; Grazing Land and Animal Feed Resources Act of 2010; Public Health Act of 2009; Wildlife Conservation Act No. 5 of 2009 and Tanzania Development Vision, 2025. Other initiatives and their outcomes include:

a) Institutional reforms and programmes

In order to improve and strengthen forest management, the Government has established a stand-alone agency, the Tanzania Forest Services Agency (TFS), newly established (2010) under The Ministry of Natural Resources and Tourism (MNRT). The new institutional arrangement enables more effective enforcement of policy and legislation on forest management. The Government has initiated the National Forest Resources Monitoring and Assessment (NAFORMA) Programme with the objective of providing key information for informed decision-making in forest management. Key findings of the initial national forest survey were released in 2013. At the time of reporting, the Government was in the process of establishing a standalone wildlife agency to enhance wildlife management. Cognizant of the fact that rural electrification is key to rural development, the Government in 2007 established Rural Energy Agency (REA) in order to promote and facilitate improved

access to modern energy services in rural areas. This initiative, among others, reduces the use of biomass energy and help conserve biodiversity.

b) Designation of protected areas and important bird areas (IBAs)

Wildlife protected areas: Tanzania has gazetted about 34% of the total land areas as wildlife protected areas, with a further 15% of her land area as forest protected area. Consequently, Tanzania has 17% of her land area devoted to wildlife conservation in protected areas where no human settlement is allowed and 18% of its surface area to protected areas where wildlife co-exist with humans.

Marine Protected Areas (MPAs): The MPAs are being promoted to mitigate the drivers of ecosystem change such as overfishing and other anthropogenic impacts on marine resources. However, protection of marine and coastal ecosystems still lags far behind the terrestrial protected area network, although it is growing gradually. Tanzania has a total territorial sea of 32,000 km^2 of which, the gazetted area as Marine Protected Areas (MPAs) is 2,173 km^2 that is about 6.5% of the territorial sea. These include three marine parks (Mafia Island Marine Park; Mnazi Bay and Ruvuma Estuary Marine Park; and Tanga Coelacanth Marine Park) and fifteen (15) marine reserves in Tanzania Mainland and three marine parks in Zanzibar (Menai Bay Conservation Area, Mnemba Island Marine Conservation Area and Pemba Channel Conservation Area).

Important Bird Areas (IBAs): Tanzania has a total of 77 Important Bird Areas (IBAs) covering a total of more than 168,000 km^2 or about 18% of the total land area with sites varying in size from 3 hectares to 5 million hectares. Out of the total IBAs, 65% are in protected areas, only 5% have part of their areas protected while the remaining 30% have no legal protection. Seven IBAs have been designated along the coastal zone. Despite their biodiversity value, many IBAs are threatened by habitat loss and lack of legal protection.

c) Participatory resource management

Participatory Forest Management (PFM): The Government has been promoting participation of local communities in forest management through Joint Forest Management (JFM) and Community Based Forest Management (CBFM). In addition, 2,328 villages, about 22% of all villages in the country are engaged in Participatory Forest Management. Through this, 4,122,500 hectares which is about 12% of all forests in the country have been managed. The Government has established 1,687 "*Malihai* clubs" in primary and secondary schools to provide opportunities for schools to participate in environmental conservation and awareness creation on the importance of conservation to the community. A number of PFM studies have reported improved forest regeneration, biodiversity, forest growth and well-being of community members.

Wildlife Management Areas (WMAs): Wildlife conservation has improved and the Government has successfully established 33 Wildlife Management Areas (WMAs) covering more than 30,000 km^2 (or about 8% of the wildlife protected area) involving about 300 villages.

Beach Management Units (BMUs): The Government has continued management measures on the coast and lake shore using patrol units and BMUs. Guidelines for Beach management units have been developed and by 2013, a total of 739 BMUs were established. BMUs have been very active and beneficial in terms of managing aquatic resources.

d) Tree planting campaign

The country continue to plant trees, under tree planting Campaign. According to the Strategy for Urgent Actions on Land Degradation and Water Catchments (2006), each District is supposed to plant not less than 1.5 million trees. However, some districts have set their own targets depending on their Action Plan. There are some improvement and increased number of trees planted. Data for tree planting from 2007-2012 indicated that some improvement have made to some districts and some regions (Figure 19(a) and (b)).

