Government of Kenya

National Environment Management Authority

NATIONAL ENVIRONMENT ACTION PLAN FRAMEWORK

2009-2013

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EXECUTIVE SUMMARY

Economic growth and environment are closely intertwined in Kenya. Environmental Action Planning is a tool that aims at enhancing the integration of environment into development planning. In this regard, the Environment Management Coordination Act 1999 provides for the formulation of the National, Provincial and District Environment Action Plans every five years. This is the second National Environment Action Plan (NEAP) for the country and will succeed the first NEAP of 1994. The drafting of the NEAP was undertaken through a participatory process both in the public, private and civil sectors. Further, this document has incorporated salient issues identified in various Districts and Provincial Environment Action plans.

The NEAP highlights priority themes and activities for the country towards achieving sustainable development. The report is divided into eight chapters. Chapter one; gives the introduction and presents the country's main profile covering the physical features, demographic, agro-ecological zones, and main environmental issues. The chapter also describes the rationale for and preparatory process of the NEAP.

Chapter two describes the country's Environment and Natural resources of Land, Water, Biodiversity (forest, wildlife, and Dryland biodiversity), wetlands and agriculture, livestock and fisheries. For each resource, major environmental issues, challenges and proposed interventions are identified.

Chapter three details the Human settlements and infrastructure in Kenya covering situation analysis, challenges and proposed interventions. Environmental challenges addressed include; waste management, sanitation, pollution, diseases, land use changes in conservation areas, demand for water, energy, materials for construction, land degradation, policy and legislation, biodiversity loss, land tenure, housing tenure, informal settlements, urban planning and design, and electronic waste.

Chapter four addresses environmental aspects in trade, industry and services sectors. The key issues under this chapter are trade in endangered species, environmental fiscal reforms, high pollution levels from industrial activities and weak enforcement of relevant legislations.

Chapter five discusses environmental hazards and disasters. The major hazards covered include; drought and famine, floods, landslides, fires and invasive species. The analysis shows that hazards in Kenya have increased both in frequency, intensity and complexity. The impacts have thus become more devastating resulting to more deaths of people and animals, loss of livelihoods, destruction of infrastructure, and environmental degradation among other effects.

Environmental information, networking and technology are discussed in chapter six. It emerges that environmental information and networking technology have continued to receive scanty attention. In order to achieve sustainable environmental management, it is necessary to focus on raising awareness and enhancing public participation at all levels.

Governance, Policy and Legal Framework as well as Institutional arrangements are set in chapter Seven. The key issues addressed include; harmonization of environmental legislations and institutional mandates, incorporation of indigenous knowledge in environmental management, defining pre-existing rights, use of incentives to strengthen compliance for environmental management and inadequate institutional capacity. Chapter eight gives implementation modalities and monitoring and evaluation strategies for NEAP. The estimated cost of implementation of the NEAP Framework for the five years is Ksh. 102.5B.

FOREWORD

The 1992 Earth Summit held in Rio de Janeiro came up with various recommendations, among them Agenda 21, a Global Environmental Action Plan. The theme of the Summit focused on how nations could attain sustainable development. The Government of Kenya embraced this idea by developing the first National Environment Action Plan (NEAP) in 1994.

Since independence, Kenya has continued to demonstrate her commitment to environmental management through various initiatives, among them the National Development Plans of 1974 and the National Environment Action Plan of 1994. Further, there have been a number of sectoral policies on environment in fields such as Agriculture, Livestock, Water, Energy, Food, Land, Wildlife, Forest, Industry, Trade, Arid Lands, Disaster Management and the Draft Sessional Paper No. 6 of 1999 on Environment and Development.

The Environmental Management and Coordination Act (EMCA, 1999) provides for the integration of environmental concerns in national policies, plans, programmes and projects. In this regard, EMCA 1999 provides for the formulation of National, Provincial and District Environment Action Plans every five years.

Environmental Action Planning is a tool that aims at integrating environmental concerns into development planning. This EAP process was participatory, involving various stakeholders from institutions and sectors, including the public, private, NGOs and local communities at District, Provincial and National levels. These consultative meetings provided the basis for formulation of the DEAPs, PEAPs and finally the National Environment Action Plan Framework.

The NEAP report addresses environmental issues from various sectors in an integrated manner and their significance in development planning. It proposes a strategy for achieving sustainable development in line with Kenya's quest to meet the Millennium Development Goals (MDGs) Vision 2030 and Medium Term Plan (MTP). The report has brought out a number of proposed interventions, legal and institutional framework to be incorporated into sectoral development plans and programmes. Its implementation will be monitored through the Annual State of the Environment Reporting.

I wish to underscore that the 2008-2012 NEAP report is a broad-based strategy that will enable the district attain sustainable development as envisaged in Vision 2030.

Dr. Edward Sambili, CBS
Chairman, NEAP Committee
Permanent Secretary, Office of the Prime Minister
Ministry of State for Planning, National Development and Vision 2030

PREFACE

Environment Action Planning is multi-disciplinary as well as multi-sectoral process that calls for a participatory approach in its preparation and implementation. Many institutions and individuals have contributed immensely to the completion of this National Environment Action Plan Framework.

The National Environment Action Plan (NEAP) Framework was being prepared concurrently with the comprehensive environment policy spearheaded by the Ministry of Environment and Mineral Resources.

I commend the National Environment Management Authority (NEMA) for continuous implementation of various provisions of the Environmental Management and Coordination Act (EMCA) of 1999, among them the preparation of the State of Environment reports and the Environment Action Plans. The SoE report is a tool for annual monitoring of the implementation of the EAP Framework and provides an update on the state of the environment for all sectors. The State of Environment (SoE) reports have focussed on key environmental concerns such as *Land Use and Environment* (2004)*, Pollution and Waste Management* (2005) and *Climate Change* (2006).

Kenya faces a myriad of environmental issues, including deforestation, soil erosion, desertification, water catchment destruction, poaching, domestic and industrial pollution, land degradation, encroachment into fragile ecosystems, loss of biodiversity, degradation of aquatic ecosystems and resources, droughts, floods and landslides, invasive alien species,. Our commitment to ensure environmental management is critical, hence the need for the National Development Plans and sectoral policies to mirror the recommendations of the EAP Framework.

The participatory approach adopted in the EAP process enhanced environmental awareness among various stakeholders including the legal fraternity, provincial administration, institutions of learning and Community Based Organizations (CBOs), therefore underpinning their relevance in sustainable development.

I look forward to all institutions, public and private partnerships, civil society and the general public to appreciate the need for implementing this plan in order to achieve sustainable development in the country.

Lawrence N. Lenayapa
PERMANENT SECRETARY
MINISTRY OF ENVIRONMENT AND MINERAL RESOURCES

ACKNOWLEDGEMENT

The process of preparing this environment action plan (EAP) benefited immensely from the support and guidance of the Ministry of Planning and National Development whose Permanent Secretary chairs the National Environment Action Plan Committee. In particular, the process gained immensely from the Ministry's experience of the National and District Development Plans. The District Development Officers gathered data on practical experience in district development planning and programme/project formulation. The officers also gave both technical and hands-on support throughout the preparation process.

The Ministry of Environment and Natural Resources provided both advisory and policy direction to the process. The Permanent Secretary and his staff provided valuable technical inputs. I commend the United Nations Development Programme (UNDP) and European Union (EU) for the continued financial and technical assistance in the preparation of the NEAP.

The Environmental Action Plan Secretariat has ensured that this NEAP is produced in the most cost-effective manner. The Department of Environment Planning and Research of NEMA provided the initial building blocks and foundation for the process and the requisite vision that has now been realized. The Secretariat was instrumental in training the technical sub-committees of the District and the Provincial Environment Committees.

Following the regional training programmes the DEAPs and PEAPs were prepared, providing the basic data for the NEAP report. I also wish to acknowledge good work by the Provincial Directors of Environment and District Environment Officers who mobilized their Environment Committees during the preparation of their action plans.

I acknowledge the efforts made by all persons who contributed directly or indirectly to the preparation of this NEAP. In particular, I pay special tribute to the Board of Management of NEMA for ensuring policy direction throughout the process, hence enriching the report and making quite relevant to the country's development agenda.

We expect the NEAP report to contribute immensely to the country's sustainable development and guide appropriately the processes development planning. I urge the policy makers, all institutions, experts and individuals from various sectors to make good use of this invaluable document.

Dr. A. Muusya Mwinzi
DIRECTOR GENERAL,
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

NATIONAL ENVIRONMENT ACTION PLAN (NEAP) PREPARATION TEAM

NEAP Secretariat

1. Ministry of Environment and Mineral Resources
2. Ministry of State for Planning, National Development and Vision 2030
3. National Environment Management Authority

Collaborating Institutions

1. Department of Mines and Geology
2. Department of Resource Survey and Remote Sensing
3. Kenya Agricultural Research Institute
4. Kenya Wildlife Service
5. Kenyatta University
6. Ministry of Local Government
7. Ministry of Agriculture
8. Ministry of Finance
9. Ministry of Forest and Wildlife
10. Ministry of Housing
11. Ministry of Livestock Development
12. Ministry of Medical Services
13. Ministry of Public Works
14. Ministry of Trade
15. Ministry of Industrialization
16. Ministry of Water and Irrigation
17. National Museums of Kenya
18. Office of the President
19. University of Nairobi
20. UNHabitat

Sponsors

National Environment Management Authority (NEMA)
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ACRONYMS

ASAL	Arid and Semi Arid Lands
CBOs	Community Based Organizations
CDM	Clean Development Mechanism
COMESA	Common Markets for East and Southern Africa
CP	Cleaner Production
DDOs	District Development Officers
DDPs	District Development Plans
DEAPs	District Environment Action Plans
DEC	District Environment Committee
DEOs	District Environment Officers
EAC	East African Community
EG&S	Environmental Goods and Services
EIA/EA	Environmental Impact Assessment /Environmental Audits
EMCA	Environment Management Coordination Act
EMS	Environmental Management System
ERSW&EC	Economic Recovery Strategy for Wealth and Employment Creation
GDP	Gross Domestic Product
GIS	Geographical Information System.
GoK	Government of Kenya
IKS	Indigenous Knowledge System
KEFRI	Kenya Forestry Research Institute
KNCPC	Kenya National Cleaner Production Centre
KRA	Kenya Revenue Authority
KWS	Kenya Wildlife Service
LA	Local Authority
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
ME&MR	Ministry of Environment and Mineral Resources
MNK&ALs	Ministry of Northern Kenya and Other Arid Lands
MNMD	Ministry of Nairobi Metropolitan Development,
MOH	Ministry of Health
NBSAP	National Biodiversity Strategy and Action Plan
NDPs	National Development Plans
NEAP	National Environment Action Plan
NEAPC	National Environmental Action Plan Committee
NEMA	National Environmental Management Authority
NEPAD	New Partnership for Africa Development
NGOs	Non-Governmental Organizations
OHS	Occupational Health Safety
PDEs	Provincial Directors of Environment
PEAPs	Provincial Environment Action Plans
PEC	Provincial Environment Committee
PPO	Provincial Planning Officer
PRSP	Poverty Reduction Strategy Paper
SEAs	Strategic Environment Assessments
TAC	Technical Advisory Committee
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
WC	Water Closet
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

CHAPTER ONE: INTRODUCTION

1.1 COUNTRY PROFILE

Location: The Republic of Kenya is situated on the East African coast on the equator. It is bordered by Ethiopia and Sudan to the north, the Indian Ocean and Somalia to the east, the United Republic of Tanzania to the south, and Uganda and Lake Victoria to the west. The total area of the country is 580,370 square kilometres (km^2). The country is subdivided into eight provinces for administrative purposes as shown in Fig. 1.1.

Figure 1. 1: Location of Kenya and Provincial Administrative units

In 2008 Kenya's population was estimated at 34 million up from 28.7 million reported in the 1999 national census and from 15.3 million in the 1979 census. In 2006 the annual population growth rate was about 2.8 percent, a rate substantially below that of the early 1980s, when Kenya's growth reached 4 percent, the highest rate in the world. About 26 percent of the population currently live in urban areas and growing at a rate of 3.9 per cent per annum. The country's largest cites are Nairobi, the capital and chief manufacturing centre; Mombasa, the principal seaport; and Kisumu, the chief port on Lake Victoria. Smaller cities include Nakuru, a commercial and manufacturing centre in the Eastern Rift Valley; and Eldoret, an industrial centre in western Kenya. The population of cities, according to the 1999 census, was Nairobi, 1,346,000; Mombasa, 465,000; Kisumu, 185,000; Nakuru, 163,000; and Eldoret, 105,000.

Topography: The altitude varies from sea level to the peak of Mt. Kenya, situated north of the capital Nairobi, which is 5,199 meters (m) above sea level. An inland region of semi-arid, bush-covered plains constitutes most of the country's land area. In the northwest, high-lying scrublands straddle Lake Turkana (Lake Rudolf) and the Kulal Mountains. In the southwest lie the fertile grasslands and forests of the Kenya Highlands, one of the most successful agricultural production regions in Africa. North of Nairobi, the Kenya Highlands is bisected by the Great Rift Valley, an irregular depression that cuts through western Kenya from north to south in two branches. The Rift Valley is the location of the country's highest mountains, including, in the eastern section, the snow-capped Mt. Kenya, the country's highest point and Africa's second highest. In the south, mountain plains descend westward to the shores of Lake Victoria.

Principal Rivers: Kenya's principal rivers are the 710-kilometer-long Tana, and the Athi, both flowing southeast to the Indian Ocean. Other rivers include the Ewaso Ngiro, flowing northeast to the swamps of the Lorian Plain, and the Nzoia, Yala, and Gori, which drain into Lake Victoria. The country shares a number of rivers with other countries: The Umba, Mara, and Pangani basins shared with the United Republic of Tanzania; The Sio, Malaba, and Malakisi basins shared with Uganda; The Omo and Daua basins shared with Ethiopia and the Nile basin shared with nine other countries.

Climate: The climate is generally equatorial and influenced by the movement of the inter-tropical convergence zone (ITCZ) and the country's position on the Indian Ocean seafront. This influence is again modified by the altitudinal differences, giving rise to varied climate regimes FAO (2007) ranging from permanent snow above 4,600 meters on Mt. Kenya to true desert type in the Chalbi desert in the Marsabit district in the north of the country. The rainfall distribution pattern is bimodal with long rains falling from March to June and short rains from October to November for most parts of the country. The driest month is August, with 24 millimetres average rainfall, and the wettest is April, the period of "long rains," with 266 millimetres. The hottest month is February, with temperatures of 13°C to 28°C, and the coolest is July, with temperatures of 11°C to 23°C. The highlands feature a bracing temperate climate. Nairobi, at an elevation of 1,820 meters, has a very pleasant climate throughout the year.

Soils: The soil types in the country vary from place to place due to topography, the amount of rainfall and the parent material. The soils in western parts of the country are mainly acrisols, cambisols, and their mixtures, highly weathered and leached with accumulations of iron and aluminium oxides. The soils in central Kenya and the highlands are mainly the nitosols and andosols, which are young and of volcanic origin. The soils in the arid and semi-arid lands (ASAL) include the vertisols, gleysols, and phaeozems and are characterized with pockets of sodicity and salinity, low fertility, and vulnerability to erosion. Coastal soils are coarse textured and low in organic matter and the common types are the arenosols, luvisols, and acrisols. Widespread soil salinity, which has adversely influenced irrigation development, is found in isolated pockets around the Lake Baringo basin in the Rift Valley and in the Taveta division in the coastal provinces (FAO, 2007).

1.2 Agro-ecological zones

Kenya has seven Agro-Ecological Zones that represent major ecosystems in the country. The land surface area comprises 20% high to medium potential agricultural and supports 80% of the population. The remaining 80% of land surface area is arid and semi lands (ASAL's) which supports only 20% of the population. However, it is important to note that the ASAL's house 50% of the livestock and 80-90% of wildlife resources in the country (DRSRS).

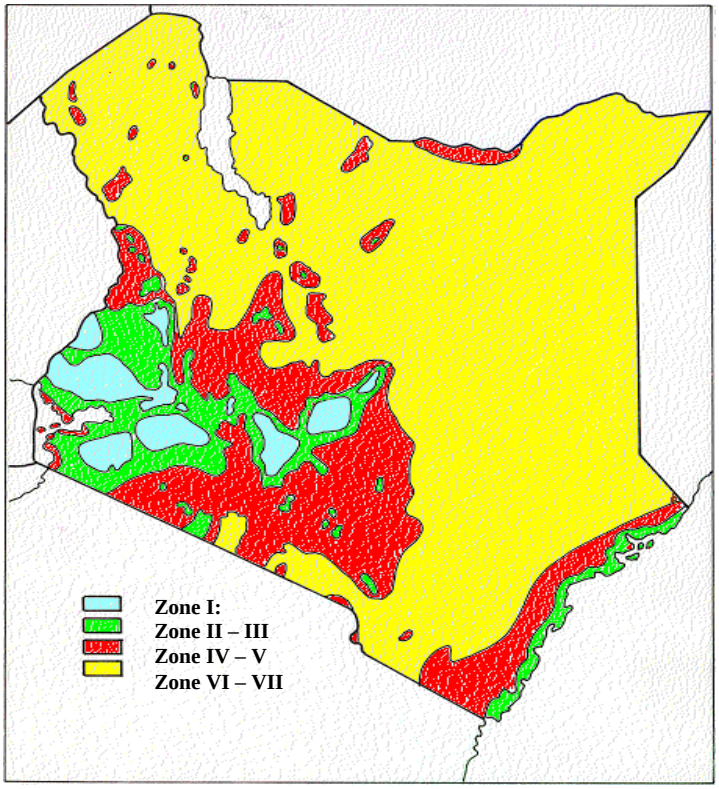

Figure 1. 2: Ecological zones of Kenya (Source: Pratt & Gwynne, 1977; GoK, 1992)

Legend
Zone I: Afro-alpine moorland and grassland or barren land above forest line.
Zone II: Forests and derived grasslands and bush lands.
Zone III: Land of high agricultural value, low forest potential.
Zone IV: Semi-humid, annual rainfall: 700 – 850 mm.
Zone V: Semi-arid, annual rainfall: 550 – 700 mm.
Zone VI: Arid, annual rainfall: 300 – 500 mm.
Zone VII: Very arid, annual rainfall: 200 – 300 mm.

Natural Resources: Kenya's most valuable natural assets are rich agricultural land and a unique physiography and wildlife. The highly diverse wildlife is a key draw for the tourism industry. The country is not well endowed with mineral resources. Mineral resources currently exploited are gold, limestone, soda ash, salt, rubies, fluorspar, and garnets. At present, only 3 percent of the land is forested, a reduction by half over the past three decades which means that Kenya is a low cover forest country. Kenya's water resources are similarly under pressure. Kenya relies to a significant extent on hydropower. These natural resources are increasingly coming under raising pressure; from shrinking tea-growing areas to disappearing lakes, increasing loss of tree cover in water catchments and proliferating mosquito breeding grounds, environmental degradation is taking its toll on Kenya's present and future development opportunities. There is need therefore for improved and more creative environment management for Kenya to realise it's vision 2030 (UNEP, 2009).

Environmental Factors: Kenya faces serious interrelated environmental problems, including deforestation, soil erosion, desertification, water shortage and degraded water quality, poaching, and domestic and industrial pollution. Water resources are under pressure from agricultural chemicals and urban and industrial wastes, as well as from use for hydroelectric power. A shortage of water is expected to pose a problem in the coming years. Water-quality problems in

lakes, including water hyacinth infestation in Lake Victoria, have contributed to a substantial decline in fishing output and endangered fish species. Output from forestry also has declined because of resource degradation. Over-exploitation over the past three decades has reduced the country's timber resources by one-half. At present only 3 percent of the land remains forested, and an estimated 5,000 hectares of forest are lost each year. This loss of forest aggravates erosion, the silting of dams and flooding, and the loss of biodiversity. In response to ecological disruption, activists have pressed with some success for policies that encourage sustainable resource use.

