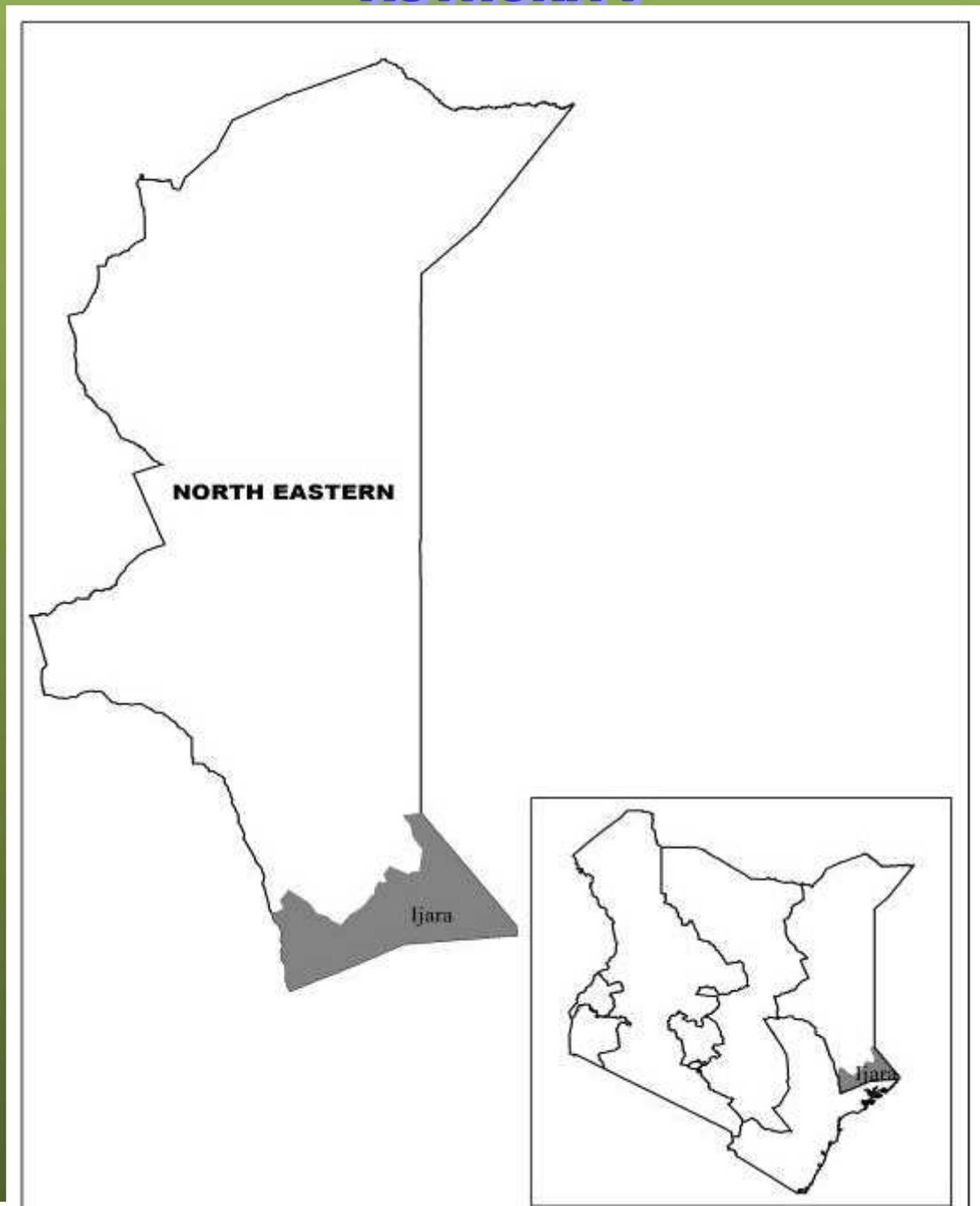




REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT AND MINERAL RESOURCES
NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY



IJARA DISTRICT
ENVIRONMENT ACTION PLAN
2009-2013

EXECUTIVE SUMMARY

The Environmental Management and Coordination Act (EMCA) 1999 provides for the preparation of District Environment Action Plans every five years. This is the first District Environment Action Plan (DEAP) for Ijara district. Preparation of this DEAP was done through a participatory process involving the civil society, private and public sectors. The document has incorporated salient issues from the divisions and it highlights priority themes and activities for the district towards attaining sustainable development. It is divided into eight chapters.

Chapter one covers the preamble that highlights provisions for environmental planning as provided for under EMCA, Environmental Action Planning process that discusses the methodology used in preparation of the DEAP. It also stipulates objectives, scope of this DEAP and challenges for environmental management in the district. It further describes district profile, climate and physical features, population size and distribution and social economic characteristics.

Chapter two discusses the district's environment and natural resources such as soils; land and land use changes; agriculture, livestock and fisheries; water sources; forest and wildlife resources and Biodiversity conservation.

Chapter three addresses the human settlements and infrastructure. It covers human settlements and planning; human and environmental health; pollution and wastes generated from human settlements; communication networks; social economic services and infrastructure and energy supply.

Chapter four discusses industry trade and services in the district. It highlights major industrial sector that covers agro-based industries, engineering, chemical and mineral industries; trade; service sector; tourism sector; mining and quarrying.

Chapter five discusses environmental hazards and disasters. It gives a definition of hazard and disaster, the extent and trend of environment hazards and disasters. The major hazards and disasters covered include; drought and floods.

Chapter six covers environmental information, networking and technology. Issues discussed include status of formal and non-formal environmental education; public awareness and participation; technologies; environmental information systems and indigenous knowledge. The chapter thus highlights the need for sustainable environmental management through environmental education and information, awareness raising and enhancing public participation at all levels.

Chapter seven covers environmental governance and institutional framework. It discusses status of environmental governance and institutional arrangements, regulatory and management tools and multilateral environmental agreements. The key issue addressed is the need for strengthened collaboration among lead agencies and stakeholders in environmental management.

Chapter eight provides an implementation strategy in a matrix form for addressing key environmental issues and proposed actions highlighted in chapters' two to seven. The implementation matrix is divided into issue category, problem statement, action needed, stakeholders involved and the time frame.

The respective lead agencies and stakeholders are expected to be involved at all stages in the implementation of the district environmental action plan. Secondly, they are required to monitor and evaluate environmental management indicators identified in the matrix for the annual reporting for the district state of environment report.

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. The process followed in preparing this DEAP was participatory, involving various stakeholders from institutions and sectors, including the public, private, NGOs and local communities at District and Provincial levels. These consultative meetings provided the basis also for formulation of the PEAP and finally the National Environment Action Plan.

The DEAP addresses environmental issues from various sectors in an integrated manner and discusses 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 Plan 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 by the DEC and will be reflected in the State of the Environment Reports.

The preparation of the DEAPs for Nyanza Province owes much to the technical and financial assistance provided by the European Commission under the Community Development for Environment Management Programme. This support, which included innovative community and civil society consultations, facilitation of DEC meetings, as well as final publication costs, is

gratefully acknowledged. I also commend the assistance provided by UNDP under the Poverty Environment for supporting the development of the EAP Manual and supporting the preparation of the DEAP for Ijara.

I wish to underscore that the 2009-2013 DEAP report is a broad-based strategy that will enable the District attain sustainable development as envisaged in the Vision 2030.

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On behalf of the National Environment Management Authority (NEMA), I would like to thank the Ijara District Commissioner, Mr. A. A., who is also the Chairman of the District Environment inputs and approval of this Committee (DEC) for spearheading the preparation process for this District Environment Action Plan,(2009-2013). I also wish to thank most sincerely the District Environment Committee and the District Environmental Action Plan Technical Committee for their invaluable environmental action plan.

NEMA also acknowledges the contribution of the members of the local communities, who actively participated in the identification and prioritization of the environmental issues in their location which formed part of this document. These members were sampled by the Community Development Environmental Management Programme (CDEMP) that financially supported NEMA to enrich the District Environmental Action Plan. Our sincere thanks goes to the District Officers (DOs), Chiefs and Assistant Chiefs who were instrumental in mobilizing the local communities and civil society organizations. Special thanks go to the civil society organizations that were drawn from entire Ijara district who were instrumental in the identification of the environmental issues across the district.

I also acknowledge the European Union (EU) for the financial and technical support in the preparation of this action plan. We particularly appreciate the technical support provided by Dr. Robert Olivier (Chief Technical Advisor), Mrs. Esther Mugure Aoko (Environmental Planning Advisor), Provincial Director of Environment (Nyanza), District Environment Officer, Mr. Daniel K. Omwanza for their insights and dedication to this process.

Last but not least, I extend my gratitude to all those who contributed towards the finalization of this District Environmental Action Plan.