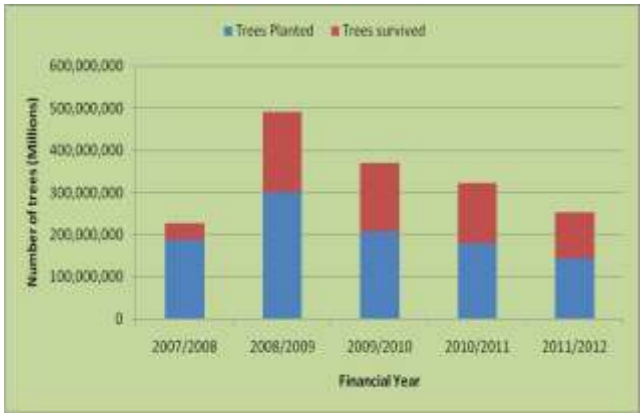

Figure 19a: Number of tees planted 2007 - 2012

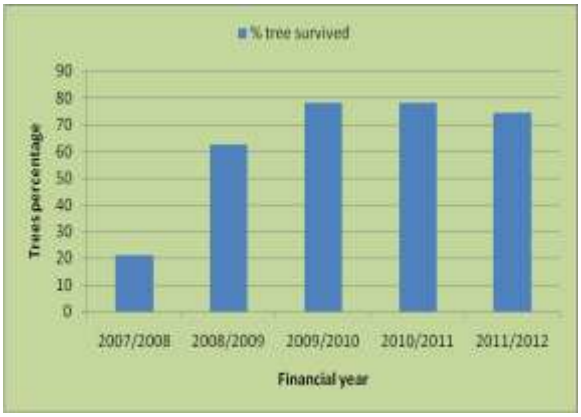

Figure 19b: Percentage of trees survived

e) Energy efficient cooking stoves

In order to reduce overexploitation pressure on forest resources, the Government in collaboration with, private sector, local government authorities, civil societies and Non-Governmental Organizations play an important role towards reduction of fuel wood consumption through production and use of energy efficient firewood and charcoal cooking stoves. Various groups of stakeholders (households, schools, prisons, colleges, hospitals, companies and NGOs) are involved in promotion and production of the stoves and awareness on sustainable charcoal production methods. Emphasis is also put on tree planting campaign including woodlots to reduce dependence on natural forests for firewood and charcoal.

Low cost mud stove for households constructed using clay soil

Energy saving stoves for institutions

f) Alternative sources of energy

Alternative energy sources have been promoted including solar, wind and natural gas to reduce pressure on forest resources. The estimated current installed Photovoltaic (PV) capacity is about 550 kWp with an annual growth rate of about 20%. Currently, a total of 122 MW are being generated in the country using natural gas from Songosongo and Mnazi Bay, accounting for 45% of total thermal power generation connected to the national electricity grid. More than 37 local industries and institutions have switched to natural gas instead of fuel oil which has contributed in reducing indirectly the amount of otherwise undesirable gaseous emissions.

g) Promotion of use of traditional knowledge in biodiversity conservation

Traditional forest management locally known as *ngitiri* in Shinyanga; *alalili* in Masailand; and *milaga* in Dodoma, are now recognized and it plays an important role in the management of forests and woodlands across many parts of Tanzania. These traditional practices involve fallowing the land for a period of time to enable regeneration of vegetation and trees and then being used later for grazing and firewood collection.

h) Waste management

Achievements have been made in waste management in the country. Some of these achievements include improved collection of solid waste in urban areas from an average of about 5% in 1990's to 50% to date and provision of sewerage systems covering about 10% to 15% of the urban population (URT, 2013). In addition, more than 69 industries have been involved in cleaner technology assessments and implemented different options contributing to reduction in emissions and waste as well as rational utilization of resources in terms of utilities and raw materials.

i) Environmental conservation programmes

Various programmes aiming at conserving biodiversity are being implemented in priority ecosystems such as Lake Victoria, Lake Tanganyika and Lower Kihansi as well as in coastal and marine environment. As a result of implementation of these programme, there has been at least improved state of biodiversity in these ecosystems.

j) Environmental strategies

Various strategies have been formulated and are being implemented, among others, is the National Climate Change Strategy (2012) which aims at enabling the country to effectively adapt to climate change and participate in global efforts to mitigate climate change with a view to achieve sustainable development.

8.2 Obstacles to implementation of the Convention

Despite all the policy and measures that have been instituted by the Government to implement the Convention, fully implementation of the Convention is hindered by the following obstacles:

i) Inadequate resources to fully implement obligations of the Convention;
ii) Inadequate resources to conduct comprehensive country biodiversity study;
iii) Inadequate mainstreaming of biodiversity issues in sectors and Local Government plans and budgets;
iv) Limited capacity for research and generation of accurate information and data as well as value of biodiversity;
v) Low level of awareness of the public;
vi) Inadequate participation of communities in biodiversity conservation.

9.0 Mainstreaming biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes

Tanzania is making various effort to conserve biodiversity by integrating into various national, sectoral and cross-sectoral policies, plans and programmes.

9.1 Institutional set up for environmental management

In order to strengthen mainstreaming of environmental issues into sectoral activities the Government has established Environmental Coordination Units in all Sector Ministries and designated Environmental Management Officers in Local Government Authorities at City, Municipality, District, Township, Ward, Village, Street and Hamlet levels. This set up has been facilitating coordination and communication on environmental management issues including biodiversity across all levels. In addition, the Government has established Special Environmental Police Unit in the Tanzania Police Force in order to strengthen enforcement of relevant laws.

9.2 Mainstreaming of biodiversity in national strategies and plans

a) Tanzania Development Vision (TDV) 2025

The TDV is a long term national development framework with three objectives which are: achieving quality and good life for all; good governance and the rule of law; and building a strong and resilience economy that can effectively withstand global competition. It is envisioned that Tanzania will achieve sustainable semi-industrialized middle market economy by 2025. In order to achieve the objectives of the TDV, biodiversity conservation and sustainable utilization of its components plays a critical role in sustaining national economy and livelihoods since the country is heavily dependent on biodiversity.

b) National Strategy for Growth and Reduction of Poverty (NSGRP)

The National Strategy for Growth and Reduction of Poverty (NSGRP), commonly known as MKUKUTA, is the national development strategy for growth and reduction of poverty. The strategy has been implemented in phase I and phase II covered the period from 2005-2010 and from 2010-2015 respectively. The strategy is implemented by all sectors while integrating biodiversity issues in their plans and budgets to ensures poverty reduction plans and actions follow the sustainable development path. One of the goals of MKUKUTA II is to achieve environmental sustainability. The strategy is focusing at production of various food crops, livestock and sustainable fishing. The strategy require the sustainable management of forests for improved governance, livelihood and forests conditions. It also stress on resilience of forests ecosystems and trees outside forest and more efficiency use of wood resources.

c) National Environmental Action Plan (NEAP) (2013)

Mainstreaming environmental concerns into development policies, plans and strategies is one of priorities in Tanzanian's sustainable development agenda. One of the mainstreaming efforts has been the preparation of National Environmental Action Plan (NEAP), 2013-2018. NEAP, among others, provides for framework of stakeholders involvement in environmental management with specific priority actions to be undertaken for conservation of biodiversity.