Economy: Kenya's economy is market-based, with some state-owned infrastructure enterprises, and maintains a liberalized external trade system. The economy's heavy dependence on rain-fed agriculture and the tourism sector leaves it vulnerable to cycles of boom and bust. The agricultural sector employs nearly 75 percent of the country's 37 million people. Half of the sector's output remains subsistence production. Kenya's gross domestic product (GDP) growth rate declined continuously from a peak of about 6.5 percent per year during the first decade after independence to less than 4 percent per year in the following decade, to only about 1.5 percent per year during the 1990s. It has experienced an upturn to more than 5 percent per year since 2004.

1.3 Poverty and Environment

Kenya ranks among the least developed countries where the poverty index shows more than 50% of its population below the global described poverty line (World Bank 2004). Since independence, one of the principal goals of Kenya's development effort has been to reduce poverty. Majority of the poor people rely more heavily and directly on local natural resources for their livelihoods than other socioeconomic groups due to lack of alternative livelihood options accessible to them (Rietbergen *et al*., 2002). Poverty is a major cause and consequence of the environmental degradation and resource depletion where major environmental challenges include deforestation, soil degradation and desertification, declining biodiversity and marine resources (Okwi *et al,* 2005). Others include water scarcity and deterioration of water and air quality.

Poverty hinders access to basic needs such as health care, nutrition and education. Currently, 46 percent of the population live below US$ 1 per day compared to 56 percent in 2006. Main causes of poverty include poor economic performance, low agricultural productivity, unemployment and low income, HIV/AIDS pandemic, landlessness, poor physical infrastructure, gender imbalance and poor governance. The most pressing environmental health problems are those associated with poor households and communities. In rural areas and in peri-urban slums in Kenya, inadequate shelter, over crowding, inadequate safe water and sanitation are by far the greatest threats to human health (Dasgupta and Karl-Goran, 1994). For instance, poor people often depend on natural resources and ecosystems for income; time spent collecting water and fuelwood by children can reduce the time at school; and environment-related diseases such as diarrhoea, acute respiratory infection, leukemia and childhood cancer are primary causes of child mortality (UNEP, 2009).

The National Environment Action Plan provides a framework to the implementation of the Environment Policy and realization of the National Millennium Development Goals and Vision 2030. "Vision 2030, with its ambitious development blueprint, is a key opportunity for the Kenyan Government to address environmental challenges as a key element underpinning the country's sustainability and development" (UNEP, 2009). The genesis of the National Environment Action Planning can be traced back to 1992 during the Earth Summit held in Rio de Janeiro. The summit came up with various recommendations, among them Agenda 21 and a

Global Environmental Action Plan. The theme of the Summit focused on how nations could attain sustainable development. The conferences through both the Rio declaration and Agenda 21 called on all States to prepare Environmental Action Plans, as a tool for integrating environment into national planning and development process. Kenya actively participated in the two conferences.

Despite these challenges some programmes including implementation of MEAs have been initiated over the last decade to address environmental degradation issues with varying degree of success. Several programmes targeting mitigation of environmental degradation have been initiated and some are ongoing. Some of these programmes include, The East African Cross border biodiversity project; Padelia, National Capacity Self Assessment; Climate Change Ozone depleting substances, Community Development for Environmental Management Programme targeting Nyanza province with the support of European Commission; CDTF supporting community environmental initiatives Environment Programme Support (Dannida), targeting Coastal Districts; Lake Victoria Environment Management Programme, Nile basin Initiative. In additions Lead agencies, local and Regional Authorities, local and international NGOs have been undertaking activities geared to sustainable management of the environment, enhancement of public participation in environmental management through commemoration of national and international environmental days at local levels;

1.4 Development Planning in Kenya and the NEAP

Environment and development issues have been at the top of national and international agenda in the recent past. These issues will continue being at the top of the agenda for many years to come. Nearly all countries have been deliberating and developing strategies on approaches of conserving, protecting, using, and managing the limited resources and the environment.

The NEAP aims at providing a broad framework for the coordination of environmental activities by all actors i.e. private sector and Government to guide the course of development activities. It is a step towards integrating environment and development for better management of resources. The Kenya NEAP report addresses environmental issues in a cross sectoral and in an integrated fashion. The NEAP provides not only a strategy for achieving sustainable development in Kenya, but also a basis for translating Agenda 21–the Global Programme Action on Environment and Development, which is one of the outcomes of the United Nations Conference on Environment and Development (UNCED).

Ratification and Domestication of Multilateral Agreements

The Kenya Government has ratified and domesticated several Multilateral Environmental Agreements that include, Convention on Biological Diversity, Climate Change, Desertification Ramsar, Cites, Kyoto and Montreal protocols among others. The following milestones has been achieved in the implementation of the provisions of the conventions including phasing out of leaded gasoline; control of substances that deplete the ozone layer; developed regulation for controlling and reducing loss of biodiversity and established mechanisms and built capacity for reduction of green house gasses. Others achievements include pollution control, prevention of encroachment to wetlands, riparian and fragile ecosystem's and more on use of environmental impact assessments and Audits for environmental management as specified in EMCA-1999

1.5 Milestones achieved from 1994 NEAP

The first NEAP was prepared in 1994 and several recommendations were made for implementation. Since then the following are some major milestones achieved to date: Enactment of EMCA in 1999; Establishment of NEMA and other EMCA, 1999 institutions namely. National Environment Council, National Environment Tribunal, , Public Complains Committee, National Environment Trust fund; Gazettement of District and Provincial Environment Committees whose responsibility is to oversee environmental management activities in their areas of jurisdiction; Development and implementation of various environmental management regulations such as. Environmental Impact Assessment and Audit Regulations, Waste Management and Water Quality Regulations, Biodiversity Regulations, Ozone Depleting Substances Regulations whereas regulations on Hazardous Chemicals, Air Quality and Noise are being developed in consultation with lead agencies and stakeholders. Other achievements include development of Biodiversity Strategy and Action Plan 1999; Development and implementation of National Action Programme (NAP) on combating desertification; Policy and Bill on Indigenous Knowledge (IK) is being finalized; Establishment of Kenya Environmental Information Network (KEIN); Development of wetlands policy, Management Plans for Lake Naivasha, Jipe and OlBollasat, prepared four State of the Environment Reports (2003, 2004, 2007 and 2006/07) among others.

1.6 The NEAP Process

Section 38 of EMCA provides for the preparation of District, Provincial and National Environment Action plans every five years. The preparation of the District and Provincial Environment Action Plans commenced with initial training of six technical members from the District and Provincial environment committees. This was through 4 regional training workshops based on the NEAP Manual. The District Environment Officers and Provincial Directors of Environment who are secretaries to their respective committees informed the District and Provincial Commissioners who chair the Environmental committees. Members of the District and provincial committees were informed and participated in preparation and validation of their respective environment action plans. Other committees including the District and Provincial Development and Executive committees were informed. During *barazas* or public meetings, members of the public were informed of the ongoing process. The District environment Action Plans were forwarded to the Provincial Directors of Environment to enable input of issues identified into the Provincial Environment Action Plans. The Provincial Environment Action Plans were forwarded to the National Environment Management Authority to incorporate issues identified at the Provincial level.

1.7 NEAP Methodology

The preparation of the National Environment Action Plan commenced in the 2006/07 financial year with participation of members listed in the First and Third schedule of EMCA. The target to prepare the NEAP framework was also incorporated in the Performance Contract for the year 2007/08. The Draft framework has been subjected to stakeholders at a National stakeholders' forum to elicit view, concurrence and validation. The zero Draft was presented to the National Environment Action Planning Committee, chaired by the Ministry of Planning and National Development for Approval. The report is expected to be presented to the National Assembly for adoption.

CHAPTER TWO: ENVIRONMENT AND NATURAL RESOURCES

This Chapter covers natural resources, which include land, water, forests, wildlife, biodiversity, wetlands, agriculture, livestock and fisheries. Environmental and natural resource degradation constitute a major challenge in Kenya's development process (GoK 2002a). These resources are increasingly under pressure as a result of unsustainable utilization. This has resulted in pollution, soil erosion, resource depletion and extinctions. Kenya faces a major challenge in planning for sustainable use of natural resource in the face of limited arable land, water, minerals, rapid population growth, poverty and limited financial capital. Increased economic activities have caused conflict with environment. Pressure on land due to population growth coupled with the introduction of exotic production technologies is causing erosion of traditional conservation strategies. Commercialisation of production systems has also encouraged unsustainable use of land-based resources.

2.1 LAND

Land and natural resources occupy an important place in the political history, social organization and economics of the country. Land is the basic commodity that supports all life forms and encompasses soils, surface topography, underlying deposits, water, plants and animals. In Kenya, most people consider land a valuable resource endowment. A large proportion of the population lives in rural areas and derives their livelihood directly from the land. The results of human activities, reflected by change in vegetative cover or by structures, are always regarded as features of land. Of the total land surface area, approximately 17% is of high and medium potential while 83% is classified as arid and semi-arid lands (GoK, 2003).

Human population increase has influenced land tenure both in high and low potential areas (zones I-V), which covers approximately 165,243 km^2. In high and medium potential areas, land has been sub - divided into uneconomical units leading to land degradation. High dependency on agriculture and land scarcity in these areas has forced people to migrate to the ASALs where they have introduced unsustainable land use practices. Change in communal land ownership to private/individual ownership has also resulted in land fragmentation, unsustainable production systems, loss of wildlife habitats and migratory corridors. As the population increases and available land becomes scarce, lack of a land policy, land degradation, biodiversity loss, inadequate enforcement of legislation and conflicting policies are issues associated with land use.

Challenges

- Enactment of Draft Land Policy
- Combating land degradation
- Reduced biodiversity
- Compliance to relevant legislation
- Harmonized policies

Proposed interventions

- Enact and implement Draft Land Policy
- Promote appropriate land use practices
- Enforce EMCA, 1999 and its subsidiary legislation and other relevant legislation
- Revise and implement National Biodiversity Strategy and Action Plan (NBSAP) and National Action Programme (NAP)
- Harmonisation of policies
- Integrate environmental concerns into regional and local development plans.
- Develop land use guidelines

2.2 WATER RESOURCES

The high population growth rate and expansion of economic activities have caused pressure on water resources. This is expected to increase unless urgent measures are taken to boost supply and rationalise demand. The National Development Plan 2002-2008 recognizes Kenya as a water scarce country whereby the water demand exceeds renewable freshwater sources; its potential annual freshwater resources are quite small, with surface water estimated at 19,590 million cubic metres (m^3) and groundwater at 619 million m^3. Per capita availability is 647 m^3, compared with 2,940 m^3 in Tanzania and 2,696 m^3 in Uganda. This is projected to fall to 245 m3 per capita by the year 2025 – well below the recommended minimum. Moreover, the available resources are unevenly distributed both geographically and seasonally. With over 80% of the country being arid and semi-arid, rainfall is highly variable which pause serious environmental challenges.

Water resources are under pressure caused by soil erosion and siltation, water catchments destruction, low level compliance to Water Quality Regulations, inefficient water use strategies, invasive alien species, uncontrolled sand harvesting and over-abstraction of water resources. In addition, there is no existing framework between countries for the utilization and management of the shared water resources.

Challenges

- Soil erosion and siltation control
- Water catchments protection
- Ensuring compliance to Water Quality Regulations
- Efficient water use strategies
- Management of invasive alien species
- Control sand harvesting
- Management of trans-boundary waters
- Regulated water abstraction

Proposed Interventions

- Implementation of soil and water conservation measures
- Provide incentives for conservation of water catchments
- Enforce EMCA, 1999 and other subsidiary regulations
- Enforce Water Act 2002 and other related legislations
- Promote efficient water harvesting, storage and usage
- Implementation of best management practices on invasive species
- Implementation of sand harvesting regulations
- Enhance regional cooperation in management of trans-boundary waters
- Strengthening hydrological monitoring systems
- Promote integrated water resource management
- Develop and implement appropriate compensation schemes for watershed ecosystem services

2.3 BIODIVERSITY

The Convention on Biological Diversity (CBD) which Kenya has ratified, defines biodiversity as the number and variety of living organisms on earth, the genes they contain and the ecosystems, ecological processes and landscapes of which they are an integral part. Kenya has a wide range of plant and animal life. These are important sources of food, beverages, medicine, forage, vegetables, and hides and skins. It is estimated that there are 35,000 known species of plants, animals and micro organisms. However, many species still remain unknown. This indicates that

the country has one of the highest gene pools with some species being endemic, rare, threatened or venerable. Inland and coastal water ecosystems contain a broad range of animals and plants communities. Coastal and marine ecosystems host animal and plant communities including different types of fish, crustaceans, molluscs and mangroves. The nation has increased the proportion of land area protected for biological diversity from 12.1 percent in 1990 to 12.7 percent (about 75 238 km2) in 2007 (UNEP, 2009).

Biodiversity provides the foundation for Kenya's main productive sectors - agriculture and tourism. In addition, it also provides resources and there resilience to change that underlies the majority of rural livelihoods in Kenya.

2.3.1 FORESTRY

Kenya is internationally considered to be a low forest cover country as it has less than 10% of its total land area classified as forest. Forests cover less than 2% of the country's landmass divided into natural (about 2 million ha) and plantation forests (about 0.24million ha) (JICA, 2002). Natural forest types include; the mountain forests (Mt Kenya, Aberdares, Mau, Kikuyu escarpment), dry zone forests (Marsabit, Taita hills and Namanga hills forests), western rain forests (Kakamega, and Nandi and small patches in Nyanza and Western provinces), coastal forests (Shimba hills and Arabuko Sokoke forests). Plantation forests, distributed throughout the country under government or privately managed, were established to meet national demand for wood products and reduce pressure on indigenous forests that act as water catchments, conservations areas, and wildlife habitat and for national heritage. The Mau Forest Complex, a key water catchment is being deforested at an alarming rate due to charcoal production, logging, encroachment and settlements. One quarter of the Mau forest – some 100,000 hectares – has been destroyed since 2000(UNEP, 2009). The five water towers - Mau Forest Complex, Aberdares Range, Mt. Elgon, Cherangani Hills and Kakamega Forest - are critical as water catchments, vital for tourism, and hence towards achieving Kenya's vision 2030 (UNEP, 2009).

Forests play a vital roles in the livelihood of the Kenyan population through provision of invaluable forest related goods and services. The most significant contribution is in the energy supply for domestic and industrial processes, provision of timber for construction and trees for regulation of water flow. It is estimated that 80% of the population use biomass energy while urban development and hydro energy rely heavily on water.

Approximately 5,000ha of forest cover is lost every year through illegal logging, encroachments, settlement of people, cultivation and development projects in forest reserves. In addition, unsustainable utilization of these resources, lack of capacity to value forest goods and services, forest fires, lack of harmonized guidelines on the management of trans-boundary forests resources and lack of forest zonation has exacerbated this trend. Decrease in forest cover has led to the decline of ecological functions, including prevention of erosion, water yield and the conservation of wildlife habitats and genetic resources. This has also led to sedimentation and siltation of downstream water resources and compounded land degradation in the arid and semiarid areas.

Challenges

- Increased forest cover
- Management and sustainable utilization of forests
- Valuation of ecosystem goods and services
- Control and efficient management of fire outbreaks
- Management of trans-boundary forests resources

- Zoning of forests
- Amelioration of climate change effects
- Regulation of bio prospecting

Proposed Interventions

- Increased planting and rehabilitation
- Implement and enforce the Forest Act 2005 and Draft policy
- Undertake research and enhance collaboration on the management of invasive species
- Adopt economic incentives for management of forest products.
- Research on efficient charcoal production technology
- Finalization and implementation of charcoal policy
- Build capacity on fire management
- Develop and harmonize management strategies for trans-boundary forests resources
- Enforce existing legislations
- Increase forest cover

2.3.2 WILDLIFE

Kenya's wildlife is one of the richest and most diversified in Africa with several of its protected areas and wetlands being internationally recognized and protected as World Heritage Sites, RAMSAR sites and Man and Biosphere Reserves. Kenya's wildlife resource also constitutes a unique natural heritage that is of great importance both nationally and globally.

Wildlife conservation areas, which are found in arid, semi-arid and mountainous-forested areas of the country, contribute directly and indirectly to the local and national economy through revenue generation and wealth creation. For example, in the year ending 30th June 2006, wildlife accounted for 70% of the gross tourism earnings, 25% of the Gross Domestic Product (GDP) and more than 10% of total formal sector employment (GoK, 2007). In addition, wildlife resources provide important environmental goods and services for the livelihood of the people and productive sectors particularly agriculture, fishing, livestock, water, energy, forestry and trade and industry.

National parks and reserves currently occupy 8% of Kenya's land area. However, 80% of the wildlife is found outside the protected areas (GoK, 2003). Table 2.1 shows details of the protected areas and others sites of significance in the country.

Table 2. 1: Protected Areas in Kenya

Protected areas	**Number**	**Area in Ha**
National parks	22	2,905,002
Marine National parks	5	5,400
Nature reserves	11	52,679
National reserves	22	1,452,755
Marine national reserves	5	70,609
Game sanctuaries	1	500
Forest reserves	203	1,669,022
Private reserves	6	13,363
Biosphere reserves	5	1,334,559
Ramsar wetlands	5	101,849
Proposed protected areas	143	938,501
Total	**428**	**8,544,239**

Source: GoK, 2003

One of the major threats facing Kenya is the loss of biological diversity. Land use changes favouring agriculture and rural and urban development have led to the reduction and modification of wild areas, resulting in the extinction of or threat of extinction to wildlife species and natural areas which serve as its habitat. Kenya's great reservoir of wildlife is increasingly under threat and consequently opportunities are being lost for it to positively contribute to economic growth, wealth creation and increased employment. Issues attributed to these trend are: lack of mechanisms for sustainable utilisation of wildlife resources, human-wildlife conflicts, bureaucracy and inadequate compensation schemes, illegal activities in the protected and non protected areas, inadequate community education and awareness on conservation, lack of harmonized guidelines in the management of transboundary wildlife resources, inequitable access and benefit sharing and sectoral management of wildlife habitats

Challenges

- Develop mechanisms for sustainable utilization of wildlife
- Control human-wildlife conflicts
- Enhance and implement prompt compensation schemes
- Protection of wildlife resources
- Conservation education and awareness
- Effective management of transboundary wildlife resources
- Improve access and benefit sharing
- Management of wildlife habitats as ecosystem units

Proposed Interventions

- Enhance community based wildlife utilization
- Develop rapid response mechanisms for human- wildlife conflicts
- Strengthen community conflict resolutions mechanisms
- Streamline compensation schemes
- Enhance the protection of wildlife resources
- Promote conservation education and awareness at all levels
- Harmonize transboundary wildlife management
- Promote access and benefit sharing
- Develop and implement integrated natural resources management plans
- Finalization of Wildlife Act and Policy

2.3.3 DRYLANDS BIODIVERSITY

Drylands in Kenya include arid, semi–arid and dry–sub humid areas and are rich in diverse plant and animal species. They occupy over 80% of the total land surface in Kenya mostly in ecological zones IV to VI. Significant wildlife, protected and unprotected, is found in ASAL areas. These areas have high habitat diversity including moist forests, dry forests, riverine habitats, woodlands, wooded grasslands, grasslands, bushes and scrub. Such habitats allow for high species diversity with direct and indirect values to communities. ASALs are home to some of Kenya's unique mammals, birds and reptiles species, which are adapted to the arid zones.