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PLANNING AND RESEARCH CO-ORDINATION

ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ASAL	Arid and Semi-arid Lands
CACC	Constituency AIDS Control Committee
CAP	Community Action Plans
CBOs	Community Based Organizations
CEA	Cumulative Environment Assessment
CEO	Chief Executive Officer
DACC	District AIDS control Committee
DAO	District Agriculture Officer
DC	District Commissioner
DDOs	District Development Officers
DDPs	District Development Plans
DEAPs	District Environment Action Plans
DEO	District Education Officer
DEOs	District Environment Officers
DFID	Department for International Development
DFO	District Forest Officer
DHMT	District Health Management Teams
DIDC	District Information and Documentation Centre
DIMS	District Information Management System
DMOH	District Medical Officer of Health
DPHO	District Public health officer
DPT	District Planning Team
DPU	District Planning Unit
DVO	District veterinary officer
EMCA	Environment Management and Coordination Act
EMS	Environment Management System
ERSW&EC	Economic Recovery Strategy for Wealth and Employment Creation
GDP	Gross Domestic Product
GIS	Geographical Information System
GMOs	Genetically Modified Organisms
GOK	Government of Kenya
GOK	Government of Kenya
GTZ	Germany Technical Assistance
HIV	Human Immune Deficiency Virus
ICE	Information Communication and Education
ICIPE	International Centre of Insect Physiology and Ecology
ICRAF	International Centre for Research in Agro forestry
ICT	Information Communication Technology
IDA	International Development Agency
IEC	Information Education and communication
IIRR	International Institute of Rural Reconstruction
IT	Information Technology
JICA	Japan International Cooperation Agency

KARI	Kenya Agricultural Research Institute
KEMFRI	Kenya Marine and Fisheries Research Institute
KIFCON	Kenya Indigenous Forests Conservation Program
KP&LC	Kenya Power and Lighting Company
KWS	Kenya Wildlife Service
LBDA	lake Basin Development Authority
LDP	Livestock Development Program
LIS	Status of Land Information System
LPG	Liquefied Petroleum Gas
MCH/FP	Maternal Child Health/Family planning
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MOEST	Ministry of Education, Science and Technology
MOFP	Ministry of Finance and planning
MSE	Medium small Enterprises
MTEF	Medium term expenditure Framework
NACC	National AIDS control Council
NALEP	National Agricultural and Livestock Extension Program
NCPD	National Council for Population and Development
NDP	National Development Plan
NDPs	National Development Plans
NEAP	National Environment Action Plan
NEAPC	National Environment Action plan Committee
NEMA	National Environment Management Authority
NEMA	National Environment Management Authority
NEPAD	New Partnership for Africa Development
NGOs	Non-Governmental Organizations
NII	National Information Infrastructure
NPEP	National Poverty Eradication Program
PAEO	Provincial Adult Education Officer
PC	Provincial Commissioner
PDA	Provincial Director of Agriculture
PDE	Provincial Director of Education
PDE	Provincial Directors of Environment
PDLP	Provincial Director of Livestock Production
PDPs	Part Development Plan
PDSS	Provincial Director of Social Services
PDVS	Provincial Director of Veterinary Services
PEAPs	Provincial Environment Action Plans
PFO	Provincial Fisheries Officer
PFO	Provincial Forest Officer
PHC	Primary Health Care
PHT	Public Health Technician
PLGO	Provincial Local Government Officer
PLWA	Persons Living with AIDS
PMEC	Provincial Monitoring and Evaluation Committee

PMO	Provincial Medical Officer
PPHO	Provincial Public Health Officer
PPO	Provincial Planning Officer
PPPO	Provincial Physical Planning Officer
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Papers
PSO	Provincial Statistical Officer
REFIP	Research Farmers Interaction program
RHTC	Rural Health Training Centre
RM	Regional Manager
SACCOs	Saving and Credit Co-operative Societies
SEAs	Strategic Environment Assessments
SIDA	Swedish International Development Agency
STIs	Sexually Transmitted Diseases
TAC	Technical Advisory Committee
UNCED	United Nation Conference on Environmental and Development
UNDP	United Nations Development program
UNESCO	United Nations Educational, Scientific and cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VCT	Voluntary counseling and testing
VIP	Ventilated Improved Pit latrine
WSSD	World Summit on Sustainable Development
YFCK	Young Farmers Club of Kenya

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CHAPTER ONE

1.0 Introduction

1.1 Preamble

The United Nations Conference on Environment and Development (UNCED) commonly known as the Earth Summit held in Rio de Janeiro in 1992 aimed at improving the global environment, while ensuring that economic and social concerns are integrated into development planning. The Conference underscored the need to plan for sustainable socio-economic development by integrating environmental concerns into development through adopting and preparing appropriate policies, plans, programmes and projects. The Conference agreed on the guiding principles and a global plan of action (*Global Environmental Action Plan*) for sustainable development commonly called Agenda 21.

Sustainable development is commonly defined as “*development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs*”. Development is also said to be sustainable if it meets ecological, economic and equity needs. The process of attaining sustainable development calls for the integration of environmental considerations at all levels of decision making in development planning and implementation of programmes and projects

The theme of the Summit was on how nations could attain the sustainable development objective. The Government of Kenya embraced this noble idea when it developed the first National Environment Action Plan (NEAP) in 1994. The country also prepared the National Development Plan (1994-97) that ensured that there was not only a chapter on Environment and Natural Resources but also that environmental concerns were integrated in all the chapters of the Development Plan. Environmental Planning was thereafter well anchored in the Environment Management and Coordination Act (EMCA, 1999). (EMCA, 1999) provides for the integration of environmental concerns in national policies, plans, programmes and projects. In this regard, EMCA provides for the formulation of National, Provincial and District Environment Action Plans every five years.

1.2 EMCA 1999 Provision on Environment planning

The EMCA provides that every District` Environment Committee shall every five years prepare a District Environment Action Plan in respect of the district for which it's appointed and shall submit such plan to the chairman of the provincial environment action plan committee for incorporation into provincial environment action plan as proposed under section 39.

The Environmental Action Planning Process

DEAP Methodology

The process started by holding regional workshops, which the DEAP Secretariat was appointed by the Director General in 2004. That comprised of a District Water Officer, District Development Officer (DDO) and District Environment Officer (DEO) to attend an induction course on the DEAP methodology. The District Environment Committee (DEC) members gazetted in 2003 were further requested to form a District Environment Action Planning Committee (Technical Committee comprising lead agencies and representatives from other stakeholders), chaired by the DDO and the DEO is the secretary. Once the draft DEAP is prepared, the DEC approves and submits to the Provincial Environment Committee for inclusion in the Provincial Environment Action Plan.

Objectives of District Environment Action Plans

The objectives of District Environment Action Planning include the following:

- To determine the major environmental issues and challenges facing the districts
- To identify environmental management opportunities
- To create synergy and harmony in environmental planning
- To integrate environmental concerns into social, economic planning and development of the district
- To formulate appropriate environmental management strategies specific to the district.

1.3 Scope of the Ijara DEAP

The preparation of the Ijara DEAP has been realigned with Vision 2030, Midterm Plan 2008-2012 as directed by the government. The current DEAP covers the period of 2009-2013 and as per EMCA shall be revised after every five years. The DEAP will be monitored by the annual preparation of the State of Environment Reports. The environmental indicators that have been developed in the implementation matrix will be monitored by the respective lead agencies on an annual basis and incorporated in the annual State of Environment Report. The National Steering Committee and the National Environment Action Planning Committee have approved the indicators.

1.4 Challenges to Sustainable Development

The economy of Ijara district solely depends on natural resources, especially pasture and water. The local community practice pastoralism as a way of life and the lack of diversification has resulted to excessive utilization of natural resources. This in turn has led to degradation of land thus the ever-declining returns in animal production. Land degradation has resulted to poor quality of pasture thus weakened and sickly animals.

1.5 Ijara district profile

1.5.1 Geographical Location, Size and Administrative Units

Ijara district is the southern most of the four districts that constitutes North Eastern Province of Kenya. It borders Lamu, Garissa and Tana River districts. Ijara district was carved out of Garissa district and took effect on the 20th May 2000. The district is located at the South East of Garissa district and lies approximately between latitude 1071 S and Longitude 40041 E and 410321 E. The area cover of the district is 11332 square kilometers. Administratively the district has 4 divisions, 18 locations and 31 sub locations, which are shown in table 1 below.