9.3 Mainstreaming of biodiversity in various sectors

a) Development and implementation of Sectoral Environmental Action Plans (SEAPs)

The Government supported development of Sectoral Environmental Action Plans (SEAPs) as part of mainstreaming of environment and biodiversity into sectoral plans and strategies in selected Ministries. These include Ministry of Health and Social Welfare; Ministry of Agriculture, Food Security and Cooperatives; Ministry of Water; Ministry of Works; and Ministry of Energy and Minerals.

b) Education and Higher Learning Institutions

The national education curriculum has integrated biodiversity knowledge in the teaching and learning processes. Biodiversity concept is being taught in various subjects from pre-schools to the higher learning institutions.

c) Forestry Sector

The National Forest Policy (1998) emphasizes on biodiversity conservation; describes the importance of forest ecosystems for maintaining biodiversity and the threats to biodiversity. The Government has various initiatives targeting conservation of forest resources including Joint Forest Management (JFM) and Community Based Forest Management (CBFM) in which local communities has been participating in forest management.

d) Tourism Sector

The National Tourism Policy, 1999 calls for sustainable tourism and tourism development that does not conflict with indigenous forests, beaches, mountains and other important types of vegetation. The Government is also promoting eco-tourism to sustain biodiversity in areas of tourist attractions.

e) Wildlife Sector

The Wildlife Policy, 2007 aims at wildlife protection and conservation to ensure sustainability of wildlife ecosystems; establishment and maintenance of Protected Areas (PA) and development of a PA network in order to enhance biological

diversity; and conservation of wildlife and its habitats outside the core areas by establishing Wildlife Management Areas (WMAs); and conservation of wetlands.

f) Energy Sector

The National Energy Policy, 2003 stresses the use of renewable and alternative energy sources such as wind, solar, hydro, Liquefied Petroleum Gas (LPG) and natural gas. The use of alternative energy sources such as biogas and briquettes both for domestic and industrial uses are encouraged to minimize the use of charcoal and firewood to protect massive deforestation.

g) Fisheries Sector

The National Fisheries Sector Policy and Strategy Statement, 1997 focuses on the promotion of sustainable exploitation, utilization and marketing of fish resources to provide food, income, employment and foreign exchange earnings and effective protection of the aquatic environment. The Government is also implementing Fisheries Sector Development Programme (FSDP) to ensure sustainable fisheries resources management and conservation of biodiversity.

h) Livestock Sector

The Livestock Development Policy, 2006 calls for promotion of integrated and sustainable use and management of natural resources related to livestock production in order to achieve environmental sustainability. The policy further promote proper land use planning for livestock production.

i) Agriculture Sector

The National Agriculture Policy, 2012 emphasizes that the natural resources (land, soil, water and forests) must be managed so that agriculture is sustained. It also advocates for measures that will minimize encroachment in public lands including forests, woodlands, wetlands and pasture; promote agro-forestry and organic farming; and intensify plant genetic conservation programmes.

j) Mining Sector

Mining legislation requires the mining operators that deforestation is mitigated through progressive rehabilitation programmes conducted during mine operation which include land reclamation, tree planting in reclaimed areas as well as defined closure measures.

k) Construction Sector

The sector prepared a number of guidelines and regulations which, among others, are meant to address biodiversity conservation. These include Road Sector Environmental, Assessment and Management Guidelines (2011); Environmental Code of Practice for Road Works (2009); Road Sector Environmental Protection Regulations (2009); and Five Years Sector Environmental Action Plan (2011-2016).

In addition, a total of 800 road engineers, technicians and other stakeholders were trained on Environment Assessment and Management.

l) Transport Sector

The sector carried out Strategic Environmental Assessment (SEA) for the Comprehensive Transport and Trade System Development Master Plan in 2014. It has also prepared Railway Environmental Management Guidelines and Civil Aviation Environmental Management Regulations and Guidelines. Public awareness is also carried out through different pathways including Exhibition of World Maritime Day and other relevant national commemorations.

9.4 Mainstreaming of biodiversity in various cross-cutting sectors

a) Science and Technology

The Science and Technology Policy, 1996 singles out the following subjects for inclusion in the national curriculum: the study and prediction of climatic and global change as a result of human activity on the environment; environmental pollution including water and air pollution with the disposal of toxic and radioactive wastes; disaster management; energy conservation; environmental conservation and enrichment; the effects of chemicals, drugs, pharmaceutical, fertilizers, etc. on biodiversity.

The National Nuclear Technology Policy (2013) addresses issues of environmental protection against the effect of nuclear technology application. On the other hand, the National Research and Development Policy (2010) aims, among others, at minimizing the effects of research undertakings on the environment and promoting research that is beneficial to environment.

b) Business and Industry

This sector consider conservation of biodiversity by advising the government on policies related to environmental management to participate effectively in economic empowerment and biodiversity conservation. The Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA) has formed a committee responsible for promoting integration of environmental issues into company policies and awareness raising of the business community on environmental issues.