The physical processes of land degradation, biodiversity evolution or extinction, and climate change are intimately inter-twined, especially in drylands (Lean, 1995). Land degradation reduces natural vegetation cover, and affects productivity of crops, livestock and wildlife. Factors accelerating dryland ecosystem degradation and biodiversity loss are encroachment of agriculture on grazing lands and exponential increase in demand for natural vegetation. These problems are compounded by shrinking resources, inadequate water harvesting and storage systems,

unsustainable land use practices, Invasive Alien Species, inadequate drought coping mechanisms and conflicts associated with these resources.

Challenges

- Reduce land degradation
- Amelioration of the effects of climate change
- Sustainable resource use
- Efficient water harvesting and storage strategies
- Sustainable land use
- Control and management of alien and invasive species
- Development of drought coping mechanisms
- Reduced conflicts associated with dry land resources

Proposed Interventions

- Enhance implementation of the ASAL Policy
- Enhancement of early warning systems
- Implement the Master Plan on ASALs
- Use of indigenous knowledge in management of ASALs
- Adopt climate change adaptation strategies.
- Provision of adequate watering points.
- Undertake research and enhanced collaborations on invasive and alien species
- Development and implement of drought coping mechanisms
- Prevention and management of conflicts associated with dry land resources

2.3.4 WETLANDS

The Kenyan definition of wetlands is "*areas of land that are permanently or occasionally water logged with fresh, saline, brackish, or marine waters, including both natural and man-made areas that support characteristic biota.*" This definition includes swamps, marshes, bogs, shallow lakes, ox-bow lakes, river meanders and floodplains, as well as riverbanks, lakeshores and seashore where wetland plants grow. It also includes marine and intertidal wetlands such as deltas, estuaries, mud flats, mangroves, salt marshes, sea grass beds and shallow reefs. The definition has been adapted from the Convention on Wetlands (Ramsar, 1971) to which Kenya is a contracting party.

Wetlands in Kenya occupy about 3-4% of the land surface and up to 6% during rainy seasons and play a fundamental ecological, economic, cultural and scientific role. They are key resources for sustainable development especially in poverty alleviation and improvement of the livestock for communities through water related function. While wetlands have the potential of contributing significantly to the socio-economic development of Kenya, they face diverse and severe threats. These threats include inappropriate human activities within the catchments and in the wetlands, lack of coordinated policy, and climate change. The threats have induced changes that have eroded the ecological and socio-economic values and services derived from wetlands. The underlying threat remains lack of recognition of the importance of wetlands and the roles they play.

Challenges

- Environmentally sound management and sustainable use of wetlands;
- Identification, mapping and gazettement of wetlands
- Control and management of invasive species
- Reduction of siltation and pollution
- Effectively apply EIA for developments that are likely to have impact on wetlands;

- Enhance public awareness and management responsibilities

Proposed Interventions

- Finalize and implement Wetlands Policy
- Inventorize wetlands resources
- Implement wetlands regulations and other relevant legislation
- Generation of accurate data and information
- Undertake research and enhance collaboration on the management of invasive species
- Enhance awareness and appreciation of wetlands

2.3.5 COASTAL AND MARINE RESOURCES

Overview

The Kenyan coast features a diverse marine environment including estuaries, mangroves, sea grass beds, intertidal reef platforms and coral reefs that are vital for the diversity and reproduction of marine organisms. These are some of Kenya's most valuable ecosystems and are protected by six marine national reserves and parks. The Kenyan coastal economy is highly dependent on natural resources on which various activities are based namely agriculture, maritime trade, tourism, fishing and mining among others. The resources also support various cultural and spiritual values of the local people. The principal economic activities that contribute to the livelihood of the people based on natural resources are: tourism (45%), port and shipping (15%), agricultural industry (8%), fisheries (6%), agriculture (5%), forestry (4%), and mining (2%) (GoK, 2007). On average, coastal tourism contributes over 60% of total earnings from tourism and employs thousands of coastal dwellers and contributes 9.2% to the Gross Domestic Product (GDP).

This important ecosystem faces various threats from the ever-increasing human population pressure through destruction of coastal ecosystems (mangroves, coral reefs, sea grass beds, coastal forests, beaches, pelagic systems), unsustainable utilization of coastal resources, inadequate enforcement of legislation, lack of land use and development plans, inadequate capacity for monitoring and surveillance, poor waste management, limited access to resources and inequitable benefit sharing, erosion of Indigenous Knowledge Systems in coastal resource management and human-wildlife conflicts.

Some estimates suggest that about half of the mangroves on Kenya's coast have been lost over the past 50 years due to the overexploitation of wood products and conversion to salt-panning, agriculture and other uses (UNEP, 2009).

Challenges

- Conservation of coastal ecosystems (mangroves, coral reefs, sea grass beds, coastal forests, beaches, pelagic systems)
- Sustainable utilization of coastal resources
- Enforcement of legislation
- Development and implementation of land use and development plans
- Build capacity for monitoring and surveillance
- Proper waste management
- Ensure access to resources and equitable benefit sharing
- Integrate Indigenous Knowledge Systems in coastal resource management
- Manage human-wildlife conflicts
- Coastal erosion
- Early warning on Tsunami

Proposed interventions

- Develop and implement an Integrated Coastal Zone Management Plan.
- Mainstream coastal and marine issues into national planning and budgetary processes
- Review legislation and strengthen enforcement of relevant legislation.
- Empower communities and integrate indigenous Knowledge Systems in coastal resource management.
- Collaborative research on the coastal resources
- Strengthen monitoring and surveillance of coastal and marine environment.
- Develop early warning for Tsunami

2.4 AGRICULTURE, LIVESTOCK AND FISHERIES

Agriculture and livestock are the main sources of livelihood for the rural population. The three broad agricultural production systems are crop cultivation, livestock rearing and fisheries. Each of the production system has the potential to significantly affect human and environmental health.

2.4.1 AGRICULTURE

Agricultural sector is the principal sector in the Kenyan economy accounting for about 24% of the Gross Domestic Product. The sector is the largest contributor of foreign exchange through exports earnings. Agriculture also provides employment and livelihood to a large percentage of the population with an estimated 75% of the population depending on the sector either directly or indirectly (EPZA, 2005). Land suitable for arable agriculture is about 12% of the total land area of the country. The remaining 88% is arid and semi-arid lands (ASALs) which is generally a fragile ecosystem not suitable for crop production. Other sectors of agriculture such as horticulture and floriculture are steadily becoming dominant contributors to the economy.

Urban farming is increasingly gaining significance in the country and involves intensive vegetable production (sometimes with pesticide overuse) for the market, small scale crop-livestock systems with recycling of organic inputs, free range livestock systems using mixed wastes as fodder, stall fed livestock using managed organic waste or bought feed, and "sewage farmers" tapping the nutrients from waste water to increase crop outputs. Although the Government of Kenya provides limited extension services to urban farmers, there is no coherent legal and policy framework governing this sector (Ayaga *et al.*, 2005).

With limited arable land and 75% of its workforce engaged in agriculture, global warming which may be responsible for Kenya's severe droughts, current inappropriate farming practices, introduction of Genetically Modified Organisms, pollution and land degradation are a main threat to this sector. In improving crop production, it is necessary to strengthen environmentally friendly agricultural practices such as organic farming, environmentally safe irrigation and horticultural practices and safe use of agrochemicals. There is also need to incorporate risk assessments in the application of biotechnologies in the development of crop varieties and livestock breeds for high yields, resistance to pests and diseases as well as drought tolerance.

Challenges

- Early warning system on drought
- Development of a national land use policy
- Control pollution from agricultural practices
- Regulation on introduction of Genetically Modified Organisms (GMO's)
- Appropriate land management

Proposed Interventions

- Integrate indigenous knowledge in crop production systems
- Put in place a national a land use policy
- Control pollution from use agricultural inputs (pesticides and fertilizers)
- Regulation on introduction of Genetically Modified Organisms (GMOs)
- Adopt and implement appropriate farm management systems
- Research on drought resistant crops
- Enhance implementation of the Strategy for Revitalizing Agriculture, 2004-2014.

2.4.2 LIVESTOCK

Livestock production is a dominant activity supporting human livelihoods especially in rural and ASAL areas. The key livestock enterprises in the country are based on the following animal categories: Beef and dairy cattle, camels, poultry, pigs, sheep & goats. Other important livestock species are bees and emerging livestock species such as ostriches and guinea fowls. Each category of livestock species has special environmental preference conditions that have largely been responsible for its distribution in the country. These conditions include the socio-cultural background of the people, edaphic factors and climatic conditions. Climate has been the single most important factor in designating some areas as suitable only for livestock production i.e. the Northern and Southern rangelands for beef, camel sheep and goats' production, while the Central, Rift Valley and parts of Western Kenya are suitable for dairy cattle and poultry rearing.

Small producers dominate the Kenyan livestock sector. The livestock population is concentrated in the ASALs and accounts for 90% of employment and more than 95% of family incomes FAO-AGAL (2005). The livestock production depends on proper management of rangelands, especially movement of pastoral communities and their livestock in search of water and forage. These movements often take communities into other districts or across national borders. Environmental issues associated with livestock industry are land degradation, resource use conflicts, pests and diseases, insecurity of livestock resources, poverty, recurring drought and breakdown of indigenous knowledge on livestock management.

Challenges

- Control of land degradation
- Reduced resource use conflicts
- Control of pests and diseases
- Curbing cattle rustling
- Creation of alternative livelihoods
- Effective early warning systems
- Mainstreaming indigenous knowledge in livestock resources management

Proposed Interventions

- Develop and implement sustainable land use guidelines
- Promote conflict resolution mechanisms
- Promote environmentally friendly pests and diseases control measures
- Creation of pests/diseases free zones
- Enforce security to curb cattle rustling
- Create awareness and promote alternative livelihood programmes
- Strengthen early warning systems on drought, floods and disease outbreaks
- Promote indigenous knowledge in livestock management
- Promote animal research, market access and extension services through collaboration
- Improve livestock breeds and market access

2.4.3 FISHERIES

In the last two decades, fisheries sub-sector has gradually evolved from a traditional domestic consumption oriented industry to a modern export oriented industry. Fresh water is the leading source of fish with Lake Victoria contributing almost 50% of the total weight of fish landings. The lake currently accounts for over 90% of the tonnes of fish caught. Kenya claims 6% of Lake Victoria's total surface area, with 43% being owned by Uganda and 51% by Tanzania. Lake wide fish production is estimated at between 400 – 500 metric tons with Tanzania landing 40%, Kenya 35% and Uganda 25%. The landed value of this catch is between USD 300 – 400 million annually (EPZA, 2005). Kenya's marine coastline stretches over 536 km and accounts for only 4% of the total output.

The fisheries sub-sector provides employment and income to over 500,000 Kenyans engaged in fish production and related enterprises. In terms of contribution to the Gross Domestic Product (GDP), Kenya's fishing industry accounted for an average of 0.3% of GDP in 1999-2003. Kenya's annual average production for the period 1999-2003 was 171,000 metric tonnes with a value of approximately KShs. 8 billion in 2003.

Nevertheless, there is great potential for development of marine fisheries currently hampered by inadequate fishing gear, particularly for the lucrative deep-sea fishing. Environmental concerns for the fishery industry are: pollution of water bodies, receding water levels, over-fishing, invasive and alien species, weak implementation and enforcement of relevant legislation.

Challenges

- Control siltation and water pollution
- Protection of water catchments
- Sustainable fisheries development and management
- Management of invasive and alien species
- Enforcement of relevant legislation
- Climatic change effects which has disturbed the breeding habits

Proposed Interventions

- Enhance water catchment and land use management
- Enforcement of relevant legislation
- Promotion of sustainable fisheries development and management
- Undertaking research and strengthening collaborations on invasive and alien species management.
- Intensify surveillance of fishery activities within the Exclusive Economic Zone (EEZ).

CHAPTER THREE: HUMAN SETTLEMENTS AND INFRASTRUCTURE

3.1 OVERVIEW

This Chapter covers human settlements and planning, pollution, waste, infrastructure, water supplies and energy supply. Over the years, these issues have continued to exert pressure on the environment. A number of policies and legislations have been put in place to address some of these emerging concerns yet environmental degradation continues unabated due to weak enforcement mechanisms in the country. Kenya is still largely a rural society with most of its people living in dispersed rural settlements, which receive minimal attention in terms of development goals.

The Chapter discusses both the urban and rural environments. Urbanization process is a demographic phenomenon that has had tremendous impacts on the social and economic processes of developing countries. It is generally accepted that the causal factors for this phenomenon are: i) migration from rural areas to urban areas, ii) natural population increase among urban residents especially when economic opportunities expand iii) reclassification of previously rural areas as urban, thus becoming built up and thus changing character. It is expected that with proper planning of the human settlements and infrastructure, social, economic and environmental issues will be addressed with emphasis on sustainable development.

Urban comprises of urban centres having population of at least 2,000 during the Population and Housing Census of 1999. The population of urban centres, which was 7.8% of the total population in 1962 increased to 27% by 1999. Declines in per-capita arable land and water supply, and degradation of soil, forests, grasslands and water quality, make rural life increasingly challenging and accelerate migration to cities (Republic of Kenya, 2002). With net rural-urban migration overwhelming Kenya's cities, over half the urban population lives in informal settlements with no direct connection to municipal water or sewage service.

Many environmental contaminants as a result of urbanization, such as radioactive materials, lead, mercury and persistent organic pollutants, work their way into the food chain and eventually into human beings, thus compromising the health of present and future generations. The proliferation of policies and legislations in the recent past has seen a greater emphasis on incorporating local communities in the management of natural resources and their goods and services.

3.2 HUMAN SETTLEMENTS

Environmental issues in the human settlement include waste management, sanitation, diseases, land use changes in conservation areas, demand for water, energy, materials for construction, pollution, land degradation, policy and legislation, biodiversity loss, land tenure, housing tenure, informal settlements, urban planning and design and electronic waste.

Challenges

- Creation of employment opportunities
- Poverty alleviation
- Provision of Sanitation and access to safe Water
- Control of rural-urban migration
- Provision of basic services

Proposed Interventions

- Diversify investment to rural areas
- Create an enabling environment for investment
- Enhance planning and development of basic services
- Enforce existing legal instruments and policy initiatives
- Encourage use of appropriate building technologies and materials
- Public Health education at all levels of society.

3.3 HUMAN AND ENVIRONMENTAL HEALTH

Health problems related to adverse environmental conditions includes lack of access to safe water and sanitation, inadequate solid and liquid waste management, poor drainage, air pollution, and exposure to excessive noise levels, as well as ineffective and inadequate health services. These leads to outbreak of environmental related diseases, namely malaria, diarrhoea, cholera, typhoid, skin and eye infections diseases as reported in all the provinces (GoK, 2004).

Challenges

- Provision of sanitation facilities
- Prevention and control of environmental related diseases
- Provision of adequate portable water
- Synergy in development, harmonization and implementation of policies
- Adequate capacity to enforce existing regulations
- Prevention, control and mitigation of noise pollution

Proposed Interventions

- Rehabilitation and extension of sanitation facilities
- Sensitization of communities on the importance of health and sanitation
- Undertake prevention campaigns of environmentally related diseases
- Implementation of the environmental sanitation and hygiene policy
- Improve water quality surveillance at point of use
- Protection of water catchments
- Enhance water harvesting techniques
- Maintenance and monitoring water supply systems
- Development and harmonization of policies
- Build capacity and promote research
- Enforce and monitor existing regulations

3.4 HUMAN SETTLEMENT AND ENVIRONMENTAL POLLUTION

Human settlements are associated with generation of huge amounts of wastes. This has had serious implications on the general cleanliness of the surrounding areas and has contributed to environmental degradation, more so if the waste is composed of non-biodegradable materials. In rural areas most households dispose their garbage by dumping it on farms or gardens within their homesteads. On the other hand, the most common forms of garbage disposal in the urban areas are through public garbage heaps, pits and other undesignated dumping sites (crude dumping).

Challenges

- Adequate waste management facilities and systems
- Cost effective technologies for waste handling, transportation and disposal
- Prioritization of waste management in local authorities
- Enforcement of legislation

- Adequate capacity
- Positive attitude and behavioural change

Proposed Interventions

- Encourage public private partnership
- Promote cost effective and appropriate waste management technologies.
- Promote research and development of value added products
- Capacity building enhance capacity of cities, municipal and other local authorities to manage waste
- Enforce existing legislations
- Increase behavioural change communication in the communities

3.5 INFRASTRUCTURE

The disparity between the rate of urbanization and economic development in relation to social infrastructure, industrial growth, commerce and employment has exacerbated the proliferation of slums and squatter settlements that suffer from inadequate water, poor sanitation, waste disposal, health facilities and roads environmental pollution, land degradation, loss of biodiversity, loss of aesthetic values, radiation and inadequate enforcement of legislation. These conditions have a great impact on the quality of urban environment and that of its surrounding rural areas.

Challenges

- Averting land degradation
- Controlling air and water pollution
- Preventing loss of biodiversity
- Maintenance of aesthetic values
- Radiation emissions
- Enforcement of legislation
- Solid and liquid waste management.

Proposed Interventions

- Integration of environmental concerns into projects, programmes and activities.
- Enforce regulations
- Promote cleaner production technologies
- Rehabilitation of degraded areas
- Control and mitigation of radiation emissions
- Encourage public private partnership
- Encourage use of appropriate building technologies and materials
- Improvement of sanitary accommodation and hygiene promotion.

3.6 ENERGY SUPPLY

The provision of energy services is essential for industrialization, social development and improved quality of life. In addition, affordable energy is essential for eradicating poverty, improving human welfare, and raising living standards. The environment provides natural resources used as raw materials for the energy supply. Activities related to energy production, distribution and consumption are perhaps the largest single category of benign sources of adverse anthropogenic impacts on the environment.

Kenya has a large potential for renewable energy resources and the market for technology based on renewable forms of energy is developing rapidly. The Government recognizes that

alternative renewable energy sources hold tremendous potential, especially for reducing heavy dependence on woody biomass.

Firewood remains the predominant fuel for cooking in rural areas. Nationwide 68.3% and 13.3% of Kenya's household population utilize firewood and charcoal for cooking respectively thereby exerting enormous pressure on the environment. Over 80% of households in the rural areas use firewood for cooking while paraffin is the leading source of cooking energy used by 44.6% of urban dwellers. Over-reliance on wood fuel affects the environment negatively through felling of trees and is also associated with respiratory complications. Over three quarters of households use paraffin lamps while electricity is used by 15.6% of Kenyans. About 1.6% of Kenyan households use solar energy, and its adoption has been slow due to the high initial installation costs (KNBS, 2007). It is estimated that Kenya receives 4-6 $kW/m^2/day$ of solar energy, on average, which translates into about 1.5 billion tonnes of oil equivalent, making it a major alternative for energy. Environmental issues arising from provision of clean energy are inadequate clean energy supply, inadequate financial resources and technology, pollution control, sustainable natural resource use, enforcement of legislations and promotion of private production and distribution of energy

Challenges

- Diversification of energy sources
- Technological and financial resources.
- Provision of clean energy
- Pollution control
- Sustainable natural resource use
- Enforcement of legislations
- Promotion of private production and distribution of energy

Proposed Interventions

- Enact legislative and regulatory frameworks on energy
- Promotion of private production and distribution of energy
- Capacity building
- Provide incentives for energy production.
- Promote integrated energy planning that incorporates energy and land use concerns
- Promote energy conserving technologies and diversification of energy sources.
- Enhance partnership and promote privatization of energy utilities

CHAPTER FOUR: TRADE, INDUSTRY AND SERVICES

4.1 OVERVIEW

Trade, industry and services play a vital role in the country's economy. Kenya is an open market economy, that imports and exports goods and services from both developed and developing countries. The expanding regionalization demands an integration of regional economic blocks mainly, COMESA (Common Markets for East and Southern Africa) and East African Community (EAC) has led to increased momentum of growth of imports and exports of goods and services in the country. For example in 2006 the total value of domestic export was KShs. 250,994 million while that of imports was KShs. 521,483 million (GoK, 2007).