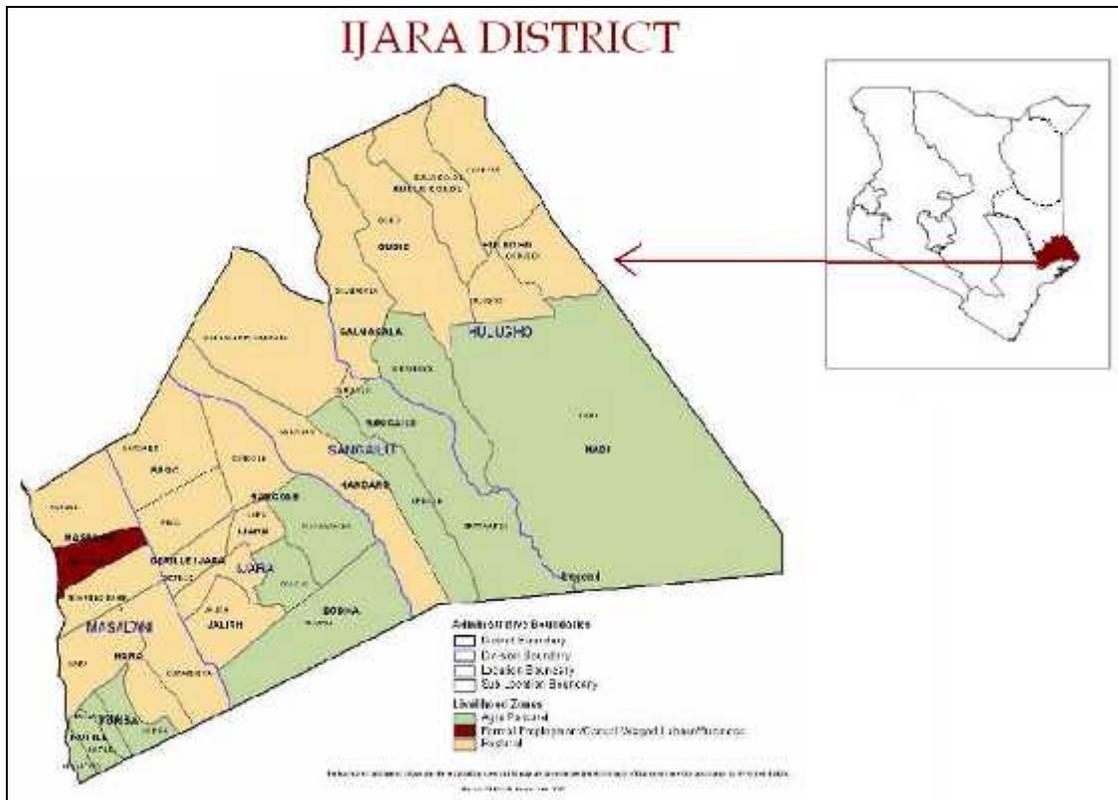


TABLE I District administrative units

Division	Area	Location	Sub location
Masalani	2470	4	8
Hulugho	1380	5	8
Sangailu	5134	2	5
Ijara	2348	7	10
Total	11332	18	31

1.5.2 Climate and Physical Features

The district is characterized by low undulating plains with low-lying altitude ranging between 0 meters and 90 meters above sea level. The district falls in ecological zone VVI with a small patch of ecological zone IV towards the coastal strip. The district is characterized by black cotton soil with small patches of sandy soil towards the coastal border. The black cotton soil that is common in the district is characterized by poor drainage, cracks and high rate of expansion.

The vegetation in the district is generally acacia species of shrubs and grass (star grass, elephant grass and). The district has a big chunk of coastal rainforest generally referred to as Boni forest, which has lakes Hadhi and Jerrei. The Mighty Tana River passes on one side of the district and is the main source of water supply in Masalani Division of Ijara district.

Ijara district has a total forest cover of 2484 Km² of which 1 339km² is gazette as Boni National Reserve under the management of Kenya Wildlife Service (to conserve biological diversity). Given the semi aridity of the district and the low altitude, the district temperatures are high most of the year ranging from 15°C to 38°C. However there are relatively cooler months between April and August. The mean annual rainfall ranges from 75 0mm to 1000mm, due to the influence of the coastal winds. The area bordering the coastal zone receives more rainfall than the other areas in the district. Changes of temperature over time could not be obtained as the area lacks a meteorological station.

1.5.3 Population Size and Distribution

As per the 1999 census, Ijara district is sparsely populated with a population of 62,642 people, consisting of 11,445 households with an average household size of 5 persons. This year (2006) the population is estimated to be 81,161 persons. The table below outlines population distribution, gender and density as per the 1999 census:

TABLE 2 indicates population distributions, gender and density

Division	Males	Females	Total	Density (Persons/Km ²)
Hulugho	10694	10137	20831	4
Ijara	8969	8267	17236	6
Masalani	7019	6339	13358	9
Sangailu	5565	5652	11217	5
Total	32247	30395	62642	6

Source: District Strategic Development Plan 2002-2008 (Ijara)

The major factor influencing population distribution is availability of watering points or tap water, schools, health facilities and administration posts because of security. The district has a population growth rate of 3.7% per annum, total fertility rate of 7 children per woman and a crude death rate of 10 per 1000 of population.

TABLE 3: Mortality trends (infants and Children below 5 years)

District	1999		2005	
	Infants	Under 5 yrs	Infants	Under 5yrs
Ijara				

1.5.4 Social Cultural and Economic Characteristics

The residents of Ijara district are predominantly the Abdalla sub clan of the Ogaden clan of the Somali tribe. The Somali are a Cushite speaking people who inhabit four different countries, namely: Somalia, Kenya, Ethiopia and Djibouti. They speak the Somali language and Islam that is the predominant religion in the district largely influences their culture. After the district was hived off the larger Garissa district in the year 2000, people from other ethnic group especially the Akamba migrated to the area. This migrant population is largely civil servants and small-scale businessmen.

The most significant artifacts among the Abdaila clan are the Herb (traditional huts) and Disso (a traditional dance).

The main economic activity of the residents of the district is livestock rearing. Nomadic pastoralism is the way of life for most members of this community. The main types of livestock kept are: Boran cattle, Maasai sheep and goats. The area residents practice subsistence farming usually on the fringes of the Boni forest. Trading is also picking up as an economic activity in the district.

Nomadic pastoralism has significantly affected the environment significantly. This is largely so because pasture is utilized without any control thus resulting to overgrazing which in turn result to land degradation. The end product of this environmental degradation is the poor health of livestock, high prevalence of animal diseases, death of animals and finally increasing poverty among the residents of Ijara district.

The district has a poverty level of 59% as per the 1999 census and this contributes about 0.3% of the total national poverty rate. The segments of the population largely affected by poverty are women, the youth and the elderly. This high level of poverty has resulted to over reliance on natural resources to meet the residents demand for basic needs and energy.

CHAPTER TWO

2.0 Environment and natural resources

2.1 Soils and land use

2.1.1 Soil

Ijara is strategically positioned between the lower Tana belt on one hand and the vast Boni forest on the other. These two physical features have influenced the types and use of the soils of Ijara. Along the Tana Belt, soils are mostly alluvial while areas close to the Bone forest consist of sand rich forest soils. Between these two types of soils are the black cotton soils that dominate.

TABLE 4: Soil Type Distribution and degradation status of the major soils types in Ijara District

Types Of Soil	Characteristics	Potential Use	Current Use
Alluvial Soils	High silt content -Freely-draining -Suitable for agric. Use	Large scale irrigation	Subsistence farming Grazing pastures
Sandy loams	-High sand content Agriculturally rich -Good drainage High content of organic matter	Agricultural use	Farming Grazing Fallow
Black cotton soils	High clay content Poor drainage Low content organic matter	Grazing Rice farming Ranching Game parks	Grazing

Key Environmental issues:

- Erosion
- Indigenous land tenure systems
- Poor farming techniques

Proposed Interventions:

- Change of land tenure system from communal to individual
- Modern dry land farming methods.
- Communal land tenure to group/individual

2.1.2 Land & Land Use Changes

The district occupies AEZ IV to VI. Adjacent areas and close to the Boni forest! Occupies AEZ IV and gradually changes to V and VI as one move away from that forest niche which enjoys coastal influence. The river line belt is an entity on its own but it does not come under Ijara district legally at the moment

Farming occupies pocket areas close of within the AEZ IV, which has few livestock due to high tsetse fly infestation. Pastoralists occupy the rest of the areas but occasionally opportunistic subsistence farming can be sported here and there. Wildlife is found all over the district. The major causes of land degradation are over grazing/overstocking, irresponsible farming, deforestation for logging and charcoal burning and occasionally forest fires.

TABLE 5: Land use systems

AEZ	Land Tenure	Land use Type
IV	Communal	Forest farming settlement occasional grazing
V& IV	Communal	Forest Farming Grazing Settlement

Key environmental issues:

- Tsetse fly infestation
- Shifting cultivation
- Poor infrastructure
- Irresponsible deforestation
- Low knowledge of exploitation of existing opportunities
- Over grazing

Proposed interventions:

- Start Dry land farming schemes
- Preserve existing forest
- Improved infrastructure
- Control tsetse fly infestation

- Afforestation
- Sustainable stocking rates
- Sustainable grazing

2.2 Agriculture, livestock & fisheries

2.2.1 Agriculture

Crop farming is practiced within AEZ IV and V. This consists of subsistence farming: growing maize, sorghum, cowpeas, citrus, guavas, bananas, papaw mangoes and others. These are grown under rain fed conditions and their production levels are low for a number of reasons. Among the major constraints are use of poor seed materials, poor production practices, high pest incidences, wildlife destruction and poor infrastructure. There are two cropping seasons in a year which following the bimodal rainfall pattern in the district. The district being new in crop farming currently there is insignificant pollution associated with this sector. Agro-chemicals are rarely used.

TABLE 6: Types and status of farming systems

Types of farming system	Extent distribution (Ha) %	Location	Agric. products	Status Current production levels (kg/ha)
Maize/cow peas/ Simsim	1000 71% 2000	Hulugho & Ijara divisions	Maize Simsim Cowpeas oil	1100 kg/ha 300kg/ha
Sorghum/cowpeas	1000 71%	Hulugho/ Masalani/ Sangailul Ijara	Sorghum Cowpeas	900kg/ha 300kg/ha
Mango/ Citrus/ Bananas/paw paw	50 >1%	Ijara	Fruits	

Key Environmental issues:

- Poor seed quality
- Pest incidence
- Wildlife destruction
- Poor production methods
- Poor varieties
- Low production
- Pest incidence

Proposed interventions:

- Dry land farming schemes
- Intensity of farmer training
- Agro forestry
- Use of improved seed quality
- Irrigation
- Use of Integrated pest management practices

2.2.2 Livestock

The district is arid! Semi- arid and the dominant economic activity system is pastoralism. Pastoralism practiced is either nomadic or semi-nomadic in nature, but it is carried out extensively throughout the district. There is the cattle production pattern, cattle-shoat pattern and the shoats' only pattern. Animals are kept for wealth.