9.5 Mainstreaming biodiversity by other players

Non-Government Organizations

These are the group which provide much efforts in the conservation of biodiversity. They are very instrumental in environmental advocacy at community level.

9.6 Mainstreaming biodiversity in relevant programmes

Major programme being implemented in the country have mainstreamed issues of biodiversity conservation. An example of these major programmes are:

i) *Lake Victoria Environmental Management Programme (LVEMP II):*This is a transboundary project designed to achieve two development/global environmental objectives. Firstly, the project is meant to improve collaborative management of transboundary natural resources of Lake Victoria Basin and, secondly, reduce environmental stress in the targeted pollution hotspots and selected degraded sub-catchments as a means of improving the livelihoods of communities who depend on the natural resources of the Basin. The programme has two components relating to biodiversity conservation. These are water shed management and point sources pollution control. Implementation of these components ensures that biodiversity of this important ecosystem is being conserved.

ii) *Lake Tanganyika Integrated Management Project:* The aim of this project is to produce an effective and sustainable management system for managing and conserving the biodiversity of Lake Tanganyika and its basin. Biodiversity issues have been mainstreamed in this programme through interventions related to catchment management and pollution control through waste water management.

In addition, to that, sectors are also implementing various programmes that are of relevance to conservation of biodiversity.

10.0 Implementation of the National Biodiversity Strategy and Action Plan (NBSAP)

Being a Party to the CBD, Tanzania among other things, has the obligation to develop and implement relevant national strategies, action plans and programmes for the conservation and sustainable utilisation of its biological resources; and integration of these into relevant sectoral or cross-sectoral plans, programmes and policies. Consistently with the Tanzania Development vision 2025, the overall vision which guided the NBSAP is to build a society that values all the biodiversity richness, using it sustainably and equitably, while taking the responsibility for actions that meet both the competing requirements of the present and the legitimate claims of the future generations. The NBSAP was formulated taking into consideration the country's dependency on the biodiversity wealth for socioeconomic development and the uniqueness of Tanzania's biological wealth worldwide.

Since its formulation the country has put in place various measures to implement the Strategy. The measures instituted to implement the Strategy ranges from establishment of policy and legal framework to implementation of specific plans and programmes all geared towards conservation and sustainable use of the country's biodiversity in the context of NBSAP. The NBSAP had three components namely Aquatic Biodiversity, Terrestrial biodiversity and agro-biodiversity. Table 4 is an account on the implementation of priority actions for each component.

Table 4: Implementation status of the National Biodiversity Strategy and Action Plan (2001)

Biodiversity Component	Priority actions	Implementation status (2009-2014)
1. Aquatic biodiversity	1.1 Develop a National Integrated Coastal Management Strategy	Reported in the Fourth National Report
	1.2 Develop contingency measure for management and containment of environmental adverse impacts to aquatic resources	• Preparation of the Marine Contingency Plan is in progress • Coastal/marine sensitivity maps was prepared and identified appropriate and safe ships navigational routes
	1.3 Establish Regional fisheries management bodies for the Great Lakes.	Reported in the Fourth National Report
	1.4 Establish operational by laws to safeguard conservation and sustainable utilization of aquatic biodiversity.	A number of District by-laws have been prepared under the coordination of Local Government Authorities
	1.5 Develop policy guidelines for Aquaculture/ mariculture and sports fishing.	Reported in the Fourth National Report
	1.6 Review and update the Fisheries legislation - Act. No. 6 of 1970	Regulations on Fisheries Management were developed in 2009
	1.7 Integrate biodiversity conservation in national economic planning	• Biodiversity issues mainstreamed in National Strategy for Growth and Poverty Reduction (NSGRP) (2010-2015) • Establishment of Sector Environmental Coordination Units in all Sector Ministries
	1.8 Establish environmental Legislation	• Various Regulations have been developed – Solid Waste (2009); and Hazardous Waste (2009). Development of Regulations on Wetlands and ABS are in progress • Guidelines on framework for environmental flow assessment development methodologies in Tanzania is in place.
	1.9 Establish national, institutional and regional biodiversity database /information centres.	• Establishment of the National Environmental Information Centre hosted under the National Environment Management Council (NEMC) • Tanzania Checklist of Species which contains scientific names and taxonomic classification of more than 14,000 species was prepared in 2012
	1.10 Integrate biodiversity conservation in	**

Biodiversity Component	Priority actions	Implementation status (2009-2014)
	national economic planning	
	1.11 Establish Environmental Impact Assessment Guidelines for aquatic biodiversity	Reported in the Fourth National Report
	1.12 Monitor and evaluate biodiversity status and trends	• The Second State of the Environment Report, 2014 is being finalized • Dar es Salaam Environment Outlook was prepared in 2011.
	1.13 To enhance research and strengthen research institutions	• National Environmental Research Agenda (NERA) (2008-2013) • Various Research activities are being undertaken by Tanzania Fisheries Research Institute, Institute of Marine Science, University of Dar es Salaam and Sokoine University of Agriculture
2. Terrestrial Biodiversity	2.1 Cooperate with any party including neighbouring countries in the conservation of transboundary ecosystem and migratory species	Cooperative arrangements have been in place through: – East African Community, – Lake Victoria Environmental Management Programme, – Lake Tanganyika Environmental Management Programme – Nile Basin Initiative – Songwe River Basin Developmen Programme – Memorandum of Understanding between United Republic of Tanzania and Government of Kenya on management of Lake Chala and Jipe Ecosystems is in place.
	2.2 Enforce EIA processes proposed developments in Protected Areas in order to minimize potential damage to the protected areas environment	Special Environmental Police Unit was established in the Tanzania Police Force in 2011 for enforcement purposes
	2.3 Review and up-date the existing conservation legislation	• Wildlife Conservation Act was reviewed in 2009 • Water Resources Management Act was reviewed in 2009
	2.4 Issue policy guidelines relevant for implementation of the Biosafety Protocol	• Biosafety Regulations were formulated in 2009 • Various biosafety guidelines and manuals have been prepared and disseminated
	2.5 Add, upgrade and extend Protected Area (PA) Network	• Saanane Island Game Reserve (Mwanza) was upgraded to National Park in 2012
	2.6 Ensure the local communities benefit from living adjacent to PAs	• As of 2014, 38 WMAs have been registered, out of which 18 have been authorized to use wildlife resources • A total of 4.2 million ha of forest are being managed through