Kenya's exports mainly constitute primary and semi-processed goods, while the imports mainly constitute processed goods. The value of Kenya's domestic export and imports has been increasing in the recent years. Liberalization has resulted in flooding the markets with counterfeit goods. Industries, trade and services benefit a lot by adopting environmental management systems that not only address production processes but also promote waste minimization, treatment and disposal.

4.2 TRADE

Kenya's trade policy objectives are articulated in Sessional Paper No. 1 of 1986 and elaborated in the 8th National Development Plan. The country's general policy objective includes moving towards a more open regime, strengthening, increasing market access and integrating Kenya into the world economy. Kenya's domestic and international trading patterns revolve around trading in agro-based goods and other products from the industrial and manufacturing sectors. Trade is divided into domestic, regional, bilateral and multilateral.

Trade is adversely affected by a number of factors, namely; influx of imports in the market, non competitiveness of the local products, limited negotiation capacity of private and public sectors, poor infrastructure, high cost of utilities, narrow product export base, finance, effects of liberalization and high cost of inputs for the locally manufactured goods. Tariffs have become Kenya's main trade policy instrument. Since the previous Review in 1993, Kenya has reduced the overall level of protection of its economy. It has dismantled most non-tariff restrictions, except for moral, health, security, and environmental reasons, or under international conventions to which Kenya is a signatory. For the country to maximise its benefits from EG&S trade liberalisation, complementary measures will be necessary, involving the private and public sectors in decision making and operations could be facilitated by:

- Developing a clear framework for involvement by the private and sectors.
- Improving the business climate, a step particularly important for attracting foreign investment, Clean Development Mechanism should be encouraged.
- Encouraging transfers of environmentally sound technology and the forging of genuine partnerships e.g. COMESA, EAC, ACP and EU countries.
- Promoting the public capital investment necessary to make concessions feasible in water supply and other services. Government and donor support in this regard is crucial.
- Changes in legislation may be needed to avoid premature liberalisation where liberalisation takes place before a country's laws enacted can support it; incumbents tend to take advantage of the situation by introducing barriers to the entry of competitors.

Management of solid and liquid waste, poor planning of market centres, importation of obsolete technologies e.g. E-waste, unregulated importation of toxic and hazardous chemicals, trade in invasive species and endangered species, noise pollution and environmental fiscal reforms are environmental issues of concern in trade.

Challenges

- Management of solid and liquid waste from trade
- Intensify Clean development Mechanism (CDM)
- Enforcement of the urban by-laws and other relevant legislations
- Enforcement of standards
- Compliance to EIA/EA regulations 2003
- Regulation and management of toxic and hazardous chemicals
- Control trade in invasive and endangered species
- Control of noise and air pollution
- Application of economic instruments (incentives and disincentives) in trade on environmental friendly technologies

Proposed Interventions

- Proper management of solid and liquid waste
- Adoption of Clean development Mechanism (CDM)
- Enforce the by-laws and other relevant legislations on planning for location of markets
- Educate the public and control use of counterfeit goods
- Finalize and implement regulation on toxic and hazardous chemicals
- Develop a policy on trade in invasive and endangered species
- Finalize and implement regulation on noise pollution
- Develop and implement economic instruments for environmental management

4.3 INDUSTRIAL SECTOR

Kenya's industrial sector is one of the largest in sub Saharan Africa and accounted for 13% of the gross domestic product that translated to 27% of the country's exports in the year 2001 (GoK, 2004). Manufacturing currently employs approximately 250,000 people, which represents 13% of total formal employment. An additional 1.3 million small-scale manufacturers constitute the informal side of the industry. The sector is highly fragmented with more than 2,000 manufacturing enterprises**.**

Kenya aspires to be fully industrialized by year 2030, opening up job opportunities and value addition to agricultural produce and natural mineral resources for export and local consumption. This trend of development is expected to initiate industrial enterprises, which would in turn result in increased quantities and complexity of pollutants. In order to reap the full benefits of this mode of economic development while conserving the environment, there is need to plan and develop the associated infrastructure to handle increased effluents and wastes. Some of the environmental challenges facing the industry include; generation and management of solid, liquid and hazardous waste; gaseous emissions, occupational health and safety, adoption of Cleaner production technologies and compliance with EIA/EA, Waste and Water regulations.

The sector faces environmental issues on solid and liquid waste management, importation of obsolete technologies, unregulated importation of toxic and hazardous chemicals, air and noise pollution, inappropriate technology in energy production, compliance with occupational, health and safety measures, EIA/EA, poor planning in respect to industrial and residential areas and fragmented licensing procedures

Challenges

- Management of solid and liquid waste
- Enforcement of standardized technologies
- Regulation and management of toxic and hazardous chemicals
- Control of noise and air pollution
- Adoption of cleaner production technologies
- Compliance to EMCA, 1999, relevant legislations and policies
- Effective implementation Physical Planning Act 1997
- One stop shop for all licences by the relevant institutions

Proposed Interventions

- Enhance use of cleaner production systems
- Enforce and implement standardized technologies
- Finalize and implement regulation on toxic and hazardous chemicals
- Finalize and implement regulation on noise pollution
- Enforce EMCA, 1999, relevant legislations and policies
- Enforce Physical Planning Act 1997
- Develop a one stop shop for all licences by the relevant institutions

4.3.1 MINING AND QUARRYING

Kenya has great potential for mineral resources development and exploitation. Currently, there are more than 200 local and foreign companies and individuals carrying out exploitation and exploration of minerals in Kenya. Mining method is mainly open cast method due to their nature and occurrence of the minerals. Environmental impacts of quarrying and mining activities include; disturbances of flora and fauna, visual squalor, noise pollution, dust and vibrations causing negative human health impacts and destruction of property. In addition, mining operations generally affect the hydrological functions and compete with ecologically protected zones such as National Reserves and gazetted forests. Abandoned quarries are pose threat to human, livestock and wildlife.

Challenges

- Control of dust and noise pollution
- Compliance to Occupational, Health and Safety measures
- Compliance to EIA/EA regulations
- Proper land-use planning
- Rehabilitation of mined and quarried sites
- Finalise the occupation health and safety policy

Proposed Interventions

- Completion and implementation of Air quality regulations
- Enforcement of Occupational, Health and Safety regulations
- Enforcement of Physical Planning Act, 1997
- Enforcement of EMCA, 1999 and its subsidiary regulations (EIA/EA regulations)
- Enactment of the occupation health and safety policy

4.4 SERVICES SECTOR

The services sector includes a broad and diverse range of industries such as tourism, food service and wholesale and retail, health, transport and telecommunication. In general they produce non-material products, although their business often includes the supply and use of goods. Kenya is a net exporter of services, mainly tourism; however, it would seem to have potential to export other services, such as financial and transportation services. Kenya has one of the most developed banking systems in the region and, due to its geographical location; it has the potential to provide maritime services to its land-locked neighbours. This sector plays an important role in creating and supporting an enabling environment that facilitates private sector investment, growth and job creation.

4.4.1 TOURISM INDUSTRY

Tourism is the country's second-largest foreign-exchange earner, after agriculture. Tourism plays an important part in the economy accounting for over seven per cent of GDP and about 9 per cent of total formal employment. Between 2004 and 2006, tourist visitor into Kenya grew by 22 per cent per year. The industry remains a leading foreign exchange earner, and earned US$800 million in 2006. In addition, multiple linkages to other sectors (including agriculture, manufacturing, banking and finance, wildlife, entertainment and handicrafts), makes tourism critical in generating employment and wealth. For example, the sector contributes over half of the earnings in the trade, restaurant, and hotel sectors. In 2007, the sector generated 253,000 jobs in the formal market and 600,000 indirect jobs (about 13 percent of all informal sector employment) could be attributed to wildlife-related activities.

The industry is dependent on the vast and abundant natural resources in the country which include; wildlife, beaches, landscapes, and diversity of cultural, historical and archaeological resources all over the country. Its supply chain is composed of those industries that provide accommodation and transportation. While tourism has positive contributions to the national economy, it also has negative impacts on the country's socio-economic and environmental landscape.

Tourism accounts for several direct environmental impacts such as resource use, pollution and waste outputs, habitat ecosystem alteration, fragmentation, impacts on wildlife, cultural and gateways communities. Nutrients leached from the septic system of a tourist's resort are very likely, in the long run, to accelerate eutrophication and ecosystem disruptions. Lack of management plans and community involvement in tourism development initiatives has resulted in unsustainable tourism. Tourism has the potential to act as a catalyst for the development of other sectors of the economy and if properly planned will contribute to the conservation and management of the environment

Challenges

- Management of solid and liquid waste
- Sustainable management of habitats and ecosystems
- Development of management plans
- Involvement of communities in tourism development
- Conservation and promotion of indigenous knowledge in tourism management

Proposed Interventions

- Enforce EMCA, 1999 and other relevant legislations
- Preparation and implementation of comprehensive management plans

- Promotion of eco-tourism
- Integrate indigenous knowledge and cultural norms in tourism conservation
- Enhance equitable sharing of tourism benefits to the surrounding communities

4.4.2 HEALTH SERVICES

Preventive, promotive and curative health services chain includes hospitals, (public and private) health centres, clinics, pharmaceutical industries and their possible impacts on environmental quality. Impacts associated with this sector include; use and handling impacts, waste pre-treatment, transportation and disposal of hazardous materials.

Challenges

- Management of hazardous and toxic materials,
- Effective management of medical and biological waste
- Compliance to radiation regulations
- Management of emissions from incinerators
- Control of water pollution

Proposed Interventions

- Completion and implementation of hazardous and toxic chemical regulation
- Enforcement of radiation regulations
- Enforce EMCA, 1999 and other relevant legislations

4.4.3 TRANSPORT

A network of railway lines, waterways, harbours, airports and airstrips that facilitate economic and social development serves Kenya. The entire road network covers approximately 151,000 Km divided into classified and unclassified roads while the railway network consists of 2,700Km long. The use of these modes of transport often cause negative impacts on the environment such as air, noise and water pollution, clearance of vegetation, solid and liquid waste disposal resulting from vehicle operation and maintenance.

Challenges

- Control of air and noise pollution
- Compliance to EMCA, 1999 and its subsidiary regulations

Proposed Interventions

- Completion and implementation of Air Quality Regulations, Noise and Excessive Vibration Regulations 2007
- Enforcement of EMCA, 1999 and its subsidiary regulations

4.4.4 TELECOMMUNICATIONS

This sector is key to sustained economic development in Kenya. It has experienced rapid growth since 2000 due to the proliferation of mobile cellular telephones. The number of cell phone subscribers increased from 24,000 in 1999 to 5 million in 2005. The landline system has been generally unreliable, having seen little modernization except for service to businesses. In 2005 Kenya's telephone landlines numbered 282,000, compared with 106,000 in 1984. Currently, three license holders, Safaricom, Zain and Telkom Wireless, operate the cellular phone system. Internet use also has expanded rapidly, reaching 1 M by 2005 to 2.8 M (Internet stats) by 2007 (Library of Congress, Country Profile). The main environmental impacts associated with this sub sector are radiation, E-waste and solid waste management and compliance to EIA/EA Regulations.

Challenges

- Control of radiations
- Management of E-waste
- Management of solid waste management
- Compliance to EIA/EA Regulations
- Occupation Health and safety policy in place

Proposed Interventions

- Enforcement of Radiations regulations
- Develop and implement E-waste Management regulations
- Enforcement of EIA/EA Regulations, 2003 and Waste Management Regulation, 2006

4.4.5 FOOD SERVICE AND WHOLESALE AND RETAIL

Foodservice and food retail industries play a key role in job creation and provision of goods and services to the consumers. The industry is fast growing and exerts a large influence on suppliers' and consumers' behaviour. These industries are in a strong position to "green" the supply chain, signalling government or customer environmental preferences to suppliers. The sector is responsible for several negative environmental impacts such as unsustainable energy consumption; solid and liquid waste generation and disposal, food hawking, compliance to existing regulations.

Challenges

- Sustainable energy consumption
- Management of solid and liquid waste
- Compliance with Public Health Act
- Compliance with occupational Health and Safety Regulation, 2007
- Control of air emissions
- Compliance to EIA/EA Regulations

Proposed Interventions

- Enforcement of EMCA, 1999 its subsidiary legislations
- Enforcement of Public Health Act
- Enforcement of Occupational Health and Safety Regulation, 2007
- Promotion of alternative and sustainable energy consumption technologies

CHAPTER FIVE: ENVIRONMENTAL HAZARDS AND DISASTERS

5.1 OVERVIEW

People and environment face threats to their life and livelihood from natural and human related hazards. Natural hazards include drought, floods earthquakes, volcanic eruptions, landslides cyclones, and storms among others. Disasters occur when these natural hazards interact with vulnerable people, property, and livelihoods causing varying damage depending on the level of vulnerability of the individual, group, property or livelihoods. In Kenya disaster impacts have become an impediment to sustainable development and a number of regions have suffered devastating effects of disasters. The most common disasters in the country are weather related natural phenomena such as floods, droughts, landslides and lightening (Table 2). In addition anthropogenic factors causing land degradation; deforestation of catchment areas, poor agricultural practices, inappropriate land use systems, changing living conditions, among others are established to be contributing to increased impacts from the various natural hazards. In the recent past these hazards have increased in number, frequency and complexity. The level of destruction has also become more severe with more deaths of people and animals, loss of livelihoods, destruction of infrastructure, and environmental degradation among other effects resulting in losses of varying magnitudes.

Table 5. 1: Disasters distribution in Kenya.

Province	Districts	**Frequencies of Disasters**						
		Floods	Drought	Land slides	Fire	Pests & Diseases	Invasive species	Accidents & Oil spillage
Western	8	4	2	1	3	2	0	1
R/Valley	18	9	12	7	12	11	1	6
Nyanza	12	7	6	1	4	5	5	3
N/eastern	4	4	4	0	0	4	3	0
Eastern	12	6	9	4	4	8	4	3
Coast	7	6	3	1	2	4	2	6
Nairobi	6	3	0	0	6	0	1	6
Central	7	3	4	3	4	6	0	3

Source GoK, 2004 (Unpublished)

5.2 ENVIRONMENTAL DISASTERS

5.2.1 DROUGHT/ FAMINE

Almost 80 % of Kenya's land mass is affected by drought experienced on a cyclic basis. This covers most parts of Rift Valley, North Eastern, Eastern and coast provinces. Kenya's vulnerability to food insecurity is highest among the pastoralists and small-scale agriculturalists in the arid and semi-arid lands (ASALs) of the country. These areas that make more than 80% of the country's landmass are prone to harsh weather conditions rendering the communities within this region vulnerable to droughts. The ASALS, due to their fragile ecosystems, unfavourable climate, poor infrastructure and historical marginalization, represent a major development challenge for the affected populations and the Government of Kenya.

Environmental issues associated with drought are: inadequate water harvesting and storage capacity, increased destruction of forests due to charcoal burning, clearing forests for agriculture, logging without replacing trees, frequent forest fires, poor management of catchments areas, which includes destruction of forests, bushes, and plants that retain water in the soil without using appropriate soil conservation measures, cultivation on stream banks and steep slopes causing erosion of the topsoil, which silts up dams and pans usually, used as dry weather water reservoirs and lack of policy for managing drought

Challenges

- An appropriate preparedness and response to drought
- Incorporation of indigenous knowledge in natural resources management
- Appropriate land use and tenure systems
- Efficient water management strategies
- Protection of water catchment areas
- Increased vegetation/forest cover
- Creation of alternative livelihood sources

Proposed Interventions

- Strengthen early warning systems
- Integrate indigenous knowledge in natural resources management
- Develop and implement appropriate land use guidelines
- Develop appropriate water harvesting, distribution and storage techniques
- Intensify awareness on drought resistance crops and animals
- Enhance appropriate soil and water conservation measures
- Campaigns and provide incentives to increase vegetation/forest cover
- Promote alternative livelihood sources

5.2.2 CLIMATE CHANGE

Kenya is extremely vulnerable to Climate Change as our economy is heavily reliant on Climate Vulnerable sectors, such as agriculture and tourism. As a result, global average temperatures have risen both on land and in the oceans, with observable impacts already occurring. Kenya is already witnessing disappearance of the glaciers on Mt. Kenya. The country relies on water supplies from Mt. Kilimanjaro while most of the country's hydropower potential is on the water system fed by glacial melts from the Mt. Kenya.

Climate change risks are particularly high to communities directly dependent on natural resources for their livelihood. Climate change for instance induces spread of diseases, draught and floods, conflict and insecurity in resource use, overgrazing and deforestation, soil erosion and fertility decline, water scarcity, food insecurity and wood fuel crisis. The challenges arising from climate change have therefore taken centre stage in the global development agenda. Counteracting the root causes of climate change will help rehabilitate degraded areas and conserve ecosystems that are under threat. Keeping the beneficial relationship between the environment and economy forefront in national development planning and policy formulation will be key to ensuring that all development interventions remain within the carrying capacities of natural resource base.

Challenges

- Mitigation of climate change
- Climate change adaptation
- Strengthen legal and governance frameworks
- Lobbying for green development

- Financing technological innovations

Proposed interventions

- Increase of national budgetary allocation to climate change mitigation and adaptation
- Environmental management institutional strengthening
- Improving inter-sectoral coordination
- Mainstreaming sustainable land management into national planning, policy and legal frameworks
- Enhancing analysis and exchange of experiences on climate change mitigation and adaptation among stakeholders and policymakers
- Undertake research on impact of climate change on environmental , social and economic sector

5.2.3 FLOODS

Floods occur due to natural factors like flash floods, river floods and coastal floods. They may also occur due to human manipulation of watersheds, drainage basins and flood plains. Areas mostly affected by floods are Western and Nyanza provinces and in Tana River district. Slum dwellers in urban centres who have erected informal structures near rivers are also affected. Kenya's record of flood disasters indicates the worst floods recorded in 1961-62 and 1997-98, the latter ones being the most intense, most widespread and the most severe. During this season the flooding was associated with the El Nino phenomenon, a weather pattern that affects most parts of the world. Floods in Kenya have profound impacts on the environment and economic development.

Some of the impacts are; loss of life, water-borne diseases, starvation and famine, destruction of infrastructure, displacement of people, soil erosion, blockage of drainage systems, silting of rivers and dams, deforestation, encroachment of water catchment areas, poor planning and maintenance of drainage systems in urban centres, climate change - rise in sea level due to global warming, inappropriate agricultural practices, lack of awareness on preparedness and response to floods and inappropriate technology and infrastructural designs

Challenges

- Appropriate forecasting, preparedness and response to floods
- Proper planning of human settlement
- Increasing vegetation cover
- Conservation of water catchment areas
- Adopting appropriate agricultural practices
- Appropriate technology and infrastructural designs
- Mitigating effects of global warming

Proposed Interventions

- Strengthen early warning systems
- Mapping of flood prone areas
- Develop and enforce land use guidelines
- Intensify afforestation campaigns and programmes
- Enforce EMCA, 1999; Water Act 2002 and other relevant legislations
- Adopt appropriate agricultural practices
- Develop and apply appropriate technology on infrastructural designs
- Intensify efforts to mitigating effects of global warming

5.2.4 LAND SLIDES

Landslides are associated with naturally occurring vibrations, changes in water content, removal of lateral support, loading with weight and weathering or human manipulation of water courses and the composition of the slope. In Kenya, landslides and mudslides occur mostly during the rainy season and are accelerated by flooding. Mudslides have become more common in Kenya because so many forests have been cleared to make way for farmland. People have cut trees to cultivate, and the soil gets loose. They have been reported in Eastern, Western, Coast, Nyanza and North Rift Valley provinces. Causal factors of landslides are encroachment to ecologically sensitive areas, lack of enforcement of the existing regulations, inappropriate agricultural practices, lack of awareness on preparedness and response to landslides.