The dominant production system is extensively classified into dry and wet grazing patterns. Production is at its peak during the wet season and lowest during dry spells. The current status of rangeland condition is highly degraded and the trend is worsening as the population increase due to the high birth rates and high immigration the number of livestock is increasing. This has resulted to pressure on land resulting to degradation of rangeland.

The ministry of livestock and fisheries is the authority in livestock production. At the local level there exists informal grazing system where each clan grazes in a particular area.

Key environmental issues:

- Conversion of bush land to traditional grazing fields.
- Declining quality of breed thus declining production.
- The tsetse fly menace that has resulted to sky rocketing expenditure on animal drugs
- Proliferation of unpalatable species of vegetation e.g. acacia ruficiens (rig)
- The ever-deteriorating rangeland condition.

Proposed interventions:

- Rangeland assessment to access the exact damage and recommend way forward.
- Development and implementation of rangeland management systems.
- Integration of traditional/indigenous knowledge into rangeland management systems.
- Conservation of indigenous species

2.3 Water resources

The key water sources are natural and manmade water sources are dug water pans and shallow wells and natural water sources in Ijara district are; River Tana, Lake Jerrei and Lake Hadi.

Types and status of water sources

The main water catchments areas are River Tana and Boni forest where Lajes, Hadhi and Jerrei are located. The major drainage system is the River Tana, which is permanent throughout the year. The status of water sources in the district is environmentally good, as they are not threatened currently. The northern water services board regulates and manages the utilization of water in the district.

The main water uses are domestic and agricultural (livestock consumption). Statistics on percentage of households with safe portable drinking water is not available but Ijara district is strategic development plan (2002-2008) states that out of 11555 households only 818 and 11112 have access to piped and portable water respectively. This is about 15% of the total population.

Table 7 shows sources and status of water sources

Source	Status		Usage
--------	--------	--	-------

	Quantity	Quality		
River Tana	-	Good	Domestic and livestock	Non
Water pans	Over 20 (10000m ³)	Fair	(Livestock)	
Lakes Jerrei & Hadhi	Not known	Good	Wild animals & livestock during drought	Non

The negative environmental impacts as a result of water sources utilization is the proliferation of watering points in the districts, as a result of the foregoing the rangeland condition is getting worse year in year out, though no regularly conflicts have arisen between the farmers who live and farm along River Tana and pastoralists.

Key environmental issues:

- Conflicts between farmers and pastoralists
- Rangeland degradation as a result of unplanned watering point
- Degradation of water pans due to poor or lack of a management system
- Underutilization of lakes
- Low coverage of household by piped water
- Siltation

Proposed interventions:

- Demarcation of water corridors along river Tana.
- EIA to be undertaken before scooping of water pans
- Formation & training of water users association to manage water pans in the district.
- Improved rangeland management systems
- Fencing of water pans
- Installation of Silt traps
- Avail Piped water to more people from rangelands
- Developments of tourism activities as the lakes are rich in biodiversity
- Increase the no. of household with water to 50% by 2013

2.4 Forestry and wildlife resources

2.4.1 Forestry

Ijara District is the only district in North Eastern province with a forest cover. The area is covered by a coastal tropical rainforest covering over 2000 km². 1,339 km² of the forest has been gazetted as Boni National Reserve while 1145 km² is classified as trust land. The Boni forest has been intact over the years due to insecurity in the area and the presence of tsetse fly. Currently, the forest is under threat from loggers, farmers and high demand for firewood.

The Boni National Reserve is managed by the Kenya Wildlife service, while the un-gazetted part is under this authority of the county council of Ijara. The forest department plays a surveillance and educative role in management of the forest. Though exploitation of the forest is minimal and ad hoc, the area residents use poles from the forest, for building purposes. The forest has acted as dry period grazing reserve. The current drought being experienced in North Eastern has not been felt much in Ijara due to the forest.

TABLE 7 indicates status and trend of forest area

Type of Forest	Location	Forest uses	Status	
			Gazetted	Trust land
Tropical coastal rain forest (2484 Km ²)	Eastern side of the district towards the sea	Timber, poles firewood, grazing of animals	1339 Km ² (Boni National Reserve)	145 Km ²

Key environmental issues:

- Forest fires lighted by pastoralists to encourage pasture growth and wild honey harvesters.
- Inadequate capacity of Ibrest Department and the County Council of Ijara to manage the forest.
- Forest destruction by illegal loggers.

Proposed interventions:

- Creation of fire breaks in the forests.

- To build the capacity of local institution to manage the forest both financially and technically.
- There is urgent need to demarcate and gazette the Ibrest.
- Creation of awareness and sensitization should be boosted
- Promotion of PFM
- Enforcement of existing legislations

2.4.2 Wildlife

Ijara is a district rich in wildlife; there are thousands of plants and animal species. Data on these is almost non-existent as the area is green in terms of research. But there are significant species in this district, these include: The Hero/a, Columbus monkey, Giraffes, Elephants, Hippos, Water bulk, various types of snakes, Warthogs, Hyenas, various species include: Moe Vera, baba kofi (AfzeIEa quansesis) Garaas (Dobena dobrina) Acacia ruficiens. The wildlife is evenly distributed in the district; the Boni National Reserve is also home to wildlife. The wildlife is managed by the Kenya wildlife service but generally the regulatory and management arrangements are very weak. Exploitation of wildlife is just for domestic use though consumption of wild animals in this area is a taboo and thus the animals are safe.

Key Environmental Issues:

- Insecurity is a major handicap to the development of tourism in the district. It is enhanced by competition for resources and collapsing traditional and modern law enforcement structures.
- Poor infrastructure: The general inaccessibility of the area due to poor communication and telecommunication networks impacts negatively on the sector.
- Under marketing of tourism despite its obvious potential, the district's visitor attraction sites have been grossly under-marketed.
- Low local capacity to leverage resource rampant poverty has compounded local incapacity to develop this sector
- Human-wildlife conflict: As pressure for land grows, competition for resources between wildlife and humans has exacerbated. A long Tana River, where irrigation agriculture is practiced, the damage to crops by wildlife is significant given the arid nature of the area. It is also along the same crocodile infested river that attacks mainly on children and livestock is experience

Proposed Interventions

- Ensure proper security measures are employed for the wildlife, community and stakeholders by increasing the number wardens and frequent patrols.
- Improve infrastructure by constructing of proper roads to improve accessibility and improve communication.
- Advertising tourism potential through the media, internet etc.
- There is need for focused growth of appropriate local and social capital.
- Improve management and utilization policies

2.5 Biodiversity conservation

Biodiversity Data Information

Ijara district is rich in times of biodiversity especially in 2484 km² Boni forest. Little data exist both at the district and national level on biodiversity in Ijara District.

Some significant biodiversity areas are:

- Boni forest
- Lake Hadhi ecosystem.
- Lake Jerrei ecosystem.
- The Northern rangeland ecosystem.

The species that are endangered or threatened include:

- Bamba Koffi (*Afzelia quansesis*).
- Herola antelope.
- Elephants.
- Indigenous knowledge on medicinal plant
- Currently the utilization of various biodiversity components is for domestic consumption; though Aloe Vera is currently generating interest is a commercial crop. The institution arrangement in place is the KWS, the forest department and NEMA.

Table 8 shows the list of invasive alien species

No	Name of	Ecosystem affected	Size of area affected	Environment impact	Proposed intervention
1.	Prosopis juliflora (mathenge)	Masalani and Ijara town	Small	- Loss of other species of plants	- Ways to be devised to eradicate this species
2,	Water hyacinth	Hulugho water pans	Half of the water pan closed	-Foul smell from the pan - Declining depth of the path	- Mechanical removal of the weed

Key Environmental Issues:

- Inadequate information on existing biodiversity
- Occurrence of Invasive species e.g. *prosopis juliflora*
- Loss of indigenous knowledge on medicinal plants
- Over utilization of tree species
- Deforestation

Proposed Interventions:

- Adequate research and publication of findings
- Protection of existing indigenous species
- Preservation of indigenous knowledge e.g. through incorporation into school curriculum
- Enforcement of forest Act and existing legislations
- Creation of awareness on the importance of tree species on the existing population

2.6 Energy sector

Kenya relies on two forms of energy namely: renewable and non- renewable. Ijara district relies largely on wood fuel (99%) while the remaining 1% relies on solar, fossil fuel and generators.

Types and Statues of Energy Sources

The major source of energy in Ijara district is wood fuel, but currently other forms of energy such as solar and fossil fuel is gaining acceptance. Wood fuel is currently abundant in the district due to the bush encroachment on the district but with increasing population it may turn out to be unsustainable in the future. The district doesn't have electricity currently.

Trend in Energy Production, Consumption, Costs, and Projectors

Wood fuel that is the major source of energy in the district is in abundance though with the increasing population it is declining around urban centers. The potential for solar and wind energy generation is very high in the district and these is an area that requires further research.

Key environmental issues:

- Over reliance on wood fuel due to lack of diversification.
- Devegetation/Deforestation due to overdependence on fuel wood
- Lack of small and large scale industries that are dependent on electricity hence people indulge in agriculture leading to deforestation

Proposed interventions:

- Encourage tree planting for energy sourcing
- Provision of electricity solar and wind
- Creation of awareness on energy exploitation and diversification

CHAPTER THREE

3.0 human settlements and infrastructure

3.1 Human Settlements and Planning

The overall land tenure system in Ijara district is trust land. The county council of Garissa used to hold the land in trust for the people of Ijara but after the creation of Ijara county council, the land is now under its jurisdiction. Some small paved of land usually as parcel of 1/8 acre are leased to residents for residential and commercial purposes especially Masalani town which is the district headquarter of Ijara district. The Kenya wildlife service is in charge of 1339 km² Boni national reserved for protection of biodiversity.