Biodiversity Component	Priority actions	Implementation status (2009-2014)
		Participatory Forest Management (PFM) involving about 2,300 villages • Authorities in protected areas have been supporting social services for surrounding communities
3. Agro-biodiversity	3.1 Establish Environmental Units within the Ministry of Agriculture	Sector Environmental Coordination Units has been established and it is operational
	3.2 Review the Agriculture and Livestock Policy to accommodate provisions for conservation and sustainable utilization of agro-biodiversity resources	Livestock Policy (2006) and the National Agriculture Policy (2013) were reviewed
	3.3 Adapt appropriate EIA for agro-biodiversity resources use and conservation	EIA and SEA are being undertaken for agricultural projects and programmes

In addition to details on implementation of NBSAP provided in Table 3, further analysis was carried out to ascertain the extent of implementation of the priority actions identified by NBSAP. A total of 21 priority actions were identified. Each of the priority action was ranked in one of four categories: fully achieved, substantially achieved, achieved to a limited extent and not achieved. The results of analysis of the extent of implementation of NBSAP is shown in Figure 20. The results indicate that in general, 28.6% of the priority actions in the NBSAP (2001) have been fully achieved, 23.8% substantially achieved, 42.9% achieved to a limited extent, and 4.7% not achieved. The highest proportion of priority actions fully achieved and substantially achieved is for aquatic biodiversity component. However, this does not necessarily imply for it being the most successful area in implementing the NBSAP, since there are many activities that have been implemented which were not included at the time of developing the NBSAP.

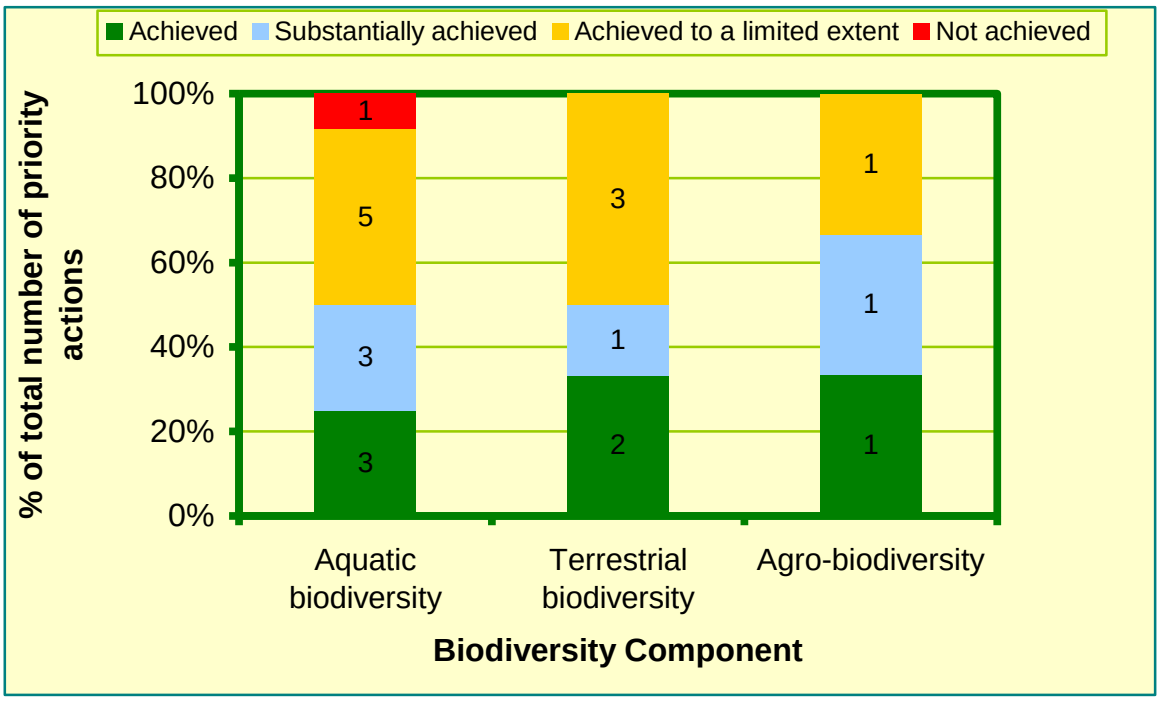

Figure 20: Analysis of extent of implementation of the NBSAP (2001)

Despite these efforts to implement the NBSAP, a fully implementation of the NBSAP could not be possible due to a number of reasons. These included:

i) Inadequate mainstreaming of biodiversity issues in sectors and Local Government plans and budgets;
ii) Low level of awareness of the public on the socio-economic importance of biodiversity;
iii) Inadequate participation of communities in the management of biodiversity;
iv) Inadequate resources to fully implement all the priority actions identified for each biodiversity component.
v) Insufficient data about biodiversity, inadequate capacity for research and dissemination, and insufficient collaboration between institutions which manage data.