Challenges

- Appropriate preparedness and response to landslides
- Proper planning of human settlement
- Increasing vegetation cover
- Adopting appropriate agricultural practices
- Appropriate technology and infrastructural designs
- Developing hot spots maps
- Enforcement of the relevant acts

Proposed Interventions

- Mapping of high risk areas
- Enforce EMCA, 1999, Physical Planning Act 1996, Public Health Act cap 242 and other relevant legislations
- Complete and enforce Disaster Management Policy
- Strengthen early warning systems
- Develop and enforce land use guidelines
- Intensify afforestation campaigns and programmes
- Develop and apply appropriate technology on infrastructural designs

5.2.5 FIRE HAZARDS

Fire hazards are associated with poorly planned urban centres or wild habitat with plenty of dry material particularly during dry seasons. In the recent past, incidents of fires have become very common in Kenya. Fires associated with poor settlement planning, human activities e.g. harvesting honey, charcoal burning, limited resources and inadequate preparedness and uncoordinated response and inappropriate safety practices in industrial, commercial, and domestic set-ups are report. They are known to cause loss of life, damage to property, infrastructure and environment.

Challenges

- Appropriate preparedness and response to fires
- Proper planning of human settlement
- Adequate capacity
- Provision of adequate equipment and facilities
- Co-ordination mechanism to control fires

Proposed Interventions

- Strengthen early warning systems
- Strengthen co-ordination mechanism in the of control fire outbreaks

- Adopt and implement of the Draft National Disaster Management Policy and other related Disaster Risk Reduction policies (DRR)
- Conduct research on fire risks and associated disaster management
- Strengthen the capacity of responders' Public, Cities, municipal, local councils and decision makers
- Provision of fire breaks, in forests, ranches, slums and squatter land
- Regular Public Health Inspections at industrial, commercial and residential set ups.

5.2.6 INVASIVE ALIEN SPECIES

Kenya has had several invasions of invasive and alien species that have had negative impacts on biodiversity, agriculture and human development. Notable examples include the *Eichhornia crassipes* (water hyacinth) in Lake Victoria; *Prosopis juliflora* commonly called 'Mathenge' found in parts of the Rift Valley (Baringo), Coast Province and North Eastern, *Lantana camara* found in all parts of the country, *Striga weed* found Western and coastal Kenya*,* larger grain borer*, Prostephanus truncates.* Prosopis - a terrestrial shrub- has blocked pathways, altered river courses, taken over farmlands, and suppressed other fodder species in the areas around Lake Baringo since the 1980s (UNEP, 2009).

Ineffective control mechanism of Invasive Alien Species, lack of national capacity and adequate legal and institutional framework, uncoordinated national and regional interventions, lack of support for a preventive approach and lack of awareness are a threat to the ecosystems and have diminished genetic diversity due to its wide spread dispersal mechanism.

Challenges

- Effective management and control where possible
- Clear institutional framework and legal mandate on management of invasive species
- Develop synergy through better collaboration at national and regional level
- Develop a national plan or strategy on invasive species
- Collaborate in research on invasive species
- Promote public and political awareness on invasive species

Proposed Interventions

- Education and public awareness
- Promote alternative use of alien species
- Enforce EMCA, 1999 and other relevant legislations
- Regional and international cooperation
- Research, capacity building and monitoring of alien invasive species
- Develop a national plan on invasive alien species

5.2.7 PESTS AND DISEASES

Pests and diseases often migrate or spread across borders, causing major losses and emergencies. Such damage can be catastrophic, leading to famines and sometimes triggering trade restrictions. They have been considered a serious threat to agricultural production in Kenya. Examples of these pests common in Kenya include locusts, quelea birds; diseases such as avian flu, cholera, typhoid, tuberculosis, HIV/AIDS, rinderpest, wheat rust among others. The causes if such outbreaks are failure to incorporate indigenous knowledge in pests and diseases management, poor handling and disposal of chemicals and equipments and lack of awareness and early warnings systems on pests and diseases.

Challenges

- Effective early warnings systems
- Integration of indigenous knowledge in pests and diseases management
- Increase level of awareness on pests and diseases
- Safe disposal of chemicals and equipments
- Compliance to EMCA, 1999 and other relevant legislations

Proposed Interventions

- Develop and implement an effective early warnings systems
- Integrate indigenous knowledge in pests and diseases management
- Intensify campaigns and awareness on pests and diseases
- Enforce EMCA, 1999 and other relevant legislations

CHAPTER SIX: ENVIRONMENTAL INFORMATION, NETWORKING AND TECHNOLOGY

6.1 OVERVIEW

Information is a fundamental resource upon which organization, countries and individuals depend on in managing their affairs. In the decision making process, information is required to define objectives, set targets and guides in the implementation of programmes. In order to make an informed decision about policies and priorities, there is need to establish a strong, authoritative data gathering mechanism. Reliable and comparable information will allow the organizations to develop indicators and link them to other critical issues such as health and poverty. The implementation of environmental education and dissemination of environmental information is fundamental to enhancing public involvement and participation in environmental management that leads to change in behaviour resulting to responsible living and interaction with the environment.

Environmental information and networking technology has not received high attention and priority for many decades as compared to other sectors. Lack of capacity, poor coordination and linkages, documentation, utilization and preservation of indigenous knowledge are key issues affecting environmental information and networking at community, civil society, private sectors, learning institution, government institutions and international levels as shown in Table 6.1. There is need to develop a framework to support country-level integrated environmental assessments and reporting at all levels.

Table 6. 1: Environmental information and networking technology issues and proposed interventions at various levels

Levels	Challenges	Proposed Intervention
Community	▪ Integrate Indigenous Knowledge Systems (IKS) in natural resource conservation - conflict resolution and sustainable natural resource management; ▪ Adequate knowledge on traditional technologies to be used in conservation ▪ Establish Intergenerational linkages	▪ Policy recognition of IKS through intellectual property rights, compensation to facilitate IKS sharing ▪ Identify and link indigenous technology systems with modern technologies through research ▪ Incorporate IK curriculum in learning institutions
Civil societies (CBOs & NGOs)	▪ Strengthen links between researchers, communities and policy makers for information flow and advocacy. ▪ Coordinated project implementation by CSOs. ▪ Develop accountability and transparency in information sharing by NGOs.	▪ Enhance the capacity of the NGO Council to ease access to information generated ▪ Review legislative and institutional framework for NGO coordination ▪ Community empowerment and participation.
Private sector	▪ Adequate compliance to environmental regulations ▪ Strengthen participation in environmental management ▪ Strengthen product stewardship and information sharing	▪ Education and awareness on existing environmental regulations

Table 6. 2 Cont..

Levels	Challenges	Proposed Intervention
Learning institutions	▪ Consolidate scientific information collection and dissemination ▪ Strengthen linkages within learning institutions and other stakeholders ▪ Adequate budget allocation for ICT infrastructure	▪ Revamp and enhance the National Council for Science and Technology to be a repository of data and information ▪ Enhance integration of IKS into formal knowledge system ▪ Prioritization of ICT system
Government institutions	▪ Harmonize institutional mandates ▪ Establish inter and intra institutional linkages ▪ Harmonize protocols on information management across borders ▪ Formulate and enforce environmental policies ▪ Adequate financing of national research ▪ Improve capacities for information management	▪ Review existing institutional mandates ▪ Enhance inter and intra institutional linkages ▪ Develop transboundary information management ▪ Develop, mainstream and implement environmental policies ▪ Improve financial support to research areas ▪ Build capacity on information management
Policy makers	▪ Strengthen linkage between the researcher and policy makers ▪ Enhanced knowledge on linkages between economic growth and environmental resources issues	▪ Capacity building for policy makers
Development partners	▪ Adequate human, financial and institutional capacity ▪ Establish information sharing network between countries	▪ Build capacity ▪ Develop protocols on information sharing

CHAPTER SEVEN: GOVERNANCE, LEGAL FRAMEWORK, INSTITUTIONAL ARRANGEMENTS AND POLICIES

7.1 OVERVIEW

Governance can be defined as the manner in which power is exercised in the management of a country's environment, social and economic resources for development. Governance involves not only governments but also civil society and other actors observing laws, regulations, frameworks, systems and processes that shape the way government operates. Kenya has many institutions involved in the management of the environment. They range from government departments, Non-governmental organizations, private sector, associations, community based organization and others. With that range of institutions there is bound to be operational conflicts and duplication of roles and responsibilities. Before the enactment of EMCA in 1999 as an overarching framework law, environmental laws were scattered and many were out-dated. EMCA devolves administration of a number of environmental and natural resources management issues to communities through District and Provincial Environment Committees. Equitable distribution of costs and benefits of devolved natural resource governance is enhanced in all new policy and legal reforms. There is now a general sense that all governance structures should include at least 30% women to influence their own course.

Key issues on governance, legal framework and institutional arrangements and policies are: inadequate capacity to interpret and enforce environmental legislations; conflict of environmental legislations and institutional mandates; undefined pre-existing ownership rights and utilization of natural resources; use of incentives to strengthen compliance for environmental management; introduction and acceptance to pay for ecosystem services and goods; over reliance on elaborate and lengthy court systems and formal institution in deliberating environmental cases and inadequate capacity to domesticate MEAs.

Challenges

- Adequate capacity to interpret and enforce environmental legislations
- Harmonize environmental legislations and institutional mandates
- Incorporation of community pre-existing rights in natural resource utilization
- Acceptance to pay for ecosystem services and goods
- Devolve court systems up to the village council level and local environmental courts to help in fast tracking environmental decisions/cases.
- Devolve funds for environment management

Proposed Interventions

- Build capacity to domesticate MEAs
- Institutionalise democratic, transparent, accountable and enforceable environmental management rules and regulations
- Synergies in institutional partnership
- Institutionalise participatory, consultative and community inclusive environment management
- Review National sectoral and transboundary environmental laws to ensure harmony in natural resource management
- Build capacity to promote sustainable utilization of natural resources
- Use of incentives to promote compliance
- Incorporate transboundary environmental management into existing environmental laws

- Enhance enforcement of EMCA, 1999 and other legislations for natural resource utilization
- Valuation of ecosystem services and goods in monetary terms
- Devolvement of funds with specific percentage for environment management

CHAPTER EIGHT: IMPLEMENTATION STRATEGIES

8.1 OVERVIEW

The DEAP, PEAP and the NEAP preparation and implementation are guided by National priorities as contained in major policy documents including the ERSWEC, the National Development Plans and the Districts Development Plans. The objective of this Environmental Action Plans is to integrate environmental concerns in development planning and implementation. Environmental concerns are cross cutting in nature and their impacts are felt at local, district, regional, national and global levels Their integration in development process at all levels is essential hence the preparation of DEAPs, PEAPs and the NEAP. Their preparation and implementation is a statutory requirement under EMCA, 1999 section 38.

8.2 STAKEHOLDER INVOLVEMENT

The implementation Strategy of Environment Action Plans will involve communities, civil society, private sector, learning institutions, government, policy makers and development partners. The engagement of stakeholders in the implementation process will be guided by their statutory mandate, their capacities and priorities. The target will be to develop Provincial and District Programmes and Projects from the framework. The recently formulated Public Private Partnership strategy sets the framework for private sector involvement. Stakeholders will be involved at all stages of project preparation and implementation including monitoring and evaluation. Measures will also be explored to enable donors finance various projects.

8.3 RESOURCE REQUIREMENTS

Implementation of the Environmental Action Plans requires a deliberate and targeted allocation of resources (financial, human, and technological) that calls for resources capacity assessment. The impacts from various interventions in integration of environmental concerns often take time to be realised hence the need for prioritization as resources for allocation are usually scarce. Potential sources of funding should include locally available resources as well as Local Authorities Transfer Fund; Constituency Development Fund; Government Budgetary allocations; support from NGOs; CBOs; religious origanization, private sector and development partners.

In addition, Section 24 and 25 of EMCA, 1999 provides for the establishment of the National Trust Fund. Under the National Action Programme to combat desertification, the government established Community Desertification Trust Fund and the Drought Contingency Fund. Global funds may be accessed through Multilateral Environmental Funds – Global Environmental Facility [GEF], Clean Development Mechanism [CDM] and Terr Africa [World Bank].

It is recognized that Kenya has over time built considerable technical capacities in various disciplines. These capacities are found within specialized departments of government, state corporations, private sector research and learning institutions. The country may also access capacities from international research institutions and regional development organizations. It is expected that the preparation and implementation of National Environment Action Plans may seek technical support from these sources.

8.4 MONITORING AND EVALUATION

The purpose of monitoring and evaluation of the National Environment Action Plan is to ensure their effective and efficient implementation as well as ensuring that Environmental

concerns are addressed and integrated in the development process. This will involve documentation of 'Best Practices' for the purpose of replication. The monitoring and evaluation of the Environment Action Plans will be carried out using participatory approaches where stakeholders will be involved in all stages. Monitoring will be undertaken on continuous basis and an annual "State of the Environment" report prepared. There will be a mid-term evaluation of the NEAP Framework and a review of the same after five years.

IMPLEMENTATION MATRICES

Table 8. 1: Environment and Natural Resources Implementation Strategy

Sector	Priority Issues	Objectives	Output	Activities	Lead Institution(s)	Time Frame	Budget Kshs.
Land	National Land Policy	- To provide framework of policies and laws designed to address land management for sustainable development	- National Land Policy enacted and implemented - A legal framework on land policy implementation - Land Use Guidelines - SEA Report	- Finalize and implement the National Land Policy - Enactment of enabling legislation - Develop Land Use Guidelines - Undertake Strategic Environment Assessment	Ministry of Lands and Settlement, NEMA	2010	500M
	Land degradation	- To curb land degradation	- Information/data on land degradation - Reduced land degradation - Land use policy - Management Plans	- Conduct research on land degradation - Promote appropriate land use practices - Develop Land use Management Plans	Ministry of Lands and Settlement, DRSRS, KARI, Local Authority, WRMA	2013	700M
	Loss of Biodiversity	- To reverse the loss of biodiversity	- Increased biodiversity - Domesticated Convention on Biological Diversity (CBD)	- Reforestation and protection of flora & fauna - Implement NBSAP - Mainstream CBD in all sectoral policies	KFS, KWS, NMK, NEMA	2012	2.0B
Water	Destruction of water catchments	- To rehabilitate degraded water catchments - To provide incentives for conservation of water catchments	- Increased water volumes - Reduced siltation and pollution - Enhanced local communities participation and revenues for catchments protection	- Inventorize, map and protect all water catchments - Rehabilitation through planting appropriate species - Develop mechanism for Payment for Ecosystem Services (PES)	WRMA, KFS	2011	1.5B
	Management of Trans boundary water resources	- To effectively manage Trans boundary water resources	- Maps of trans-boundary water resources - Reports on joint water management and water potential - Policy on trans-boundary water resources	- Mapping of Trans boundary water resources - Prepare reports on joint water Management and water potential - Finalize Policy on transboundary water resources	Ministry of Water and Irrigation, Min. of Lands, KMFRI, WRMA	2013	700M
	Invasive species	- Control of invasive species	- Inventory and documentation of invasive species.	- Conduct EIA before introduction - Research on appropriate control methods	KEFRI,KARI, KEPHIS, KMFRI, WRMA	2012	100M

Environment and Natural Resources Implementation Strategy Cont...

Sector	Priority Issues	Objectives	Output	Activities	Lead Institution(s)	Time Frame	Budget
Water	Water siltation and pollution.	- To control water siltation and pollution.	- Reviewed Water Master Plan. - Improved water quality. - A map of pollution point sources and sampling points. - Reduced dangers to health.	- Review of Water Master Plan - Enforce Water Act, Water & Waste Management Regulations - Inventorize and map all water pollution point and non point sources. - Enforce Public Health Act	WRMA, MoPH and Sanitation	2011	800M
	Over-abstraction	- To control water abstraction	- A Map of existing water abstractions - Reduced no of illegal abstractions	- Inventorize existing water supplies. - Licensing water users - Implement and enforce water resources permitting regulations	Min of Water and Irrigation, WRMA	2012	50M
Forestry	Increasing forest cover	- To increase forest cover and biodiversity	- Increased forest cover - Increased forest biodiversity	- Afforestation - Reafforestation	KFS	2013	1.5B
	Unsustainable utilization of forest resources	- To diversify livelihoods - To develop and implement forest management plans	- Sustainable utilization of wood and non-wood forest products. - Inventory and maps of different land uses in forestry. - Increased Eco-tourism development. - Increased community awareness, benefits and participation in forest resource management - Economic value of forests established	- Processing licensing and marketing of wood and non-wood forest products - Inventorize and map land uses in forestry. - Develop eco-tourism facilities in both local and state owned forests. - Promote access and benefit sharing of forest resources - Forest Valuation - Establish woodlots and farm forestry - Enforcement of Forest Act	KFS, KWS, DRSRS	2013	1.0B
	Fires	- To control and manage forest fires	- Forest fire management plans	- Increase fire fighting capacity, - Identification of fire risk areas. - Develop an integrated forest fire management system - Maintenance of fire breaks. - Enhanced forest fire patrols - Construction of forest fire watch towers - Enforcement of Forest Act	KFS	2011	500M

Environment and Natural Resources Implementation Strategy Cont...

Sector	Priority Issues	Objectives	Output	Activities	Lead Institution(s)	Time Frame	Budget
Wildlife	Unsustainable management of wildlife resources.	- To promote sustainable utilization of wildlife resources	- Reviewed Wildlife Policy and Act - Updated checklist of wildlife resources - Wildlife utilization guidelines - Integrated Natural resources management plans - Reduced illegal activities - Increased community awareness, benefits and participation in wildlife resource management	- Finalise and implement Wildlife Act and Policy - Inventorize wildlife resources - Develop and implement integrated natural resources management plans - Control illegal activities in the protected and non protected areas - Promote access and benefit sharing	KWS, NMK, Private Sector, NGO	2011	1.5B
	Human wildlife conflict	- To minimize human wildlife conflict.	- MOU signed and implemented - Reviewed guidelines on compensation - Electric fences - Community involvement in wildlife resource management - Wildlife Corridors	- Develop MOU for management and utilization of wildlife resources. - Developing guideline for compensation - Fencing of protected areas - Streamline compensation schemes - Education and awareness - Secure Wildlife Corridors	KWS, NMK, Private Sector, NGOs	2012	500M
	Management of trans boundary wildlife resources	- To effectively manage trans boundary wildlife resources	- Inventory of trans-boundary wildlife resources - Harmonised regulations/policies on trans boundary wildlife resources	- Develop and implement trans-boundary management plans - Inventorize trans- boundary wildlife resources, - Develop joint wildlife resources Management regulations/policies	KWS, NGOs	2011	700M
Drylands	Land degradation	- To control land degradation	- ASAL policy and guidelines - Land use policy - Guidelines on dryland carrying capacity	- Finalization of ASAL policy & guidelines - Develop of Land use Management Plans - Research on land carrying capacity	MEMR, NEMA, Min of Regional Development, MNK&ALs	2010	250M
	Desertification	To combat desertification	- Reduced effects of climate change on community - Increased communities participation in drylands conservation	- Adoption of climatic change strategies - Implementation of NAP	MNK&ALs / Special Programmes, MEMR	2012	500M

Environment and Natural Resources Implementation Strategy Cont...