Data is only available as from the year 2000 onwards when the district was created. The major land use types are: urban areas gazetted/protected area and rangelands. The protected area is used as grazing land especially during times of drought.

TABLE 11: Land use types

Land use	Area	% Of total land area
Total land area	11,332km ²	100
Protected/gazetted area	1,339km ²	11.2
Non gazetted forest	1,145km ²	10.1
Urban area Range land	336km ²	2.96

Source: District Strategic Development plan 2002-2008 (Ijara)

The district lacked physical development plans until 2002 when a local plan part development pan was prepared for Masalani town the district headquarters for Ijara district. In rural areas the common housing types are the temporary traditional Somali huts (Herio). This houses are circular in shape, are made of poles, mats made of grass and the roof is grass.

In most urban areas in Ijara there are three main housing types depending on the income of the particular individuals, these are namely: temporary, semi-permanent and permanent houses. The semi-permanent houses are constructed using gravel/Murram for Wales; timber and corrugated iron sheets are used for roofing. The permanent houses are constructed using blocks from quarries that are mainly obtained from Kilili district at a distance of 250 km from Masalani.

Permanent and semi- permanent houses usually have smooth cemented floor. Water pans serve the major proportion of the district and 1000 households based in Masalani town have tapped water from River Tana. The district has two livestock markets at Ijara trading Centre and at Kotile location. A market for foodstuffs and other household goods has been constructed in Masalani town but is yet to be opened and the district has a total of 32 primary schools and 2 secondary schools, which is fairly adequate.

Regarding settlement schemes the district is fairly new and land adjudication has yet to be done.

TABLE 12: Average distance for service

Area	Water	Schools	Health
Ijara district	40km		40km

Source: District strategic Development Plan 2002-2008 (Ijara)

Hulugho division of Ijara district was once highly affected due to the impacts of displaced persons as a result of insecurity in neighboring Somali republic. The refugees were later moved to Dadaab refugee camp in Garissa district.

The factors influencing shelter and settlement patterns are; the type of economic activity (i.e. pastoralists prefer temporary houses and are nomadic in nature) business people prefer semi permanent or permanent houses depending on level of income. Watering points influence settlement patterns, as population are more around areas with watering points.

Key Environmental Issues:

- Deforestation as areas are cleared for settlements and trees is cut for poles.
- Land scars as a result of quarrying without rehabilitation.
- There is degradation of riverbanks especially through sand harvesting.
- The increase in number of watering points has resulted in rangeland degradation

Proposed Interventions:

- Afforestation and re-Afforestation
- Agro forestry
- Rehabilitation of quarries
- Control of sand harvesting activities
- Environmental Audit
- Creation of awareness
- Controlled grazing
- Regarding of degraded area

3.2 Human and Environment Health

The common diseases influenced by environmental factors in the district are; Malaria, pneumonia.

Key environmental Issues

- Malaria cases are high. It is endemic though highest during two rainy seasons annually i.e. March to May and September to November during the short rains and long rains respectively.
- Diarrhea diseases are second in prevalence then respiratory tract infections and finally tuberculosis. The rest occur almost at the same level and percentages are almost equal.

Proposed interventions

- Intensification of vector control for malaria
- Promoting environmental hygiene to control food and water quality
- Advocating for behavior change through health education e.g. some households acquire mosquito nets but do not make use of them hence putting them at risk of contracting malaria and therefore advocacy on the same should change such behavior.

3.3 Pollution/Waste Generated From Human Settlement

Ijara is a scarcely populated district and the waste generated is insignificant. But in the last three years polythene menace has been a major eye sore in urban centers. Though there are several activities by local CBOs to address this issue the problem has not been solved. The district headquarters where the population is growing at high rate due to immigration lacks a dumpsite. Solid waste management in Masalani town is wanting as the town.

Key Environmental Issues:

- Polythene bags litter the environment posing danger to domestic animals and harbor diseases e.g. malaria
- Lack of a proper waste disposal mechanisms
- Lack of waste management policies

Proposed interventions:

- Construction of a dumpsite
- Creation of awareness in proper waste disposal.
- Enactment of by-laws by the county council of Ijara.

3.4 Communication Network

The district has a total of 435 km of earth roads, 65km of gravel road and 2 airstrips. The roads are impassable during wet seasons and this has hampered the movement of people and goods. There are in the district total telephone collections of 27 landlines and 1 post offices in Masalani town. The rest of the district is not covered. *Social Economic Services and Infrastructure*

Water: The major sources of water are; water pans, River and shallow wells. The Tana River passes along the eastern border of the district and serves Masalani town and four other locations.

Key environmental issues

- Inaccessible roads
- Poor road condition
- Inadequate communication systems
- Dry weather induces air pollution from the dust associate with the untarmacked roads

Proposed interventions

- Rehabilitation of existing roads
- Encourage community participation in road maintenance
- Addition of post offices
- Addition of landlines and mobile phone transmitters

CHAPTER FOUR

4.0 Tourism, industry, trade and services

4.1 Tourism

Though Ijara district is endowed with abundant wildlife and other natural resource the tourism industry is non-existent in the district. Tourism as an economic activity has not been exploited even though Ijara district is only 100km from both Lamu and Malindi major tourism towns.

Key Environmental issue

- Feasibility study on the potential of Ijara district as a tourist attraction area

Proposed Interventions

- Establishment of an eco-tourism centre
- An initiative to create a conservancy

4.2 Industrial sector

Ijara district has only the construction/building and mining industry. The construction industry is very small while in the mining industry; the district has only one quarry (Duban Dubesa quany). The raw materials in these two industries are sand, building stones, timber, poles and cement. Cement is brought from Mombassa. Building blocks are mostly brought from Kilifi district. Industrial development in Ijara district is at its infancy stage as there are only building and quarrying industries that exists. Apart from quarrying at Duban, Dubesa quarry and building of residential houses there are no other industrial activities that are present.

Type of Industry	Raw materials	Product	No. employed	Waste
1. Murram	Murram for road & house construction	30	Earth scars	De-vegetation Threat to people life & livestock Dents on land surface.
2. Blocks/Murram / sand	Houses	200	Debris	Poor acetic of land de-vegetation

Key environmental issue in the industrial sector;

- Generation of dust
- Soil degradation is at an accelerated rate

- Loss of biodiversity
- Deforestation
- Depreciating aesthetic value

Proposed Interventions

- Afforestation
- Protecting the biodiversity
- Implementation of proper policies on mining and quarrying

4.3 Trade Sector

The types of trade in Ijara district are retail and wholesale enterprises. These enterprises deal in foodstuffs and other home appliances, there are a few hardware shops and hotels. Livestock products such as milk and meat are also sold within the district. The environmental impacts as a result of these enterprises are waste that they generate which result to degradation of land. The major challenge is the polythene bag menace and this is a result of their use as packaging materials by these enterprises.

TABLE 9 Type of trade and impact on environment

No.	Type of - trade	Product	No. of people employed
Retail	Food stuff Detergents Clothes Ready food	Over 200	-Polythene bags -Food left over

4.4 Service sector

The service sector in Ijara district is yet to pick up. There are only some few small hotels and several government offices. Thus the impact on the environment by this sector is not negligible.

Key environmental issues

- Foul smell in town
- Land degradation
- Poor aesthetic quality in most urban centers

Proposed interventions

- Creation of awareness in proper waste management
- Proper waste management

4.5 Mining and quarrying

4.5.1 Mining

Currently there is no mining in the district.

4.5.2 Quarrying

Ijara has one quarry which is just 10km from Masalani town, the district headquarters of Ijara district. The products from the mine are building stone and Murram. The quarry has been operational for over 20 years and little data exists on the quarry. The county council of Ijara is currently in the process of undertaking environmental audit for Duban Dubesa Quarry. Though the mine is still operational there is need to fence it in order to protect passersby and herders from injury.

Type of quarry	Method of quarrying and purification	Geographic allocation name of quarry	Size of quarry	Regulation agency	Environmental impact
1. Open cast in the Rangeland	Mechanical	Masalaxii Division (Ijara District) Duban Dubesa Quarty	Quarried area is 5 Ha	-Mines & geologic al department -NEMA -County Council of Ijara	

The trend in development of quarries over the few years is that only one quarry exists but utilization has been increasing over the last 3 years.

4.5.3 Sand Harvesting

Sand harvesting is done on a small-scale basis mostly on areas bordering River Tana. This is not of good quality and thus its low demand. Due to the low demand the threats on the environment is almost insignificant.

TABLE 10: Methods of extraction

No	Source of sand	Method of sand harvesting	Location/name of site	Size (Ha)	Quantity extracted	Regulatory Agency
1.	River Tana	Manual scooping	Old Masalani	I	Not known	County Council of Ijara

Key environmental issues

- Earth scars
- River bank erosion
- Destruction of scenic beauty
- Dust being associated with respiratory problems
- Noise pollution
- Land degradation especially soil surrounding the mining area is left loose and is likely to fall over when wet or easily eroded by run off
- Occupational health hazards. No safety requirements are adhered to.