PART III: PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE RELEVANT 2015 TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS

11.0 Progress towards implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
Strategic goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society			
Target 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.	**	• Public awareness being undertaken by various actors including media, politicians, academia and NGOs	
Target 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 appropriate, and reporting systems.	**	• Environmental sustainability including biodiversity has been mainstreamed into the National Strategy for Growth and Poverty Reduction (2010-2015) and Tanzania Development Vision 2025 • State of the Environment reporting, as a requirement of the Environmental Management Act (2004), includes biodiversity	
Target 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	**	• Positive incentive community around nature conservation e. g apportioning part of revenues to the local communities (PFM, WMAs,BMUs, and Villages)	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
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.			
Target 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.	**	• National Programme on Sustainable Consumption and Production was developed in 2007 • Sustainable Cities programme is being implemented since 1992 • A total of 37 local industries and institutions have switched to natural gas since 2004 • Alternative energy sources (biogas, wind and solar) and efficient cooking stoves are being promoted in an attempt to curb massive deforestation since more than 90% of national energy consumption constitute biomass energy	
Strategic goal B. Reduce the direct pressures on biodiversity and promote sustainable use			
Target 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.	**	• A total of 344,511 cattle, 134,317 goats and 102,023 sheep were evicted from Ihefu wetland (about 150 km^2) in 2006/2007 which has resulted into regeneration of vegetation and increased water level. • General Management Plans (GMPs) for protected areas (forest, wildlife and fisheries) have been developed and are being implemented • In the year 2013 alone, 15 Forest Management Plans and 8 maps were developed; and 479 beacons were	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
		erected in Central and Lake Zones.	
Target 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 threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	**	• Strategy for Urgent Actions for Conservation of Marine Environment, Lake, Rivers and Dams was developed in 2008 and is being implemented • A total of about 2,500 km^2 of marine waters (or 8% of territorial sea) are managed through Collaborative Fisheries Management Areas (CFMAs). • To reduce pressure on natural fish resources, aquaculture is being promoted whereby, a total of 19,000 ponds for tilapia with an area of 150 m^2 each have been established • Operations and campaigns against Illegal fishing	
Target *7*: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	**	• Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) are being conducted for agriculture, aquaculture and forestry projects and programmes • Agricultural Land use Master Plan has been developed and is being implemented • Guidelines for Establishment and Management of Beach Management Units (BMUs) have been developed • As of todate, a total of 739 BMUs have been established countrywide • Guidelines for Sustainable Aquaculture Management have been developed	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	**	• Implementation of National Land use Master Plan • various measures resulting into reduced pollution • A Basin-Wide Strategy for Sustainable Land Management in the Lake Victoria Basin was developed in 2012 • Water Quality Management and Pollution Control Strategy was developed in 2011 • Water Sector Environmental Action Plan was developed in 2011 • More than 70 industries have participated in cleaner production programme and have implemented • Guidelines for Water Resource Monitoring and Pollution Control was developed in 2012	
Target 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 to prevent their introduction and establishment.	**	• Lake Victoria Environmental Management Programme (LVEMP-II) has expanded the management of water hyacinth to Kagera Basin catchment • Integrated Pest Management Plan (IPMP) was developed in 2009 • Indian House Crow Eradication Programme is being implemented in Dar es Salaam, Tanga, Morogoro and Zanzibar	
Target 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.	**	• National Climate Change Strategy was developed in 2012 • Strategy for Urgent Action for Conservation of Coastal and Marine Environment, Lakes, Rivers and Dams is being implemented • Integrated Coastal Zone Management Strategy is	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
		being implemented • Coastal tourism project is being implemented to ensure sustainable tourism	
Strategic goal C. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity			
Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas, 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 landscapes and seascapes.	Increase marine protected area from 6.5% (2011) to 10% by 2020	• Tanzania has designated 40% of total land area to wildlife and forest protected areas and 6.5% of territorial sea to marine protected areas Water Basins have identified 174 threatened water sources to be demarcated by 2019 and 59 water sources have been protected and gazetted by 2013. • Preparation of Programme for effective and sustainable protection and conservation of water sources (2014/15 – 2018/19) is on-going.	Good progress
Target 12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained	**	• Elephant Management Plan (2010-2015) is in place • Routine anti-poaching operations are being conducted • National anti-poaching action plan is being prepared	
Target 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	**	• The National Plant Genetic Resource Centre (NPGRC) has been established • Biotechnology Policy (2010) is in place • Regulations on Access and Benefit Sharing of Genetic Resources (ABS) are being prepared	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.		• Phenotypic characterization in cattle has been done and has led to the distinction of indigenous cattle breeds and strains • Existence of some infrastructures such as the National Artificial Insemination Centre makes it possible to have *ex-situ* conservation of livestock genetic resources in the form of semen, ova and embryos. • Ratification of the Nagoya Protocol on Access and Benefit Sharing of Genetic Resources is underway	
Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services			
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	**	• Strategy on Urgent Actions on Land Degradation and Conservation of Water Catchments (2006) is being implemented • Strategy for Urgent Action for Conservation of Coastal and Marine Environment, Lakes, Rivers and Dams (2008) is being implemented • Environmental conservation programmes for priority ecosystems are being implemented in Lake Victoria and Lake Tanganyika • Integrated Water Resources Management and Development Plans are in place for each of the nine Water Basins • Tree planting campaigns	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
Target 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.	**	• National Climate Change Strategy (2012) is in place to address adaptation and mitigation to climate change impacts • National Action Plan to Combat Desertification (2010) is in place • Sustainable Land Management (SLM) Programme is being implemented in several parts of the country • REDD initiatives	
Target 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.	**	• The National Focal Point and Competent Authority for the Nagoya Protocol have been designated • Ratification of the Nagoya Protocol on Access and benefit sharing is in progress • Regulations on ABS is being finalized	
Strategic goal E. Enhance implementation through participatory planning, knowledge management and capacity-building			
Target 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.	**	• The drafting of the reviewed NBSAP is in progress	
Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources,	**	• The Draft Regulations on ABS have recognized and integrated traditional knowledge associated with conservation of genetic resources and germplasm • Traditional knowledge and practices are being promoted and recognized in national biodiversity conservation efforts	