Sector	Priority Issues	Objectives	Output	Activities	Lead Institution(s)	Time Frame	Budget
Drylands	Water scarcity	- To Promote efficient water harvesting and utilization	- Diversified water harvesting and storage techniques.	- Implementation of ASALS Master plan - Development of additional watering points - Development of water harvesting and storage systems.	Min. of Special Programmes, OP/ MNK&Als, WRMA, NGOs	2011	1.4B
Wetlands	Encroachment	- To implement Wetlands Policy	- Guidelines on Wetlands Policy - Wetlands valued economically - Maps, inventory of wetlands - Community participation in wetlands conservation	- Develop and enforce guidelines - Valuation of wetland resources - Mapping and inventorization of wetlands - Education and community awareness	NEMA/ KWS, WRMA, MNMD	2011	250M
	Pollution	- To control pollution	- Reduced pollutants - Wise use of wetlands	- Enforce EMCA, 1999; Water Act & Water Quality Regulations ,Public Health Act	NEMA ,MoPH and Sanitation	2013	50M
Coastal and Marine Resources	Destruction of coastal ecosystems	- To conserve coastal ecosystems	- Increased biodiversity	- Community mobilization - Afforestation - Awareness creation	Min. of Fisheries/KFS/ KMFRI	2013	60M
	Inadequate enforcement of legislation	- To enhance compliance with relevant legislations	- Enhanced level of compliance	- Regular inspection - Prosecution	NEMA	2012	10M
	Lack of land use and development plans	- To ensure development control	- Land use and development plans	- Preparation of land use/development plans	Physical Planning Dept, LA	2012	40M
	Inadequate capacity for monitoring and surveillance	- To improve capacity for monitoring and surveillance	- Improved capacity for monitoring and capacity	- Capacity building; human, financial and institutional	All lead agencies/ Community	2011	100M
	Poor waste management	- To control pollution	- A clean coastal environment	- Enforcement of water quality and waste management regulations, 2006 - Enforcement of council By-laws	Local Authorities/ WRMA NEMA	2013	10M

Environment and Natural Resources Implementation Strategy Cont...

Sector	Priority Issues	Objectives	Output	Activities	Lead Institution(s)	Time Frame	Budget
Coastal and Marine Resources	Limited access to resources and inequitable benefit sharing	- To ensure access to resources and equitable benefit sharing	- Guidelines on access to resources and equitable benefit sharing	- Development of guidelines and MOU on access and equitable benefit sharing	Min of Finance, CDA	2012	20M
	Erosion of Indigenous Knowledge Systems in coastal resource management	- To integrate indigenous knowledge in coastal resources management	- IKS documented and incorporated in management plans	- Finalization of policy on IKS	NMK	2010	10M
	Human-wildlife conflicts	- To reduce human-wildlife conflict	- Increased benefits to community	- Enforcement of Wildlife Act	KWS	2013	150M
Agriculture	Unsustainable agricultural production.	- To promote sustainable agricultural production.	- Appropriate water harvesting and storage technologies developed - Agrochemical based pollution controlled - River banks protected - Drought tolerant crops adopted	- Promote water harvesting and storage technologies - Use efficient irrigation methods - Control of agrochemical based pollution - Intensifying river bank protection - Conduct research on drought resistant crops	Min. of Agriculture, NEMA, KMD, Min. of water and irrigation, NGOs	2013	700M
Livestock	Overstocking	- To promote sustainable livestock production.	- Provision of extension services - Guidelines on stocking capacity	- Capacity building - Determination of carrying capacity. - Provide credits, incentives for alternative livelihoods	Min of Livestock, Min. of Agriculture	2012	350M
Fisheries	Over fishing/ Depletion of fish stock	- To promote sustainable utilization of fisheries resources. - Improve market and quality control	- Improved livelihoods - Reports on sustainable yields. - Appropriate fishing gears in use - Developed fishponds	- Research to determine sustainable harvesting - Licensing - Regulation of fishing seasons - Regulated use of fishing gears - Enforce legislation on proper fishing practices - Develop fishponds at household/institution level	Min of Fisheries	2013	300M
PROPOSED BUDGET FOR IMPLEMENTATION OF ENVIRONMENT AND NATURAL RESOURCES							**9,306,650,000**

Table 8. 2: Human Settlement and Infrastructure Implementation Strategy

Sector	Priority Issue	Objective	Output	Activities	Lead Institution(s)	Time Frame	Budget
Settlements and infrastructure	Poor access to clean water and Sanitation	- To improve access to clean water and Sanitation - To provide portable water - To provide improved and accessible sanitation advocacy.	- Increased supply of clean water - Improved water sources and supply systems - Accessible improved Sanitation - Improved Hygiene - Reduction of Sanitation and Hygiene related Diseases.	- Develop infrastructure for efficient water delivery - Education and awareness creation - Enforcement of relevant legislations - Harmonize laws relating to water management - Conduct health education - Develop and disseminate IEC materials - Construct Demonstration improved Sanitation facilities - Conduct regular Water Quality Surveillance	Ministry of Water and Irrigation, NEMA, Local Authority Min. of Public Health and Sanitation,,	2013	500M
	Proliferation of informal settlements	- To enhance planned settlements	- Well-managed urban centres. - National urban development policy. - Reviewed building codes and regulations - Housing policy -	- Undertake slum upgrading - Enforce existing legislation and building codes as well as regulations - Review urban land use plans - Develop regional and local plans - Enforcement of the Public Health Act (Housing and Sanitation Requirements)	Min of Housing, Local Authorities, MNMD, MOPH and Sanitation,	2012	2.5B
	Inadequate sanitation	- To provide adequate sanitation facilities	- Rehabilitated sanitation facilities - Increased sanitation facilities - Reduced incidences of waterborne diseases - Improved sanitation	- Rehabilitation and construction of sanitation facilities - Improve sewerage systems - Enforce relevant legislation - Build capacity - Enhance education and awareness on sanitation - Enforce the Public Health Drainage and Latrine Rules - Construct Demonstration Improved Sanitary Facilities. - Implementation of the Environmental sanitation and hygiene policy	MoPH and Sanitation, Min of Water and irrigation, local authorities , Min of Education, MNMD	2013	4B

Human Settlement and Infrastructure Implementation Ctnd…

Sector	Priority Issue	Objective	Output	Activities	Lead Institution(s)	Time Frame	Budget
Settlements and infrastructure	Inadequate clean energy supply	- To promote sustainable utilisation of energy - Prevention of Indoor Pollution	- Clean energy supply - Diversification of energy sources - Increased rural electrification Programmes - CDM initiatives - Reduced no of Upper respiratory Diseases	- Promotion of public-private partnership in production and distribution of energy - Promotion of clean energy - Research to support alternative energy initiatives - Support energy conserving technologies - Invest on affordable sources of clean energy - Legalisation and regulation of charcoal - Advocacy /Public Health Education - Improvement of Air and Ventilation	Min. of Energy MFW, MOPH and Sanitation, Private Sector	2013	2B
	Pollution control	- To control pollution	- Recommendations on Management of municipal solid waste - Sanitary landfills - E-waste policy - Reduction of non point sources of water pollution.	- Research and education - Management of Health care medical and other hazardous wastes by enforcing relevant legislation and constructing sanitary landfills - GIS mapping and Inventorying all current and Proposed Waste disposal Sites - Management of electronic wastes, - Capacity building on recycling - Awareness creation and enforcement of relevant legislation.	- MOH, NEMA and Local Authorities, MOPH and Sanitation	2012	10.0B
PROPOSED BUDGET FOR IMPLEMENTATION OF HUMAN SETTLEMENT AND INFRASTRUCTURE							**19,000,000,000**

Table 8. 3: Trade, Industry and Services Implementation Matrix

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Trade	Solid and liquid waste management	- To minimize solid and liquid waste generation	- Increased no of sanitary land fills - Increased education and awareness - Operational waste treatment plants - Reduced generation of wastes	- Establishment of sanitary landfills - Enhance education and awareness - Enforcement of relevant legislations - Rehabilitation and maintenance of the treatment plants - Promote cleaner production technologies	Local Authorities, Private Sector	2011	25.0B
	Food miles of exported products e.g. Fresh produce and flowers	- To enhance and promote exportation of fresh agricultural products	- Increased acceptance of local produce in the international market	- Intensify CDM - Increased forest cover - Promotion of appropriate technology in production, processing and transportation.	Min of Agriculture and KFS, Private Sector	2012	6.0B
	Poor planning of market centres	- To develop integrated plans for market centres	- Integrated land use plans	- Meetings with relevant stakeholders to develop or review of existing plans - Implementation of plans - Monitoring of the implementation	Min of Local Governments	2011	5.0B
	Importation of obsolete technologies e.g. waste	- To ensure conformity with standards	- Increased no of goods that meet Kenyan standards	- Enforcement of standards - Adaptation and adoption of appropriate technologies	KEBS Min of industrialization	2010	25.0M
	Unregulated importation of toxic and hazardous chemicals	- To encourage importation and use of non-toxic and non-hazardous chemical.	- Enhanced compliance of regulations on toxic and hazardous chemicals	- Finalization and implementation of regulation on toxic and hazardous chemicals	NEMA, Pesticide Control Board	2010	20.0M
	Trade in invasive species and endangered species	- To control trade on invasive and endangered species	- A national Management Plan on invasive species - Developed alternative use of invasive species. - Research papers on effective management of invasive species	- Education and public awareness - Promote alternative use of invasive species - Enforce EMCA, 1999 and other relevant legislations - Regional and international cooperation - Research, capacity building and monitoring of alien invasive species - Develop a national plan on alien invasive species	ME&MR, NEMA, KEPHIS	2011	10.0M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institution	Time Frame	Budget
Trade	Air and Noise pollution	- To minimize air and noise pollution.	- Reduced air and noise pollution	- Gazettement of air and noise pollution control regulations. - Enforcement of relevant regulations. - Promote use of economic instruments - Implementation of Occupational Health Act, 2007 - Set up air quality monitoring system	NEMA, Min of Labour (Dept. of OHS)	2010	90.0 M
	Environmental fiscal reforms	- To ensure proper environmental management by use of economic instruments	- economic instruments developed for environmental management	- Develop and implement economic instruments - Provide incentives and disincentives in trade on environmental friendly technologies. - Provide incentives for acquisition and innovation on environmentally friendly technologies	NEMA, Min of Finance, Min of Trade, KAM	2011	15.0M
Industry	Poor liquid and solid waste management	- To minimize liquid and solid wastes generation	- Increased no of sanitary land fills - Reduced dumping of wastes - Increased education and awareness - Increased no of effluent treatment plants - Operational waste treatment plants	- Establishment of sanitary landfills - Enhance education and awareness - Enforcement of relevant legislations - Promote establishments of effluent treatment plants - Rehabilitation and maintenance of the treatment plants	Local Authorities and Water Service Boards and Water service providers	2011	10.0B
	Inappropriate technology in energy production	- To promote cleaner production	- Adoption of appropriate technology	- Awareness creation - Research in appropriate technology - To develop and implement regulations on the use of economic instruments - Adoption of cleaner production - Award for best practices	Min. of Energy, KAM, KEPSA	2011	20.0M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institution	Time Frame	Budget
Industry	Non-compliance with occupational, health and safety measures	- To ensure compliance of OHS measures	- Compliance to OHS	- Implementation of Occupational Health Act, 2007 - Enhance awareness and education - Regular inspections to monitor compliance	Directorate of Occupational Health and safety	2011	15.0M
	Non-compliance with EIA/EA regulations	- To ensure compliance to EIA/EA regulations	- Compliance to EIA/EA regulations	- Regular inspections to monitor compliance. - Prosecution of offenders	NEMA	2013	25.0M
	Land-use conflicts	- To harmonize conflicting land uses	- Harmonized land uses - Land use guidelines	- Proper zoning of land uses - Enforcement of EA/EIA regulations. - Enforce Physical Planning Act 1996 - Regular inspections - Develop land use guidelines	Department of Physical Planning NEMA	2011	90.0M
	Fragmented licensing procedures	- To have a one stop shop for licensing	- Established one stop shop for all licensing	- Stakeholders consultations - Establishment of one stop shop for licensing - Establishment of one stop shop for registration of MSMEs - Monitoring licensing operations	Min of Trade Min of Industrialization, KAM, KEPSA	2010	20.0M
Mining and Quarrying	Abandoned mined and quarried sites	- To rehabilitate mined and quarried sites	- Rehabilitated abandoned mined and quarried sites - Increased Public Safety. - Reduced public health nuisances. - Improved aesthetics.	- Inventorize all abandoned quarried sites - Develop and implement site management plans - Inventorize mining and quarrying firms - Identify Quarries that can be rehabilitated through construction of controlled tipping sites.	NEMA, MoPH and Sanitation	2010	25.0M
	Non-compliance to OHS measures	- To ensure compliance to OHS measures	- Compliance to OHS	- Implementation of Occupational Health Act, 2007 - Enhance awareness and education - Regular inspections to monitor compliance	Occupational Health and safety	2013	15.0M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institution	Time Frame	Budget
Mining and Quarrying	Non-compliance with EIA/EA	- To ensure compliance to EIA/EA regulations	- Compliance to EIA/EA regulations	- Regular inspections to monitor compliance. - Prosecution of offenders	NEMA	2013	10.0M
	Land-use conflicts	- To harmonize conflicting land uses	- Harmonized land uses	- Develop land use guidelines - Enforcement of EA/EIA regulations. - Enforcement of Physical Planning Act 1996 - Regular inspections	Department of Physical Planning, NEMA	2011	20.0M
Tourism	Habitat and ecosystem alteration	- To restore and minimise further habitat destruction	- Restored habitats and regulated tourism activities	- Regulation of tourism activities - Enforcement of EA/EIA regulations and Physical Planning Act 1996 - Rehabilitation degraded sites	Min. of Tourism, MEMR,	2012	20.0M
	Erosion of cultural values	- To preserve positive cultural values	- Preserved cultural values	- Education and awareness about the need for Preservation of cultural values	Min. of Tourism, Min of Education	2011	30.0M
	Generation of solid and liquid waste	- To minimize liquid and solid wastes generation	- Improved liquid and solid wastes management	- Enhance education and awareness - Enforcement of relevant legislations - Establishment of waste handling facilities and maintenance	Local Authorities and Water & Sewerage Providers, Min of Education	2012	15.0B
	Lack of management plan	- To develop management plans	- Management plans	- Preparation and implementation of comprehensive management plans - Monitoring of implementation of management plans.	Department of Physical Planning.	2012	55.0M
	Lack of community involvement in tourism development	- To involve communities in tourism development	- Community involvement in tourism development	- Develop mechanism for equitable sharing of tourism benefits to the surrounding communities - Capacity building for community	Min of Tourism, KEPSA, NGOs	2010	10.0M
Health Services	Water pollution	- To reduce water pollution	- Enhanced compliance on the water quality regulations - Increase Public Health inspections.	- Enforce water quality regulations - Monitoring to ensure compliance - Prosecution of offenders	NEMA, MOPH and Sanitation, KAM, KEPSA	2013	10.0M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institution	Time Frame	Budget
Health Services	Use and disposal of radioactive materials	- To ensure safe use and disposal of radioactive materials	- Enhanced compliance to regulations, guidelines and standards on radioactive materials	- Develop facilities for disposal of radioactive materials - Enforce regulations on radioactive materials	Radiation Protection Board,	2013	50.0M
	Air emissions from incinerators	- To minimize air emissions from incinerators	- Reduced air emissions	- Gazettement of air and noise pollution control regulations. - Enforcement of relevant regulations. - Implementation of Occupational Health Act, 2007 - Set up air quality monitoring system	NEMA/ MOH	2010	70.0M
	Use and disposal of hazardous and toxic materials	- To encourage use of non-toxic and non-hazardous chemical. - Enhanced community Safety	- Enhanced compliance of regulations on toxic and hazardous chemicals - Reduced individual and community chemical accidents	- Finalization and implementation of regulation on toxic and hazardous chemicals - Construction of demonstration Waste Treatment Incinerators	NEMA, MoPH and Sanitation	2011	10.0M
	Medical and biological waste	- To ensure proper management of medical and biological wastes	- Adoption of the 4Rs - Waste management system developed	- Segregation of waste at source - Establishment of sanitary landfills, incinerators - Enhance education and awareness - Enforcement of relevant legislations - Rehabilitate and maintain treatment plants - Develop CDM projects - Safe management of Health Care Waste.	Min of Medical Services	2011	400.0M
	Air and noise pollution	- To minimize air and noise pollution.	- Reduced air and noise pollution - Reduced noise induced deafness	- Gazettement of air and noise pollution control regulations. - Enforcement of relevant regulations. - Promote use of economic instruments - Implementation of Occupational Health Act, 2007 - Set up air quality monitoring system - Advocacy/Public Health Education - Provision of Personal Protective Equipments (PPE)	NEMA, MoPH and Sanitation	2010	90.0 M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institution	Time Frame	Budget
Health Service	Non-compliance to EIA/EA regulations	- To ensure compliance to EIA/EA regulations	- Compliance to EIA/EA regulations	- Regular inspections to monitor compliance. - Prosecution of offenders	NEMA	2013	15.0M
	Solid and liquid waste disposal	- To minimize liquid and solid wastes generation	- Increased use of incinerators - Established clean and aesthetically appealing work environments - Reduced Water borne Diseases. - Reduced nuisances and accidents at dumpsites.	- Establishment of incinerators - Enhance education and awareness - Enforcement of relevant legislations - Rehabilitate and maintain treatment plants - Conduct Regular Public Health Inspections and Advice accordingly	Water & Sewerage Providers Local Authorities, MOPH and Sanitation,	2011	400.0M
Telecommu-nication	E-waste	- To ensure safe management and disposal of E-waste	- Regulations on E-waste - Economic instruments - 3Rs	- Develop regulations on management of E-waste - Promote use of economic instruments - Establish recycling plants	Min. of Comm. & Infor, MoF	2010	10.0M
	Oil spillage	- To reduce oil spillage	- Reduced oil spillage	- Enforcement of Waste Management Regulation, 2006	NEMA	2010	10.0M
	Solid and liquid wastes management	- To ensure proper management of liquid and solid wastes	- Adoption of the 4Rs - Waste management system developed	- Segregation of waste at source - Establishment of sanitary landfills - Enhance education and awareness - Enforcement of relevant legislations - Rehabilitation and maintenance of the treatment plants - Develop CDM projects	Local Authorities and NEMA	2011	3.0B
	Non-compliance to EIA/EA regulations	- To ensure compliance with EIA/EA regulations	- Compliance to EIA/EA regulations	- Regular inspections to monitor compliance - Prosecution of offenders	NEMA	2013	15M
	Non ionization radiation regulations	- To ensure no harmful RF are emitted	- Compliance to ICNIRP regulations and guidelines	- Enforce compliance to regulation and guideline on non ionizing radiation	Radiation Protection Board,	2010	10M