Proposed Interventions

- Formation of one organized group/CBO to run and manage the sand harvesting in each and every beach through consultation with relevant government agencies such as Social Services
- Development of sand harvesting plans. The plan allows harvesting to be done in one area (Site A) as the other (Site B) piles up, when site A is cleared, the group moves to B as the A heals up and piles. This activity is done rotating from one site to the next.
- Regulation of sand harvesting through proper enforcement of EMCA that allows mining in required sites. Prohibiting scooping of sand along the shores, and subjecting such activities to Environmental Audit.
- Rehabilitation of the damaged sites by planting the appropriate tree species and establishing the appropriate soil conservation measures

CHAPTER FIVE

5.0 Environmental hazards and disasters

5.1 Extent and Trends Of Environmental Hazards and Disasters

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 calamitous event, esp. one occurring suddenly and causing great loss of life, damage, or hardship, as a flood, airplane crash, or business failure.

Ijara is prone to drought and floods caused by natural and manmade activities. The floods and droughts have impacts on the socio, economic, public health and environment sectors. They include; loss of life, destruction of property, famine, hunger and starvation, outbreak of diseases and the destruction of infrastructure facilities

The most recent flooding; the El Nino phenomenon (1997/1998) was so severe that most residents of the district lost their entire livestock. The El Nino floods occurred due to the heavy and continuous rainfall that fell throughout the county. The government had to seek assistance to cater for the El- Nino emergency and economic recovery. The emergency assistance in Ijara district involved the dropping of relief supplies using planes, as the roads were impassable.

Among the reconstruction was the repairing of Masalani water supply.

Seasonal floods occur along the Tana River though it has more benefits than loses. Most farmers depend on the floodwaters for their farming. The district has black cotton soil and due to its poor water absorption, small rains cause water flooding.

Droughts are a more common phenomenon in Ijara district and these has hugely contributed to the high poverty levels. Currently, the district is experiencing drought and various emergency programmes are ongoing. The programmes include; scooping of pans, water tinkering, emergency take off for annual and relief food distribution.

TABLE 11 Type of disaster and their impacts

Year	1960	1970	1980	1990	2000	2005	Remarks
Disaster Type	Drought	Drought	Drought	Floods	Drought	Drought	The Periods Between
Severity (No. of People Affected)	The whole Population Affected	The whole Population Affected	The whole Population Affected	Disaster Continue to shorten			
Property Damaged	Loss of Livestock	Loss of Livestock	Loss of Livestock	-Loss of Livestock & human life - damage of infrastructure	Loss of Livestock	Loss of Livestock	

5.2 Status of Early Warning and Preparedness

The Arid Lands Resource Management Programme, which is a project under the ministry of special programmes, has developed drought monitoring and preparedness plan. The Project has employed drought monitors whose findings are published monthly. Members of the district steering group frequently undertake rapid drought assessment. Though monitoring is ongoing, the district still lacks the capacity to deal with disasters as evidenced by the current drought.

TABLE 12: Sector capacities for disaster preparedness and response

Sector	Type of disaster	Human Resource	Technical equipment	Financial	Coordinating mechanism	Lead agency
Office of The President	Drought	Enough Man Power (both skilled and unskilled)	- 1 water Tanker - 1 lorry - Plastic -water reservoirs (over 50) 20,000m3	Emergency Funds with ALRMP II Project, water department and DC's office	District Steering Group (DSG) consist of key departments and civil society	ALRMP II Office

Key Environmental issues:

- Low level of awareness on disaster management
- Low enforcement of relevant legislations
- Deforestation
- Poor land use practices

Proposed Interventions:

- Reliable sources of water required like bore holes and dams
- Awareness creation on disasters and disaster management
- Flood preparedness and early warning systems
- Afforestation
- Practice conservation farming
- More technical equipment should be provided for district such as water tankers.

CHAPTER SIX

6.0 Environmental information, networking and technology

6.1 Status of Environment Education

The types of environmental education programmes in Ijara District are both formal and informal. Several schools have school based environment related clubs such as 4k clubs and wildlife clubs. Currently, the district environment office has boosted environmental education in schools and soon the number of schools with registered environmental clubs will increase significantly.

TABLE 13: status of Environmental Programmes in schools

No.	No. of Schools		Types of environmental programmes
	Primary	Secondary	
	8	1	4k clubs (The clubs have a total membership of 242)

Source: District Agriculture office Annual Report 2005

TABLE 14: Status of Environmental Programmes in the district

Environment Programmes	Key players	Challenges	
NRM component of ALRMP 11 Project	ALRMP, Communities		-
School based awareness programmed	- District Environment Officers - Department of Agric.		-

Key Environmental issues

- Poor articulation of activities
- The project lacks technical personnel on environmental issues
- Low funding

Proposed interventions

- The NRM component ALRMP II project should be led by District Environment Officers
- The project should employ qualified personnel
- Funding to the district environmental office to be increased

6.2 Public Awareness and Participation

Environmental awareness has improved office, the forest department KWS Office, Public Health Department, Terra * (an international NGO), CBO's such as IWICET, CIRU and ALRMP II project are the key stakeholders in promoting public awareness programmes in environmental conservation. ALRMP TI Project and the district environment office have collaborated in public awareness in environment especially on protection of watering points through fencing and construction of silt traps.

The forest department has related awareness on participatory forest management approach in the district. Various posters brochures and magazines have been and continue to be distributed in the district. Those publication include; posters on oceans and seas; posters on EMCA (1999); Posters on polythene bag menace; NEMA quarterly magazine and brochures on NEMA and EIA.

Key Environmental issues:

- Low funding for environmental conservation Programmes.
- The high illiteracy level among area residents.
- The long distances between settlements in the district which has increased the cost of creating public awareness

Proposed Interventions

- More funds should be availed towards enhancing environmental conservation programmes
- Approaching awareness creation as a team not as an individual department
- Educating the community

6.3 Environmental information systems

The types of environment data available in the district are; state of environment report for 2003 and 2005 for national and 2004 SOE report on Ijara District; NEMA Quarterly Magazine- 5 publications, brochures on the Institutional framework created by EMCA (1999); copy of EMCA (1999) and EIAIEA regulations 2003; Drought assessment reports by ALRMP 11 projects among others and EIA reports.

These data is available on the following offices based in Masalani town; the headquarters of Ijara District; ALRMP II offices, DC office, District Environment office. These data are available either electronic or paper form. The data is available free of charge to all stakeholders in the district.

TABLE 15 Types and sources of Environment information

Type information types	Form	Institutions	Access condition	Users	System of updating
SOE 2004 report	Electronic Hard copy	NEMA	Freely	All stakeholders	Prepared yearly
NEMA Quarterly magazine	Booklet	NEMA	Freely	All stakeholders	Published quarterly
Drought Assessment Reports	Booklet	ALRMP II Project	Freely	All stakeholders	Prepared monthly
EIA/EA Reports	Booklet	Project Proponents EIA/EA experts	Freely	All interested parties	

Source: District Environment Office — Ijara

6.4 Status of Environmental Information Management Systems

Environment information in possession of various sectors and it has been a challenge to obtain it. The data is stored manually and retrieving it has been a challenge. The environmental information system in the district is extremely weak as the district lacks documentation Centre, library and archive.

Due to the inaccessibility of the district there are no circulating newspapers though on few occasions the standard newspaper is sold on the street in only one urban center.

The challenge facing storing and dissemination environmental information is lack of libraries and documentation Centre in the district. The poor communication infrastructure is also a hindrance.

Key environmental issues

- Inaccessibility of the information
- Lack of basic facilities e.g. computers
- Lack of publications

Proposed interventions

- Need to establish a library
- Provision of basic office facilities
- More publications to ease information sharing

6.5 Indigenous Knowledge

The Somali community, which is the majority in the district, has important indigenous knowledge, which has never been documented. With the dying of the elderly this information may be lost forever as lifestyles continue to change. It is important to note that the local community has sustainable rangeland utilization system that was disrupted with changes in leadership from elders to central government. Knowledge on medicinal plant exists but the custodians are slowly disappearing into graves.

Key environmental issues

- Indigenous knowledge documentation
- Documentation and dissemination of environment information

Proposed interventions

- Research on 1K and its documentation
- Building of a documentation centre and library
- Improving radio reception through booster
- Extension education to make people realize the value of it and the need not to leave it diminish
- Putting up responsible institutions
- Relevant government departments, NGO's AND CBO's

CHAPTER SEVEN

7.0 Environmental governance and institutional arrangements

7.1 Status of Environmental Governance and Institutional Arrangements

In Ijara district, the district environment committee coordinates governance whose chairman is the district commissioner. The district environment officer is the secretary to the committee and under takes the day to day running of the office. The district environment office was established in Ijara district in October 2004 when the national environment management authority recruited and posted district environment officers. The district environment committee was gazetted in December 2005.

There are various government departments that contribute to environment management or are in charge of several aspects of the environment. They include; Agriculture (soil conservation and management); Livestock (range land management); forestry (forest management; Kenya Wildlife Service (wildlife management); Water (water resources management) just to name but a few.

There are several civil society groups that contribute towards environment management. Terra Nuova an international NGO is implementing a Trans-boundary environment programme in three district of Kenya and some in Somali Republic. Woman Kind Kenya a local NGO funds groups to implement environmental projects such as tree planting and sometimes carries out creation of awareness on environmental issues. Several community based organizations are active in environmental management issues among them are IWICET, CIRU and ICE.