Aichi Targets	National targets	National actions taken (2009-2014)	Overall Assessment (Green/ Orange/Red)
are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.			
Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	**	• Tanzania Biodiversity Information Facility (TANBIF) is in place • Annual National Biodiversity Forum are being organized • National Environmental Communication Strategy is being finalized	
Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	**	• Tanzania Wildlife Protection Fund (TWPF) is in place • National Environment Trust Fund has been established and initiatives to operationalize are underway • Tanzania Forest Fund is in place • Eastern Arc Mountain Endowment Fund is in place	

** *National targets will be developed during the on-going review and update of NBSAP (2001)*

(Green) - Fully achieved *(Orange) – Some achievements* *(Red) – Not achieved*

12.0 Contribution of actions to implement the Convention towards the achievement of the Millennium Development Goals

Tanzania continues to implement Agenda 21 on Sustainable Development through, among others, implementation of the Convention on Biological Diversity (CBD) and the Cartagena Protocol on Biosafety; the United Nations Convention to Combat Desertification (UNCCD); the Rotterdam Convention on Prior Informed Consent in International Trade of Certain Hazardous Chemicals and Pesticides; Montreal Protocol on Ozone Depleting Substances; United Nations Framework Cionvention on Climate Change and the Kyoto Protocol on Climate Change; the Basel Convention on the control of Transboundary Movements of Hazardous Wastes and Their Disposal; and the Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environemnt of the Western Indian Ocean. The country is also implementing regional and national policies, legislation, programmes, plans and strategies related to environmental conservation and sustainable development.

Preparation and implementation of the various policies, legislation, programmes, plans and strategies related to environmental conservation and sustainable development explained in Section 8 of this report ensure that the environment is appropriately conserved and managed. Strategies such as the Strategy on Urgent Actions for Conservation of Coastal Marine, Lakes, Dams and River Environment; and the Strategy for Urgent Actions on Land Degradation and Water Catchments have resulted into achieving MDGs. Awareness of the community towards environmental management aspects has risen to a considerable extent. This has been possible through the use of print and electronic media.

Other initiatives that contribute to achieving the MDGs include mainstreaming of environment into MKUKUTA I (2005-2010) and II (2010-2015); sectoral policies; strategies and plans. Implementation of National Biodiversity Strategy and Action Plan (NBSAP) (2001); National Biosafety Framework (NBF) (2005); Cleaner Production initiatives (1994 to date); National Waste Management Strategy and Action Plan (2012); National Adaptation Programme of Action (NAPA) (2007); National Action Plan to Combat Desertification (NAP) (2005); National Adaptation Strategy and Action Plan (2009); and National Environmental Action Plan (NEAP, 2013-2018). These initiatives aim to ensure environmental sustainability and hence contributing to achieving the MDGs.

Participatory resource management has contributed in achieving MDGs at community level. The BMUs contributed to proper fishing practices including collection and retention of revenues to the community which contribute to the MDG goals on Poverty Alleviation and Environmental Sustainability. Guide for Establishment of Collaborative Fisheries management Areas has been Developed and three Fisheries Management Areas has been established (URT, 2011a). Management of Marine parks and reserves has been strengthened, the management coupled with the re-appearance of coelacanths has drawn more international attention as tourist destination. The number of coelacanths observed in Tanzania has been increasing from 1 specimen in 2003 to a total of 37 specimens in 2011 (URT, 2011b).

Wildlife management through WMAs has contributed in achieving the MDGs. It has increased protection of areas that are considered ecologically important either as dispersal areas, wildlife corridors or important wildlife areas. financial benefits to the governments and communities has increased. Villages in WMAs with earnings are receiving their share of financial benefits and using them to support social infrastructure development. Some of these earnings are directly used for improving health care, education and other infrastructures.