Trade, Industry and Services Implementation Matrix Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Food Service and Wholesale and Retail	Solid and liquid wastes management	- To ensure proper management of liquid and solid wastes	- Adoption of the 4Rs - Waste management system developed	- Segregation of waste at source - Provision of waste receptacles - Enhance education and awareness - Enforcement of relevant legislations - Rehabilitate and maintain treatment plants - Develop CDM projects - Compliance with Public Health Act	Local Authorities, NEMA, Public Health, Private Sector	2010	1.0B
	Inappropriate technology in energy production and consumption	- To promote cleaner energy production and consumption	- Adoption of appropriate technology	- Awareness creation - Research in appropriate technology - To develop and implement regulations on the use of economic instruments - Adoption of cleaner production - Award for best practices	Min. of Energy	2011	50M
	Air and noise pollution	- To reduce air and noise pollution	- Air and noise regulations. - Database on air quality	- Gazette air and noise pollution control regulations. - Enforcement of relevant regulations. - Promote use of economic instruments - Implement Occupational Health Act, 2007 - Set up air quality monitoring system	NEMA, MoPH and Sanitation	2010	250M
	Non-compliance to OHS measures	- To ensure compliance of OHS measures	- Compliance to OHS	- Implement Occupational Health Act, 2007 - Enhance awareness and education - Regular inspections to monitor compliance	Occupational Health and safety	2012	20M
	Non- compliance to EIA/EA regulations	- Ensure compliance to EIA/EA regulations	- Compliance to EIA/EA regulations	- Regular inspections to monitor compliance. - Prosecution of offenders	NEMA	2011	60M
PROPOSED BUDGET FOR IMPLEMENTATION OF TRADE, INDUSTRY AND SERVICES							**66,985,000,000**

Table 8. 4: Environmental Disasters and Hazards Implementation Strategy

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Floods	Lack of floods management strategies	- To develop integrated flood management programme	- Strengthened early warning systems - Maps of flood prone areas - Land use guidelines - Increased tree cover in catchment areas - Improved infrastructural designs	- Strengthen early warning systems - Mapping of flood prone areas - Develop and enforce land use guidelines - Intensify afforestation campaigns and programmes - Adopt appropriate agricultural practices - Develop and apply appropriate technology on infrastructural designs - Intensify efforts to mitigating effects of global warming	Office of the President, NEMA	2010	1B
Drought	Lack of drought management strategies	- To come up with an integrated drought management programmes	- Strengthened early warning systems - Maps of drought prone areas - Land use guidelines - Developed alternative livelihoods - Increased tree cover - Developed water harvesting and storage techniques.	- Strengthen early warning systems - Promote alternative livelihood sources - Campaigns and provide incentives to increase vegetation/forest cover - Develop appropriate water harvesting, distribution and storage techniques - Enhance appropriate soil and water conservation measures - Intensify awareness on drought resistance crops and animals - Integrate indigenous knowledge in natural resources management - Develop and implement appropriate land use guidelines	Office of the President (PA), NEMA, MNK&ALs	2011	40M
Climate Change	Mitigation of Climate change impacts	- To develop and implement climate change mitigation programmes	- Increased tree cover - Clean development projects - Sensitized communities - Adoption of appropriate technologies - Research findings	- Afforestation and reafforestation - Prepare bankable projects and programmes - Integrate climate change mitigation and adaptation into the national budgetary processes - Capacity building and institutional strengthening - Improve inter-sectoral coordination - Mainstreaming sustainable land management into national planning, policy and legal frameworks - Undertake sensitization among stakeholders - Undertake research on impact of climate change on environmental , social and economic sector	KMD, NEMA, KFS, KAM, PPP, CSOs	2013	500M

Environmental Disasters and Hazards Implementation Strategy Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Land Slides	Destructions due to land slides	- To minimise destruction due to land slides	- Maps of land slides prone areas - Strengthened early warning systems - Land use guidelines - Increased forest cover - Improved infrastructural designs	- Mapping of high risk areas - Enforce EMCA, 1999, Physical Planning Act 1996 and other relevant legislations - Complete and enforce Disaster Management Policy - Strengthen early warning systems - Develop and enforce land use guidelines - Intensify afforestation campaigns and programmes - Develop and apply appropriate technology on infrastructural designs - Community Awareness to be intensified.	Office of the President (PA), Min of health – DE&DM.	2010	500M
Fire	Frequent incidences of fire outbreaks	- To reduce the incidents of fire	- Increased human and institutional capacity in fire management - Coordinated response to fire outbreaks - National Disaster Management Agency created	- Strengthen the capacity of responders' and decision makers - Enhance co-ordination mechanism in fire management - Adopt and implement of the Draft National Disaster Management Policy and other related Disaster Risk Reduction policies (DRR)	MOLG (local authorities)	2012	1.2B
Invasive Species	Lack of management plans on alien invasive species (AIS)	- To control and manage invasive species	- A national Management Plan on invasive species - Developed alternative use of invasive species. - Research papers on effective management of invasive species	- Education and public awareness - Promote alternative use of invasive species - Enforce EMCA, 1999 and other relevant legislations - Regional and international cooperation - Research, capacity building and monitoring of alien invasive species - Develop a national plan on management of alien invasive species	MENR, Private sector	2012	1.5B

Environmental Disasters and Hazards Implementation Strategy Cont...

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Pests and Diseases	Lack of early warnings systems	- To develop an effective early warning system	- Developed early warning system	- Developing and implementing an effective early warnings systems	Office of the President(PA)	2012	200M
	Incorporate indigenous knowledge in pests and disease management	- To document and integrate indigenous knowledge in pests and disease management	- Increased use of integrated pest management	- Research in IKS on pests and disease management - Integrate indigenous knowledge into modern technologies in pest and disease management	NCST, Min of Livestock, Agriculture, ICIPE	2012	50M
	Lack of awareness on pests and diseases	- To reduce incidences of pests and disease outbreaks	- Increased use of integrated pest management	- Undertake campaigns and awareness on disease and pest management	Min of Livestock, Agriculture, ICIPE	2011	100M
	Safe use and disposal of chemicals and equipments	- To ensure safe disposal chemicals and equipments	- Enhanced compliance to waste management regulations - Enhanced compliance to health and safety regulations	- Enforcing regulations waste management - Enforce EMCA, 1999 and relevant regulations - Monitoring to ensure compliance	NEMA	2012	65M
	Occupational Health and Safety of workers	- To ensure compliance of OHS measures	- Compliance to OHS	- Implementation of Occupational Health Act, 2007 - Enhance awareness and education - Regular inspections to monitor compliance	Directorate of Occupational Health and safety	2011	40M
PROPOSED BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL DISASTERS AND HAZARDS							**5,195,000,000**

Table 8. 5: Environmental Information, Networking and Technology Implementation Strategy

Sector	Priority Issues	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Environmental Information, Networking, Capacities and Technology	Inadequate documentation, utilization, integration and preservation of indigenous knowledge	- To document, and promote the utilization of IKS	- Policy on IKS - IK integrated into education curricular	- Policy formulation and implementation - Improve IK research and utilization - Incorporate IK into education curriculum	NMK	2010	150M
	Standards and formats to govern the collection, documentation, and access to environmental information and technologies.	- To harmonise standards and formats to govern the collection, documentation, and access to environmental information and technologies;	- Harmonised Environmental information standards and formats in place. - Enhanced environmental information linkages and networks	- Develop standards, formats - Review relevant existing guidelines and regulations to govern environmental information management system and technology;	Ministry of Information, NEMA, UNEP	2011	200M
	Inadequate capacity i.e. funds, infrastructure and skills	- To build capacity at all levels.	- Enhance capacity for environmental information management and sharing.	- Revamp the National Council for Science and Technology to be repository of data and information - Promote and strengthen the use of ICT - Build capacity to domesticate MEA's - Promote public and private sector participation	Min. of Comm & Infor Ministry of Planning, NCST, Private Sector	20111	400M
PROPOSED BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL INFORMATION, NETWORKING AND TECHNOLOGY							**750,000,000**

Table 8. 6: Governance, Legal Framework, Institutional Arrangements and Policies Implementation Strategy

Sector	Priority Issue	Objective	Output	Activities	Lead Institutions	Time Frame	Budget
Environmental governance and institutional arrangement	Over reliance on lengthy court systems and formal institution in deliberating environmental cases	- Establish environmental courts within the existing system and strengthen traditional arbitration	- Environmental courts and traditional arbitration system in place	- Build capacity to operationalize arbitration system and environmental courts	Office of the Chief Justice, NEMA	2012	200M
	Inadequate capacity to interpret and enforce environmental legislations	- To develop an effective environmental governance system	- Harmonized sectoral laws - Enhanced compliance - Trained Lawyers and Judiciary on Environmental Law	- Review sectoral laws to ensure harmony in natural resource management - Use of Incentives to promote compliance - Build capacity for legal Professionals	MENR	2012	300M
	Environmental resource valuation	- To integrate economic values of environmental services and resources in national planning process	- Integrated economic valuation of environmental services and resources in national planning	- Valuation of ecosystem goods and services in monetary terms	ME&MR, Min of planning, Finance	2013	200M
	Harmonization of environmental legislations and institutional mandates	- To harmonize sectoral legislations with EMCA	- Harmonized sectoral laws and Policies	- Review of sectoral laws; - Amendment of EMCA 1999; - Amendment and formulation of other relevant policies	All lead agencies	2012	500M
	Use of incentives to strengthen compliance to environmental management	- To enhance appropriate instruments and technologies on environmental management system	- Increased use of appropriate incentives and technologies	- Develop and apply economic instruments and technologies	Ministry of Planning, MoPH and Sanitation	2010	100 M
PROPOSED BUDGET FOR IMPLEMENTATION OF GOVERNANCE, LEGAL FRAMEWORK, INSTITUTIONAL ARRANGEMENTS AND POLICIES							**1,300,000,000**

MONITORING AND EVALUATION MATRICES

Table 8. 7: Environment and Natural Resources Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Lead Institutions for M&E
Land	Finalization and implementation of National Land Policy	- National Land Policy in place	- The National land policy	Annual	Min. of lands and Settle.
		- No of recommendations implemented	- Reports	Annual	Min. of lands and Settle.
	Promote appropriate land use practices and research	- Appropriate land use practiced	- Land use guidelines - Research findings on land degradation	Annual	MoA
Water	Protection of water catchments and control of siltation	- No. of water potential reports	- Reports on water potential	Annual	WRMA
		- No. of catchments areas mapped and rehabilitated	- Reports	Annual	WRMA
		- No. of catchments committees implementing PES	- Reports	Annual	WRMA
		- National Land Use Policy	- Policy	Annual	Ministry of Lands and settlement
		- SS level in rivers, reservoirs and lakes.	- Reports	Annual	WRMA
		- Turbidity level in rivers, reservoirs and lakes	- Reports	Annual	WRMA
	Management of Trans boundary water resources	- No. of mapped areas	- Maps	Annual	WRMA, DRSRS
		- No. of reports on joint water management and water potential	- Reports - Protocol on Environment (EAC) Commission on Lake Victoria	Annual	WRMA, Min. of Water & Irr.
		- Policy on trans-boundary water resources	- Policy	Annual	Min. of Water & Irrigation.
	Water pollution control	- Inventory and mapping of all significant point sources of pollution - Inventory and mapping of all diffuse sources of pollution	- Inventory reports - Maps	Annual	WRMA, NEMA, Ministry of Public Health and Sanitation
		- Environmental (ambient) Water Quality Standards	- Progress reports - Standards in place	Annual	WRMA, NEMA, KeBS, Ministry of Water and Irrigation
		-Concentration of pollutants levels in water bodies	- Water quality reports	Quarterly	WRMA
		- No of prosecutions	- Reports on compliance/non-compliance to water quality regulations	Quarterly	WRMA, NEMA. Ministry of Public Health and Sanitation

Environment and Natural Resources Monitoring and Evaluation Strategy Cont….

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Lead Institutions for M&E
		- No of Inspection of pollution sources	- Reports	Quarterly	WRMA, NEMA, Ministry of Public Health and Sanitation
		- No. of discharge licences issued	- Reports	Quarterly	WRMA, NEMA
	Control of invasive alien species	- No. of EIAs conducted on invasive alien species	- EIAs reports on invasive alien species	Bi annual	NEMA
		- No. of Environmental Audit reports on invasive species	- Audit reports on invasive species	Annual	NEMA
		- No. of invasive alien species identified	- Report on distribution and control of invasive alien species	Bi annual	NEMA, KWS, KARI DRSRS
		- No. of maps on invasive alien species distribution	- Maps on distribution of alien species	Annual	NEMA ,KWS, KARI, DRSRS
	Control water abstraction	- No. of water permits issued and user charges levied	- Report of water permits issued and user charges levied	Quarterly	NEMA, WRMA
		- No. of water abstractions mapped	- Report of existing water abstractions	Annual	WRMA, NEMA
Forests	Afforestation and re-afforestation	- Increased forest cover	- Report	Annual	KFS, LA
	Forest Cover assessment	- Ha under forest cover - No of Indicator species	- Reports, Maps, inventories	Annual	KFS
	Sustainable management of forest resources	- No. of management plans	- Management plans	Annual	KFS, LA
		- No. of successful non-extractive projects	- Reports	Annual	KFS, LA
		- Increased forest biodiversity	- Inventories	Annual	KFS, LA
	Forest fires management	- Type and no. of fire fighting equipment	- Reports	Annual	KFS, LA
		- No. of forest fire risk areas mapped.	- Reports	Annual	KFS, LA
		- No. of integrated forest fire management system	- Reports	Annual	KFS, LA
	Effective Management of Trans boundary forests	- No. of joint management plans	- Joint management plans	Annual	KFS
		- No. of agreements	- Signed agreements	Annual	KFS
		- No. of guidelines developed	- Guidelines to manage shared forest resources	Annual	KFS

Environment and Natural Resources Monitoring and Evaluation Strategy Cont….

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Lead Institutions for M&E
Wildlife	Sustainable management of wildlife resources	- Reviewed Wildlife Act and Policy	- Revised Wildlife Act and Policy	Annual	KWS
		- No. of integrated management plans	- Integrated Management plans	Annual	KWS
		No. of licensed wildlife utilization ventures	- Reports	Annual	KWS
		- Inventory of wildlife resources	- Inventory report	Annual	KWS
		No. of offenders apprehended and prosecuted	- Reports	Annual	KWS
	Human wildlife conflict	- No. of cases reported and compensated	- A report	Annual	KWS
		- No. of wildlife corridors and protected areas reclaimed	- Reports on wildlife corridors	Annual	KWS
		- No. of easement, restoration and conservation orders enforced	- Status Reports	Annual	KWS
		- No. of compensation schemes	- Reports	Annual	KWS
	Management of trans boundary wildlife resources	- No. of trans boundary management plans and guidelines	- Trans boundary management plans	Annual	KWS
		- No. of regulations /policies	- Reports	Annual	KWS
Dry lands	Combat desertification	- No. of programmes initiated on domestication of UN Convention to Combat Desertification (UNCCD)	- A status report	Annual	MEMR
		- No. of strategies developed to mitigate against climatic change effects	- A status report	Annual	MEMR
	Promote efficient water harvesting and utilization	- No. of programmes initiated and implemented on efficient water harvesting techniques	- Reports	Annual	MNK&ALs
Wetland	Implement Wetlands Policy	- No. of wetlands identified gazetted - Proportion of wetland protected from intensive human activities - No. of wetlands mapped and Inventoried - No. of wetlands valued - No. of community initiatives - No. of Ramsar sites	- Inventory reports, gazette notices, maps - Reports	Annual Annual	NEMA MENR
	To control pollution	- No of cases reported and prosecuted	- Reports	Annual	

Environment and Natural Resources Monitoring and Evaluation Strategy Cont….

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Lead Institutions for M&E
Coastal and Marine Resources	Community awareness & afforestation	- No. of awareness programmes initiated - No. of afforestation programmes initiated - Area afforested	- Status report	Annual	Min. of Fisheries
	Regular inspection Prosecution	- Enhanced level of compliance	- Inspection reports	Annual	NEMA
	Preparation of land use/ development plans	- No. of land use and development plans developed	- Land use and Development plans	Annual	Physical Planning Dept
	Capacity building; human, financial and institutional	- No of personnel trained - Type and No. of equipment purchased	- Reports	Annual	All lead agencies/co mmunity
	Enforcement of water quality and waste management regulations, 2006 Enforcement of council By-laws	- No. of licences issued - No. of Inspections and prosecutions done - No. of environmental conservation, easement and conservation orders issued	- Report on compliance levels - Case proceedings reports	Annual	Local Authorities/ NEMA
	Development of guidelines and MOU on access and equitable benefit sharing	- Guidelines on access to resources and equitable benefit sharing developed	- Reports on guidelines developed	Annual	Min of Finance
	Finalization of policy on IKS	- Finalization of IKS policy	- IKS policy finalised and gazetted	Annual	NMK
Agriculture	Promote sustainable agricultural production.	- No. of appropriate water harvesting technologies developed	- Report	Annual	WRMA
		- No. of efficient irrigation methods developed	- Report	Annual	WRMA
		- No. of drought tolerant crops adopted by local communities	- Report	Annual	MoA
		- No. of awareness and education programmes initiated on safe use of agrochemicals	- Reports on awareness	Annual	Pest Control and Management Board
		- Length of river bank protected	- A status report	Annual	WRMA
		- No. of effluent discharge licences	- A report on licence and monitoring	Annual	NEMA
		- No of soil conservation methods in use - Area of land protected from soil erosion	- Reports	Annual	Min Agri and Irrigations

Environment and Natural Resources Monitoring and Evaluation Strategy Cont...