7.2 Regulatory and Management Tools

In Ijara district environmental impact assessment and environment audit is the major that are used to enforce environment regulations. Currently there are only four enterprises in the district that require environmental audit two of which have presented their reports to NEMA for approval.

Key Environmental Issues:

- Lack of resources such as means of transport and the low financial allocations to the district environment offices
- Delay in formulation of the various environmental standards, regulations and gazettelement of environmental inspectors
- Training on compliance and enforcement for district environment offices has not yet been done

Proposed Interventions:

- Capacity building for environmental agencies
- Development of environmental standards
- Capacity building of district environmental committees
- Training on compliance and enforcement
- Training on investigative skills of environmental offences
- Sensitization of legal departments on environmental law

CHAPTER EIGHT

8.0 Implementation strategy

TABLE 16: Implémentation Matrices
Implémentation Matrix for Soil and Land Use

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
Desertification	Curb desertification	Sustainable environment	-Raise awareness -introduce controlled grazing -establish seed banks form grass rejuvenation -soil conservation programmes	2010	FD, MOA, MLP\$F, NGOS NEMA Communities	NEMA	10 million
Wildfire outbreaks	Control wildfires	Forestry and wildlife conserved	Creation of fire breaks. Surveillance during droughts	2010	FDMLP\$F NEMA	Forest department	2million

Implementation Matrix for Livestock and fisheries

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
Breed quality	Better livestock production	Superior breeds are introduced	Provide all services introduce grade bulls	2006-2010	MLP\$f DVS, KLMC ALRMPII	MLP\$F	50M
Pasture	Have better and more pasture	Pasture improved	Introduce grazing patterns Pasture reseeding	2006-2010			
Production Services	Better market access, introduce emergency livestock (poultry, fish)	Market for livestock established Extension provided	Lobby for better marketing Established Tsetse fly control Vaccinations treatments	2006-2010			

Implementation Matrix for Agriculture

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
IMPROVE FOOD SECURITY	Create alternatives for pastoralists drop outs	2000 ha under food irrigation on rain fed	Prospective train farmers on rain fed farming Crop husbandry and better farming technique -Establish trial demonstration plots and farmers field days -Provision of extension services -Provide certified seeds and farm implements -soil and water conservation	2006-2007 2006-2007 2009-2010 2009-2010	MOA MWI NEMA PROVINCIAL ADMINISTRATION COA	MOA	

Implementation Matrix for Water Resources

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
Increase acreage under irrigation	Increased food production	10,000 ha under irrigation	-Carry out soil and topographic surveys -design irrigation systems -construction of irrigation structure -procure pumping sets -train farmers on land use and management	2006-2007	MWI ALRMP NEMA FAQ DONORS	MWI MOA	200 million

Provision of safe water	50% of Ijara	50% population by piped water	-Expand cured treatment works	2006-2007	MWI NWSB	NWSB	200M
Water	Residents have access to drinking water by 2010		-Tanks and booster stations -design, provide and lay pipes along Masalani safe, Ijara, Hulugho proposed pipeline -provision of pumping, equipment's, desilting of pans, -design construction of new water pans, carryout complete, hydrological surveys (district wide)	2010	ALRMP NEMA		50 M 3M

Implementation Matrix for Wildlife and Forest Resources

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
1.	Gazettement of Boni forest	Protection of the forest	Secure and sustainable forest	Training and sensitization Demarcation of forest area	Ongoing by 2010	- FD, CCI, DDC, DEC - Communities	- FD , - CCI	3M 1M
2.	Management plan	To come up with a sustainable management plan of the forest	Sustainable management of forest	Involves community in drawing the management plan Prepare forest management agreement with communities Train communities on MPFM	By 2010	- FD, - Communities - DEC, CCI - agriculture - Livestock - Civil Society	- FD, CCI	2M
3.	Utilization of forest	Sustainable utilization of non-wood forest resources	Economically empowered communities Sustainable forest	Promote modern bee keeping production targeted of 10 tonnes for year Organize beekeepers into society to market their products	2010	- RPT	- FD, Livestock	5m
				Formation of range management Communities living along border	By 2010	-FD, -CCI -Livestock -Communities -Civil societies	-FD, CCI	1M

Implementation Matrix for Forest Resources

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
4.	Urban forestry	To have green urban centers	Greened training centers	-Establishment Of tree nurseries, recreational parks, arboretums. -Promote trees planting by land owners in homesteads		-FD, -DEC -PA, CCI -Communities -Civil society	-FD	2M
5.	Exploitation of tourism potential	To promote tourism in Ijara district	a flourishing tourism industry	-Identify eco-tourism sites -Link Ijara with the north coast tourism circuit -Market Ijara as a tourism destination	By 2010	-KTB, CCI -KWS, Civil society	-KTB, CCI	2M

Implementation Matrix for Wildlife Resources

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
1.	Human Wildlife Conflicts Reduction	To minimize Wildlife conflict With human	Harmonize Co- existence Between wildlife	Creation of awareness and Sensitization Construct watering points for wildlife in the forest	By 2010	KWS , CCI DEC, PA Civil Society Communities	KWS	20M

			and mankind	Create wildlife Sanctuaries		FD		
2.	Awareness on endangered wildlife	To Create awareness on endangered wildlife species	Endangered Species protected	Sensitization of communities on endangered species Promotion of environmental conservation programmes to protect Promotes continuous production of wildlife species e.g. Aloe Vera	By 2010	KWS KEPHIS FD DEC Civil society	KWS FD	2M

Implementation Matrix for Tourism

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
Develop tourism	Income from tourism is increased by connection to coast tourist circuit	Number of tourists increased by 30%	Improve tourism infrastructure (roads, campsites) -train tour guides establish observation -construct tourist lodges -establish community conservation	2006-2010 2008-2010	-MT -KWS -County Council -Investors -NGOs -Investors	-50 million -10 million -5 million	

Implementation Matrix for Biodiversity

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
1.	Biodiversity Conservation	To conserve biodiversity	Biodiversity conserved	- Sensitization and awareness on importance of biodiversity - Research on medicinal values of plants - Research and documentation of 1K	2010	NMK,KWS, KEPHIS,NEMA FD, Communities Civil Society Institution of higher learning	NMK KWS	3M

2.	Promote environmental education and creation of awareness	- To increase the level of awareness on environmental issues	Environmental issues comprehended by communities and environment	<ul style="list-style-type: none"> - Implementation of ESD. - Promotion of school based environment education item, eco-school, clubs - Environmental barazas at sub- location level 	2008	<ul style="list-style-type: none"> - NEMA - KWS - Agriculture Education - CMI society - ALRMP - FD- 	NEMA	5M
3.	Promotion of environment grandly technologies	- To increase the use of environmental friendly technologies	Pollutions minimize	- Creation of awareness on available environmental friendly technologies	2010	<ul style="list-style-type: none"> - ITDG - NEMA - UNED 	NEMA	1M

Implementation Matrix for Energy

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
ENERGY RESOURCE UTILIZATION	Connection to national grid	District connected to national grid	Lobby for connection	2006-2007	KPLC KENGEN M&E NEMA ALRMP	M&E NEMA	2MILLION
Development renewable energy resource	Exploit energy potential	Solar and wind power exploited	Awareness Virtues of renewable energy sources	2006-2010			
Charcoal burning	Reduce charcoal burning	Charcoal burning reduced	Awareness raising in need to reduce charcoal burning Awareness raising on alternative and improved stoves and ovens	2006-2009	NEMA ALRMP FOREST Departments. Community	NEMA FOREST Department	1 MILLION

Implementation Matrix for Mining and Quarries

Priority issue	Objective s	Output	Activity	Time frame	Stakeholders	Responsible institution	Cost
Reclamation and restoration of quarries arid sand harvested areas	Reclamation and restoring and land scrapping	Land reclaimed	Land scrapping Planting of appropriate species of trees	5 years	NEMA, County councils	NEMA county councils	1 M
			EIA audits Fencing provision of protective clothes	1year	NEMA county councils	NEMA County councils	

Implementation Matrix for Biodiversity Environmental Information Systems

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
	Documentation and environmental information	To improve access to documents and environmental information	Accessible environment information	- Construction of a district information documentation center	By 2010	NEMA, FD, DDC, KLS, CDF EDUCATION	NEMA	6M
	Information access and sharing	To improve access and sharing of information	- Improved sharing and access of information	Legislation on access and sharing of information should be to club bureaucracy Right to environmental information be guaranteed Information to be disseminated, should be accurate and timely	2010	Parliament NEMA AG	NEMA	

Implementation Matrix for Environmental Governance and Institutional Framework

	PRIORITY ISSUE	OBJECTIVES	OUTPUT	ACTIVITY	TIMEFRAME	STAKEHOLDERS	RESPONSIBLE INSTITUTION	COST
	Strengthen environmental governance	To strengthen environmental governance at district level	Improved environmental governance	Capacity building for D&C members and civil society Provision of means of transport Improve on funding for DEC	2007	NEMA Ministry of finance	NEMA	6M
	Improve on compliance with environment regulation and standards	To improve compliances with environment regulations and standards	- Improve environment	-Training of environment officers on compliances and enforcements Appointment and gazettement of environmental inspectors - Formulation of gazettement of various environment standards	2007 2007 2008	NEMA FD, KEPHIS JUDICIARY	NEMA	5M