Participatory Forest Management (PFM) in Tanzania has triple objectives, namely forest conservation, improved rural livelihoods and good forest governance. In areas where PFM has been well facilitated it has lead to recovery and/or maintenance of forest quality. Forests under PFM has been a source of cash and subsistence products, and contributed significantly to rural livelihoods and in some cases to village government funding. Although empirical evidence is scanty and long term ecological monitoring has been very limited, many villages responsible for forest management under PFM arrangements are reporting Improvements in water discharge and quality; increasing natural regeneration in degraded areas; Reduced incidences of fire; Reduced incidences of an illegal activities; Reduction in encroachment of agricultural land into forest areas and increases in game and wildlife numbers/diversity

13.0 Lessons learned from the Implementation of the Convention in Tanzania

Since ratification of the CBD, the country has taken various measures to ensure that biodiversity is being conserved for sustainable development. Apart from meeting its obligation, Tanzania accords biodiversity a high importance due to the fact that most livelihoods and economic development is highly dependent on use of biodiversity resources of which the country is endowed. Throughout implementation of the Convention up to the time of this reporting, Tanzania has learnt a number of lessons in the course of implementation of the CBD obligations. Some of these lessons include:

i) Effective implementation of the convention needs commitment and cooperation among ministries, and between central and local agencies.

ii) Mainstreaming biodiversity into other sectors requires institutional change which takes long time 5-10 years. Long term vision and persistence is required.

iii) Influencing policy environment requires flexibility and cannot be a tightly managed process. In this case broader understanding on the environment is key towards achieving the intended goals with regard to biodiversity conservation.

iv) Collaborative partnerships is very important between and among multiple stakeholders, including government sector ministries, NGOs/CBOs, Civil society and private sector.

v) Inadequate communication, education and public awareness raising and limited biodiversity-related law enforcement are putting more pressures on biodiversity.

vi) Promotion of alternative livelihood activities can greatly enhance protection of biodiversity and ecosystem processes by reducing harvesting pressure. However, adoption is slow due to the cultural and social beliefs.

vii) Inadequate reliable data and information limits the understanding on status and trends of biodiversity.

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ANNEXES AND APPENDICES

APPENDIX I : INFORMATION CONCERNING THE REPORTING PARTY AND PREPARATION OF THE FIFTH NATIONAL REPORT

A1. REPORTING PARTY

Contracting Party	**UNITED REPUBLIC OF TANZANIA**
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Signature of the officer responsible for submitting the national report	
Date of submission	06TH MAY 2014

A2. PREPARATION OF THE FIFTH NATIONAL REPORT

The Fifth National Report on the Implementation of the Convention on Biological Diversity was initially drafted by a team of experts under coordination of the Vice President's Office. The team gathered information from numerous available sources including national reports and online documentations.

The draft report was then reviewed and improved by the Secretariat from the Vice President's Office before subjecting to stakeholders' consultations. A one-day workshop was organized where stakeholders were invited to provide inputs on key issues related to their areas of competence while taking into consideration Guidelines for Preparation of the Fifth National Report. The workshop served not only as a platform for consultation and validation, but also offered an opportunity for sensitize stakeholders and obtain their views on the on-going process of reviewing and updating NBSAP (2001). It gathered participants from Government Ministries, Departments and Agencies; media; Non-governmental organizations (NGOs) and development partners.

In order to provide ample time for providing inputs, stakeholders were requested to provide further written inputs after the workshop. The Secretariat compiled the inputs and finalized the Report.

Key sources of information used during the preparation of the Fifth National Report were:

- National Biodiversity Strategy and Action Plan (NBSAP) (2001);
- National Reports on Millennium Development Goals (MDGs);
- National Environmental Action Plan (NEAP) (2013 - 2018);
- Second State of the Environment Report (2014);
- National Climate Change Strategy (2012);
- Ministries Budget Speeches (2009/2010 - 2013/2014);
- Sectoral Reports on Achievements after 50 Years of Independence; and
- National policies, plans, strategies, legislation and reports.

APPENDIX II : FURTHER SOURCES OF INFORMATION

A. Publications

1. Fourth National Report on Implementation of the Convention on Biological Diversity (2009)
2. National Climate Change Strategy (2012)
3. Wildlife Policy of Tanzania (2007)
4. National Wetlands Management Strategy (2005)
5. Tanzania Biodiversity Country Study (1998)
6. Text of the Convention on Biological Diversity

B. Websites

Government Ministries, Departments and Agencies	
Vice President's Office	www.vpo.go.tz
First Vice President's Office - Zanzibar	www.fvpo.go.tz
Ministry of Natural Resources and Tourism	www.mnrt.go.tz
Tanzania Wildlife Research Institute (TAWIRI)	www.tawiri.or.tz
Tanzania Forest Research Institute (TAFORI)	www.tafori.org
Tanzania National Parks (TANAPA)	www.tanzaniaparks.com
Ministry of Livestock and Fisheries Development	www.mifugouvuvi.go.tz
Tanzania Fisheries Research Institute (TAFIRI)	www.tafiri.go.tz
Ministry of Water	www.maji.go.tz
Ministry of Agriculture, Food Security and Cooperatives	www.kilimo.go.tz
Ministry of Agriculture and Natural Resources - Zanzibar	www.kilimoznz.or.tz
Ministry of Energy and Minerals	www.mem.go.tz
Ministry of Works	www.mow.go.tz
Tanzania Commission for Science and Technology (COSTECH)	www.costech.or.tz
National Environment Management Council (NEMC)	www.nemc.org.tz
University of Dar es Salaam	www.udsm.ac.tz
Sokoine University of Agriculture (SUA)	www.sua.ac.tz
Institute of Marine Sciences (IMS)- Zanzibar	www.ims.udsm.ac.tz
Ardhi University	www.aru.ac.tz
Tanzania Biodiversity Information Facility (TanBIF)	www.tanbif.org
Non-Governmental Organizations	
Tanzania Forest Conservation Group (TFCG)	www.tfcg.org
Journalist Environmental Association of Tanzania (JET)	www.jettanz.com
Western Indian Ocean Marine Science Association (WIOMSA)	www.wiomsa.org
Tanzania Traditional Energy Development and Environmental Organization (TaTEDO)	www.tatedo.org
Lawyers Environmental Action Team (LEAT)	www.leattz.org