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Livestock	Control of overstocking	- No. of awareness programmes initiated and implemented	- Reports	Annual	Ministry of Livestock
		- No. of reports on land carrying capacity for various ecozones	- Reports on land carrying capacity	Annual	MNK & ALs
		- No. of programmes initiated to provide credits, incentives for alternative livelihoods	- Reports	Annual	Ministry of Livestock
Fishing	Control of over-fishing	- Status of inventory/research on fish stock	- Inventory report	Annual	Min. of Fisheries
		- No. of non-compliance vessels reported	- Reports on enforcement to fishing legislation	Annual	KEMFRI
		- No. of fishing regulations developed	- A report on fishing regulations	Annual	Min. of Fisheries, NEMA
		- No. of cases reported and prosecuted	- Report	Annual	NEMA
		- No. of fishponds developed at household/institution levels	- Reports	Annual	Min. of Fisheries

Table 8. 8: Human Settlement and Infrastructure Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Settlement and Infrastructure	Improve access to clean water and Sanitation	- % of people with access to clean water - % of people with Sanitary facilities	- Survey Reports	Annual	MoWI MoPH and Sanitation
		- No. of water facilities developed for efficient delivery - % of house holds within 30 min of functional safe water source	- Reports	Annual	Local Authorities
		- No. of Public Health education awareness programmes initiated and implemented	- Reports	Annual	MoPH and Sanitation
		- Level of enforcement on relevant legislations	- Reports	Annual	Local Authorities
		- No. of harmonized laws	- Reports	Annual	Local Authorities
	Control of unplanned settlement	- No of Authorities to manage urban centres established	- Report on institutional structure in place	Annual	Physical Panning
		- No. of updated urban land use plans	- Urban land use plans	Annual	Physical Panning
		- A National Urban Policy in place	- A policy paper	Annual	Min. of Housing
		- No. of informal settlements upgraded	- A report on the number of houses upgraded	Annual	Min. of Housing
		- Housing policy	- A policy paper	Annual	Min. of Housing
		- No. of Building Plans Approved by PUBLIC Health department	- A report on no. of Housing Plans Approved.	Annual	Mo Housing MoPH and Sanitation
	Provision of adequate sanitation facilities	- No. of upgraded sewerage infrastructure	- Reports	Annual	Local Authorities
		- No. of houses connected to sewer line	- Reports	Annual	Local Authorities
		- No. of effective sewage plants in place	- EA reports	Annual	Local Authorities
		- No. of house holds utilizing Improved Sanitation facilities	Report	BI-Annual	MoPH and Sanitation
		- Level of enforcement on relevant legislations	- Reports	Annual	Local Authorities
		- No. of education awareness programmes initiated and implemented	- Reports	Annual	Local Authorities

Human Settlement and Infrastructure Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
	Promote utilization of clean energy	- No. of cleaner energy production technologies adopted	- A report	Annual	Min. of Energy
		- A National Charcoal Policy in place	- Policy paper	Annual	Min. of Energy
		- Concentration of carbon mono oxide in designated parts of major urban centres	- Reports - Research findings	Annual	NEMA Min of Industry
	Energy supply and demand assessment	- Total primary energy supply by fuel type - Annual energy consumption per capital - Share of consumption of renewable energy resources	- Reports	Annual	Min of Energy
		Electricity generation by fuel type	- Reports	Annul	Min of Energy
Settlement and Infrastructure	Control of pollution (Solid, liquid, E-waste, hazardous waste)	- No. of sanitary landfills in place	- A report	Annual	Local Authorities
		- No. of waste recycling activities in place	- A report	Annual	Local Authorities
		- No. of incineration facilities in place	- Inventory report	Annual	Local Authorities
		- No. of awareness programmes in place	- Reports	Annual	NEMA
		- No. of waste and effluent discharge licence issued	- Licences issued and monitoring reports	Annual	NEMA
		- No. of degraded sites rehabilitated	- Reports	Annual	NEMA
		- No. of cases reported and prosecuted	- Report	Annual	NEMA

Table 8. 9: Trade, Industry and Services Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Trade	To minimize solid and liquid waste generation	- No. of sanitary landfills established	- Records	Annual	NEMA, Local Authorities
		- No. of awareness programmes initiated	- Records	Annual	NEMA, Local Authorities
		- No. of offenders prosecuted	- Records	Annual	NEMA
		- No. of treatment plants constructed and rehabilitated	- Records	Annual	NEMA
	To enhance and promote exportation of fresh agricultural products	- No. of successful CDM projects initiated and implemented	- CDM projects	Annual	ME&MR
		- Forest cover acreage increased	- Report	Annual	KFS
		- Types and No. of appropriate technologies in production, processing and transportation promoted	- Report	Annual	MoA, KFS
	To develop integrated plans for market centres	- No. of reviewed land use plans	- Records	Annual	Min. of Lands & Settle. Local Government
		- No. of offenders prosecuted	- Records	Annual	NEMA, Local Government
	To ensure conformity with standards	- No. of containers with counterfeits goods impounded	- Records	Annual	KEBS, KRA
	To encourage importation and use of non-toxic and non-hazardous chemical.	- Finalized regulation on toxic and hazardous chemicals	- Regulation	Annual	NEMA
		- No. of licenses issued to toxic and hazardous chemicals manufacturers, handlers and importers.	- Records	Annual	NEMA
	To control trade on invasive and endangered species	- A national management plan on invasive and endangered species	- Records	Annual	NEMA
		- No. of awareness programmes initiated	- Records	Annual	NEMA, Min. of Trade
	To minimize air and noise pollution.	- No. of licenses issued to proponents under Air and Noise Pollution Control Regulations.	- Records of EA reports	Annual	NEMA
		- No of programmes initiated to promote use of economic instruments	- Records	Annual	Ministry of Trade, KIRDI
		- No. of OHS compliant certificates awarded	- Records	Annual	Directorate of OHS Services.
	To ensure proper environmental management by use of economic instruments	- No. of programmes initiated to promote use of economic instruments	- Records	Ministry of Trade, KIRDI	Annual
		- No. Enterprises listed for tax waivers for using environmentally friendly technologies	- Records	KRA/ NEMA	Annual

Trade, Industry and Services Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Industry	To minimize solid and liquid waste generation	- No. of sanitary landfills established	- Records	Annual	NEMA, Local Autho.
		- Quantity of solid waste disposed in land fills	- Records	Annual	LA, Private sector
		- No. of awareness programmes initiated	- Records	Annual	NEMA, Local Authorities
		- No. of offenders prosecuted	- Records	Annual	NEMA
		- No. of treatment plants constructed and rehabilitated	- Records	Annual	NEMA
		- % of solid waste recycled	- Records	Annual	LA, Private sector
	Adoption of appropriate technology	- No. of awareness programmes on appropriate technology initiated	- Record	Annual	KNCPC
		- No. of regulations developed on use of economic instruments	- Regulations	Annual	NEMA
		- No. of environmentally friendly technologies developed and implemented	- Record	Annual	KNCPC
		- No. of enterprises participating/receiving cleaner production awards	- Record	Annual	KNCPC
	To ensure compliance to OHS measures	- No. of OHS compliant certificates awarded	- Records	Annual	OHS
		- No. of awareness programmes on OHS initiated	- Record	Annual	KNCPC
		- No. of offenders prosecuted on OHS compliance	- Records	Annual	NEMA
	Compliance to EIA/EA regulations	- No. of EIA licences issued and EA letters of compliance.	- Records	Annual	NEMA
		- No. of offenders prosecuted EIA/EA compliance	- Records	Annual	NEMA
	To have a one stop shop for licensing	- No. of a one stop shop for licensing established	- Records	Annual	Min of Ind. Min of Trade
Mining and Quarrying	To rehabilitate mined and quarried sites	- No. of abandoned mines and quarries rehabilitated	- Records from NEMA		Annual
		- No. of site management plans developed and implemented	- Management Plans	Annual	NEMA
		- List of mining and quarrying firms	- Records	Annual	ME&MR
	To ensure compliance of OHS measures	- No. of OHS compliant certificates awarded	- Records	Annual	OHS
		- No. of awareness programmes on OHS initiated	- Record	Annual	KNCPC
		- No. of offenders prosecuted on OHS compliance	- Records	Annual	NEMA
	To ensure compliance to EIA/EA regulations	- No. of EIA licences issued and EA letters of compliance.	- Records	Annual	NEMA
		- No. of offenders prosecuted EIA/EA compliance	- Records	Annual	NEMA
	To harmonize conflicting land uses	- Land use Guidelines developed	- Guidelines	Annual	NEMA
		- No. of offenders prosecuted on EIA/EA/OHS/ Physical Planning Act compliance	- Records	Annual	NEMA

Trade, Industry and Services Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Tourism	To restore and minimise further habitat destruction	- No. of eco-tourism programmes initiated	- Reports	Annual	KFS, Min. of Tourism
		- No. of tourism sites rehabilitated	- Reports	Annual	KFS, Min. of Tourism
		- No. of offenders prosecuted	- Reports	Annual	KFS, Min. of Tourism, NEMA
	To preserve cultural values	- No. of programmes initiated to preserve cultural values	- Reports	Annual	Min. of Tourism
	To minimize liquid and solid wastes generation	- No. of sanitary landfills established	- Reports	Annual	Local Authorities
		- No. of awareness programmes initiated	- Reports	Annual	Local Authorities
		- No. of offenders prosecuted	- Court Proceedings	Annual	NEMA, Local Authorities
		- No of treatment plants rehabilitated and maintained	- Reports	Annual	Local Authorities
	To develop management plans.	- No. of ecosystems units with management plans.	- Records	Annual	Local Authorities/KWS
	Enhance eco tourism	- No. of community enterprises	- Records	Annual	Min of Tourism
Health Services	Enhanced compliance on the water quality regulations	- No. of effluent discharge licences issued by NEMA	- Reports	Annual	NEMA
	To ensure safe use and disposal of radioactive materials	- No of facilities for disposal	- Reports	Annual	Radiation Protection Board,
		- No of cases prosecuted	- Reports	Annual	Radiation Protection Board, NEMA
	To minimize air emissions from incinerators	- Gazetted air and noise pollution control regulations.	- Gazette notice	Annual	NEMA
		- No. of cases reported	- Reports	Annual	NEMA
		- No. of air quality monitoring systems set up	- Reports	Annual	NEMA
	To encourage use of non-toxic and non-hazardous chemical.	- Regulation on toxic and hazardous chemicals Finalized and implemented	- Regulations	Annually	NEMA
		- No of Chemical safety (Public Health) Inspections Conducted	- Reports	Annual	MoPH and Sanitation
	To ensure proper management of medical and biological wastes	- No. of waste segregation sites	- Reports	Annual	MoH
		- No. of sanitary landfills established	- Reports	Annual	MoH
		- No of awareness programmes initiated	- Reports	Annual	MoH
		- No. of Chemical safety (Public Health) Inspections Conducted	- Reports	Annual	MoPH and Sanitation
		- No. of cases prosecuted	- Reports	Annual	MoH/NEMA
		- No. of treatment plants rehabilitated and maintained	- Reports	Annual	MoH
		- No. of CDM projects developed	- Reports	Annual	MoPH and Sanitation

Trade, Industry and Services Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Health Services	To minimize air and noise pollution.	- Gazetted air and noise pollution control regulations.	- Gazette notice	Annual	NEMA
		- No. of cases reported	- Reports	Annual	MOH/NEMA
		- No. of economic instruments	- Reports	Annual	NEMA
		- No. of air quality monitoring systems set up	- Reports	Annual	NEMA
	To minimize liquid and solid wastes generation	- No. of sanitary landfills established	- Reports	Annual	MOH, Local Authorities
		- No. of awareness programmes initiated	- Reports	Annual	MOH, Local Authorities
		- No. of offenders prosecuted	- Court Proceedings / Reports	Annual	LA/NEMA, MoPH and Sanitation
		- No. of treatment plants rehabilitated and maintained	- Reports	Annual	MOH, Local Authorities
	To ensure compliance to EIA/EA regulations	- No. of EIA licences issued and EA letters of compliance.	- Records	Annual	NEMA
		- No. of offenders prosecuted EIA/EA compliance	- Records	Annual	NEMA
Telecommunication	To ensure safe management and disposal of E-waste	- Regulations on management of E-waste	- Regulation	Annual	NEMA
		- No. of programmes initiated to promote use of economic instruments	- Reports	Annual	Min. of Comm. & Infor, .MoF, NEMA
	To reduce oil spillage incidence	- No. of incidences reported - No. of sites restored	- Reports	Annual	NEMA
Food Service and Wholesale and Retail	To ensure proper management of liquid and solid wastes	- No. of facilities which have embraced segregation of waste concept	- Reports	Annual	Min. of Comm. & Infor/Private Sector, MoPH and Sanitation,
		- No. of sanitary landfills established	- Reports	Annual	Min. of Comm. & Infor
		- No of awareness programmes initiated	- Reports	Annual	Min. of Comm. & Infor
		- No of cases prosecuted	- Reports	Annual	Min. of Comm. & Infor/NEMA
		- No of treatment plants rehabilitated and maintained	- Reports	Annual	Min. of Comm. & Infor
		- No of CDM projects developed	- Reports	Annual	Min. of Comm. & Infor, MoPH and Sanitation
	To promote cleaner energy production and consumption	- No. of awareness programmes	- Reports	Annual	Min of Energy
		- No. of economic instruments developed and implemented	- Reports	Annual	Min of Finance/ Energy
		- No. of CDM programmes initiated	- Reports	Annual	Min of Finance/ Energy, MoPH and Sanitation
		- No of awards for best practices	- Reports	Annual	Min of Energy

Trade, Industry and Services Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of Verification)	Reporting Schedule	Lead Institutions for M&E
Food Service and Wholesale and Retail	To minimize air and noise pollution.	- Gazetted air and noise pollution control regulations	- Gazette notice	Annual	NEMA
		- No. of cases reported	- Reports	Annual	Min of Energy/NEMA
		- No of economic instruments	- Reports	Annual	Min of Energy/NEMA
		- No. of air quality monitoring systems set up	- Reports	Annual	NEMA
	To ensure compliance of OHS measures	- Implementation of Occupational Health Act, 2007	- Report	Annual	Public Health
		- No of awareness programmes initiated	- Report	Annual	MoH/Public Health
		- No. of cases reported	- Report	Annual	MoH/Public Health
	To ensure compliance to EIA/EA regulations	- No of awareness programmes initiated	- Report	Annual	MoH/Public Health
		- No of cases prosecuted	- Report		NEMA/Public Health

Table 8. 10: Environmental Hazards and Disasters Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Responsible Institutions for M&E
Floods	To develop an integrated flood management programme	- Effective early warning systems in place	- Reports	Annual	Office of the President (PA)
		- No. of maps developed on flood prone areas	- Reports	Annual	Office of the President (PA)
		- Land use guidelines developed	- Reports	Annual	NEMA
		- No. of afforestation campaigns and programmes initiated	- Reports	Annual	KFS/Private Sector
		- No. of farmers applying appropriate agricultural practices	- Reports	Annual	Min. of Special Programmes/ MoA
		- No. of facilities with appropriate infrastructure designs	- Reports	Annual	Office of the President (PA)/ Public works
Drought	To come up with an integrated drought management programmes	- Effective early warning systems in place	- Reports	Annual	Office of the President (PA)
		- No. of alternative livelihood programmes initiated in ASALs	- Reports	Annual	Min. of Special Programmes, Private Sector
		- No. of afforestation campaigns and programmes initiated	- Reports	Annual	KFS/Private Sector
		- No. of appropriate water harvesting, distribution and storage techniques developed	- Reports	Annual	Min. of Special Programmes Min of Water and Irrigation
		- No. of farmers who have adopted appropriate soil and water conservation measures	- Reports	Annual	Min. of Special Programmes MoA
		- No. of awareness programmes on drought resistance crops and animals	- Reports	Annual	Min. of Special Programmes, MoA
		- No. of programmes integrating IKS in natural resources management	- Reports	Annual	Min. of Special Programmes, NMK, NEMA
		- Land use guidelines	- Guidelines	Annual	NEMA
		- No. of designated and gazetted water catchment areas	- Reports	Annual	WRMA, NEMA
Climate Change	To develop and implement climate change mitigation programmes	- % increase in tree cover - No. of Clean development projects - Sensitized communities - No. of adoption of appropriate technologies - No. of research findings	- Reports		NEMA, KFS, MEMR, KAM, Research Institutions
Land Slides	To reduce land slides incidences	- Extent high risk areas mapped	- Maps	Annual	DRSRS
		- Level of compliance to EMCA, 1999, Physical Planning Act 1996 and other relevant legislations	- Report	Annual	NEMA, Min. of Lands
		- Disaster policy in place	- Policy	Annual	Office of the President (PA)
		- Effective early warning systems in place	- Reports	Annual	Office of the President (PA)

Environmental Hazards and Disasters Monitoring and Evaluation Strategy Cont…

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Responsible Institutions for M&E
Land Slides	To reduce land slides incidences	- No of landslide areas rehabilitated	- Reports	Annual	Office of the President (PA)
		- Land use guidelines	- Guidelines	Annual	NEMA
		- No. of afforestation campaigns and programmes initiated	- Reports	Annual	KFS/Private Sector
		- No. of facilities with appropriate infrastructural designs	- Reports	Annual	Min. of Special Programmes/ Public works
Fires	Fire management	- No. and type of fire fighting equipment	- Reports	Annual	Office of the President (PA)/ LA
		- No. of personnel trained	- Reports	Annual	Min. of Special Programmes/ LA
		- A fire management coordinating unit	- Reports	Annual	Office of the President (PA)/ Local Authority
		- National Disaster Management Policy and other related Disaster Risk Reduction policies (DRR)	- Policies	Annual	Office of the President (PA)
Alien & Invasive Species	To control and manage invasive species	- No. of exchange programmes on management of invasive species	- Reports	Annual	Office of the President (PA)KEFRI
		- No. of alternative uses for invasive species	- Report	Annual	Min. Sci. & Tech.
		- Level of compliance to EMCA, 1999 and other relevant legislations	- Report	Annual	KEPHIS, KFS, NEMA
		- No. of regional and international cooperation programmes developed and implemented	- Report	Annual	Min of Regional Cooperation
		- National Management Plan on invasive species in place	- Reports	Annual	Min. of Special Programmes KEFRI
Pests & Diseases	Develop an effective early warning system	- Effective early warning systems in place	- Reports	Annual	Office of the President (PA), MoA, MoL,
	Integrate IKS in pests and disease management	No. of programmes integrating IKS into modern technologies in pest and disease management	- Reports	Annual	Min. of Special Programmes, NMK, NEMA
	Reduce incidence of pests and disease outbreaks	- No of awareness programmes on disease and pest management	- Reports	Annual	Min. of Special Programmes, NEMA
	Safe use and disposal of chemicals and equipments	- No. of incidences reported and prosecuted	- Reports	Annual	Pesticides & Poisons Board, NEMA
	Ensure compliance of OHS measures	- Implementation of Occupational Health Act, 2007	- Report	Annual	Public Health
		- No of awareness programmes initiated	- Report	Annual	Public Health
		- No. of cases reported	- Report	Annual	Public Health

Table 8. 11: Environmental Information, Networking and Technology Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Responsible Institutions for M&E
Information, Networking and Technology	To document, and promote the utilization of IKS	- Policy formulated and implemented	- Policy document	Annual	NMK
		- Level of IKS documented, promoted and integrated into education curriculum	- Report	Annual	NMK, Min of Education
	To develop standards & formats	- No of harmonised environmental information standards and formats.	- Formats and standards	Annual	Ministry of Information, NEMA
	To review relevant existing guidelines and regulations	- No. of guidelines and regulations reviewed	- Legal notices	Annual	NEMA
	Revamp the National Council for Science and Technology to be repository of data and information	- Type and no. Infrastructure put in place	- Reports	Annual	Min of Information, Min of Planning, NCST
	Promote and strengthen the use of ICT	- No. of trained personnel in ICT	- Reports	Annual	Ministry of Information
	Promote public and private sector participation	- No. of collaborative programmes initiated	- Collaborative Programmes	Annual	Ministry of Information

Table 8. 12: Governance, Legal Framework, Institutional Arrangements and Policies Monitoring and Evaluation Strategy

Sector	Activity	OVIs (Objectively verifiable indicators)	MOVs (Means of verification)	Reporting Schedule	Lead Institutions for M&E
Governance, Legal Framework, Institutional Arrangements and Policies	Build capacity to operationalize arbitration system and environmental courts	- No. of awareness meetings held - No. Environmental courts and traditional arbitration system in place	- Progress reports	Annual	Office of Chief Justice, NEMA
	Review sectoral laws to ensure harmony in natural resource management	- No. of harmonized sectoral laws in natural resource management	- Legal notices	Annual	MENR
	Use of Incentives to promote compliance	- Types of incentives developed	- Report on types of economic instruments	Annual	Ministry of Planning
	Build capacity	- No. of personnel trained	- Reports of training conducted	Annual	All lead agencies
	Valuation of ecosystem services and goods in monetary terms	- Integrated economic valuation of environmental services and resources in national planning	- Report on economic valuation	Annual	ME&MR, Min of Planning, Finance
	Review of sectoral laws; Amendment of EMCA 1999; & Amendment and formulation of other relevant policies	- Harmonized sectoral laws	- Legal notices	Annual	All lead agencies
	Develop and apply economic instruments and technologies	- Increased use of appropriate incentives and technologies	- Report on types of economic instruments	Annual	Ministry of Planning

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DEFINITION OF TERMINOLOGIES

Hazard: A potentially damaging physical event, human activity or phenomenon with a potential to cause loss of life or injury, property damage, social and economic disruption of life, environmental degradation among other effects.

Disaster: A disaster can be defined as a serious disruption of the functioning of the society causing widespread human, material or environmental damage and losses which exceed the ability of the affected community to cope using their own resources.

Risk: Risk is the probability of harmful consequences or loss resulting from the interaction between natural hazards and vulnerable conditions of property and people.

Governance is the manner in which power is exercised in the management of environmental and natural resources. It includes environmental policies and the institutions that develop and implement them.

Legal framework is a set of laws, regulations and system of rules used to govern the management of environmental and natural resources. It consists of the legislation, standards, regulation, and institutions to control activities likely to damage the environment.

Wetlands as defined by the Ramsar convention are "Areas of marsh, fern, peat lands or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh or brackish or salt including areas of marine water the depth of which at low tides does not exceed six metres".