**TABLE 17: Monitoring and Evaluation matrix
Monitoring and Evaluation for Energy Resources**

Activity	OVI	MOV	Reporting Schedule	Implementers	Responsible Institution	Cost
Lobby for Connection to the National grid	District Connected	Existence	Annual	Kengen, KPLC, Politicians	Ministry of Energy	
Awareness Raising on Renewable Energy Sources	Awareness raised	No. of workshop held	Annually	NEMA, Forest Department, Civil Society	Ministry of Energy	1m
Awareness Raising on The effects of charcoal burning	Awareness raised	No. of awareness raising forums held and reports	Annually	Forest Department, NEMA	Forest department,	1m

Monitoring and Evaluation for Soil and Land Use

Activity	OVI	MOV	Reporting Schedule	Implementers	Responsible Institution	Cost
Awareness Creation on Sustainable Range Management	Awareness Forums	No. Held and Reports	Quarterly	MLP\$D,PA, NEMA,DRSRS	NEMA	
Establish Seed banks	Bulk plots in use	No. of plots	Quarterly	MOA, MLP\$F,	NEMA	
Monitor soil Erosion & Land Degradation	% of soil loss	Monitoring reports	Quarterly	MOA, DRSRS	NEMA	

Monitoring and Evaluation for Agriculture

Activity	OVI's	MOV	Reporting Schedule	Implementers	Responsible Institution	Cost
Training of prospective farmers	Farmers trained	No. Trained and reports	Quarterly	MOA	MOA	
Establishment of Demonstration Plots	Plots established	No. of plots Established	Quarterly	MOA	MOA	
Soil and water Conservation Training	Communities Trained	No. Trained and reports	Quarterly	MOA	MOA	

Monitoring and Evaluation for Livestock and fisheries

Activity	OVJ -	MOV	Reporting Schedule	Implementers	Responsible institution for M&E
Reseeding of degraded Land	Area Reseeded	Size of area Reseeded	Annually	MLP&F and	MLP&F
Creation on Sustainable Range land Use	Awareness raised	No. of awareness forums held	Annually	MLP&F, NEMA MOA, Civil Society	NEMA,
Carrying capacity analysis	Analysis undertaken		Annually	DRSRS, MLP&F	MLP&F

Monitoring and Evaluation for Environmental Hazards and Disasters

Activity	OVJ -	MOV	Reporting Schedule	Implementers	Responsible institution for M\$E
Drought Mitigation Response Measures	No. of mitigation measures undertaken	Work tickets for water buster No. of livestock No. of vaccinated No. of beneficiaries given relief food waybills No. of kit supplied to health facilities No. of therapeutic centers established	Quarterly	ALRMP, M.O.H Ministry of Water Provincial Administration	
Flood preparedness Measures put in place	No. of preparedness put in place	Constructed dykes, Water Harvesting Constructed deck dams and diversion of ditches No. of H2O spreading structures construction	Quarterly	M.O.W, ALRMP Provincial Administration M.O.R.P.W	M.O.W ALRMP Provincial Administration M.O.R.P.W

Monitoring and Evaluation for Environmental Education and Technologies

ACTIVITY	OVI	MOV	REPORTING SCHEDULE	IMPLEMENTORS	RESPONSIBLE INSTITUTIONS FOR M&E
Promotion of school based environment education	No. of eco school clubs established	Club registration certificates	Annual reports	NEMA Ministry of Education (schools)	NEMA
Environment barazas held at locational level	No. of locations where barazas were held	Barazas reports	Quarterly reports	NEMA PA	NEMA
Construction of environmental information documentation center	No. of environment information documentation in center	Existence of environment information documentation center	Annual reports	NEMA	NEMA
Construction of public library at Masalani town	No. of public library constructed	Existence of public library at Masalani	Annual reports	- CDF ICIS	DDC
Capacity building for DEC members civil society	No. of capacity building exercise held	Capacity building exercise report	Annually	- NEMA - Civil society	NEMA
Operationalization of district environment office	No. of offices built, vehicles brought and office equipment brought	Existence of district environment officer with means of transport	Annually	- NEMA - Ministry of finance	NEMA
Environment inspectors appointment, gazettement and training on compliance and enforcement	No. of environment inspectors appointed & gazetted No. of training held	Existence of environment inspectors Training reports	Annually	NEMA Ministry of environment	NEMA

Formulation and gazettelement of various environment staff	No. of staffs formulated and gazetted	Kenya government Gazette notice on standards			
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Monitoring and Evaluation for Forestry and Wildlife Resources

ACTIVITY	OVI ^s	MOV ^s	REPORTING SCHEDULE	IMPLEMENTORS	RESPONSIBLE INSTITUTIONS FOR M&E
Training and sensitization	No. of people trained and sensitized	Training and sensitization reports	Quarterly	NEMA FD, Civic society	- NEMA, FD
Demarcation on of forests	Area demarcated as forest	Forest demarcation reports	Annually	-FD, -Ministry of land and settlement, CCI	- FD
Preparation of forest management agreement with community	No. of agreement signed with communities	Management Agreement reports	Annually	CI , FD	-FD
Training of communities on preparation of forests management	No. of training held and no. of participants	Training report	Quarterly	FD, Civil society	- FD
Promote modern bee keeping (production targeted on 10 tones per annum)	No. of promotional campaigns held Amount of honey Produced	Promotional campaigns reports Annual sales Reports	Annually	Livestock production Departments Ministry of cooperatives	Ministry of cooperative
Organize bee keepers in groups	No. of groups formed and registered	Registration certificates	Annually	Livestock production Department Ministry of	Ministry of cooperative

Formation of range management committees for communities living along the forest	No. of communities formed	Registration certificate	Annually	Livestock production department	FD
Establishment of tree nurseries, parks and arboretum	No. of tree nurseries parks and arboretums established	Existing tree nurseries parks and arboretum	Annually	FD CCI Community, civil society	- FD
Identification and establishment of eco- tourism sites	No. of eco- tourism site established	Existing eco- tourism sites No. of license (saved for eco- tourism site)	Annually	KWS, KTB CCI , Communities	KTB

Monitoring and Evaluation for Forestry and Wildlife Resources Ctd.

ACTIVITY	OVI _s	MOV _s	REPORTING SCHEDULE	IMPLEMENTORS	RESPONSIBLE INSTITUTIONS FOR M&E
Linking Ijara with North Coast tourism circuit	No. of tourism arrivals in Ijara district	Tourism arrival reports	Annually	KTB, KWS , CCI	KTB
Construction of water points for wild life in the forest	No. of watering points constructed	Existence of wildlife watering points	Annually	KWS, CCI	KWS
Creation of wildlife sanctuaries	No. of wildlife sanctuaries	Presence of sanctuaries in the district & registration certificate for sanctuaries	Annually	KWS, Civil society CCI	KWS
Promotion of environmental conservation programmes to protect endangered species	No. of promotional undertaken	Promotion reports	Annually	CCI, KWS, KEPHCS NEMA, FD	NEMA
Sensitization of communities Endangered wildlife	No. of Sensitization Exercise carried out	Sensitization Reports	Quarterly	NEMA, KEPHICS FD, NEMA	NEMA
Sensitization and Creation of Awareness on the Importance of Biodiversity	No. of Sensitization Exercise Carried out	Sensitization reports	Quarterly	NEMA, KEPHCS FD, NEMA	NEMA
Research on wildlife	No. of Research Carried out	Research Publications	Annually	Research institutions	NEMA

of Medicinal Value	on Medicinal Value of w/life				
Research and dissemination of IK	No. of Research Carried out on 1K	Research Publications	Annually	Research institutions	NEMA
Restocking of 40% of H/H in the district	-No. of Households Restocked in Masalani, Ijara, Hulugho	Branded animals Progress reports Quotations Beneficiaries Names/ID/No	Quarterly	- Community	-DSG/DDC - Specific Dept e.g. ALRMP

Monitoring and Evaluation for Industry, Trade and Services

ACTIVITY	OVI's	MOV's	REPORTING SCHEDULE	IMPLEMENTORS	RESPONSIBLE INSTITUTIONS FOR M&E
Building partnership and entrepreneurship	No. of Communities Trained	W/shop reports List of participants	Quarterly	G.O.K, NGO's CBO's	DSG, NGO's CBO's
Silting of Dumping Sites and Provision of a tractor for Collection of Refuse	- No. of dumping Sites sited and Provision of Tractors	No. of dumping Sites constructed Tractor provided Work ticket in place	Quarterly	CCI, DPHI	CCI, DPHO
Desilting of 4 no. of h2o pans for livestock trade	no. of constructed pans	Desilted water pans in use	Quarterly	CCI, NGO,s Ministry of livestock And fisheries	CCI, NGOs Ministry of water Ministry of livestock and fisheries
Provision of loans to cooperatives societies in Masalani, Ijara, Hulugho and Sangailu	No of cooperative group supported	M.O.U Financial agreement Bank statement Certificate of registration	Quarterly	Ministry of cooperative society, (D.S.D.O) D.D.O, ALRMP	Ministry of Cooperative DSDO, DDO ALMRP
Provision of TBA training	No. of TBAs	Training reports No. of participants No. of delivery kits provided photos/video	Quarterly	M.O.H, NGOs CBOs	NGOs, CBOs

		taken			
Training of communities on safe clean water	No. of communities trained	List of participants Training reports	Quarterly	Ministry Of Water	Ministry Of Water