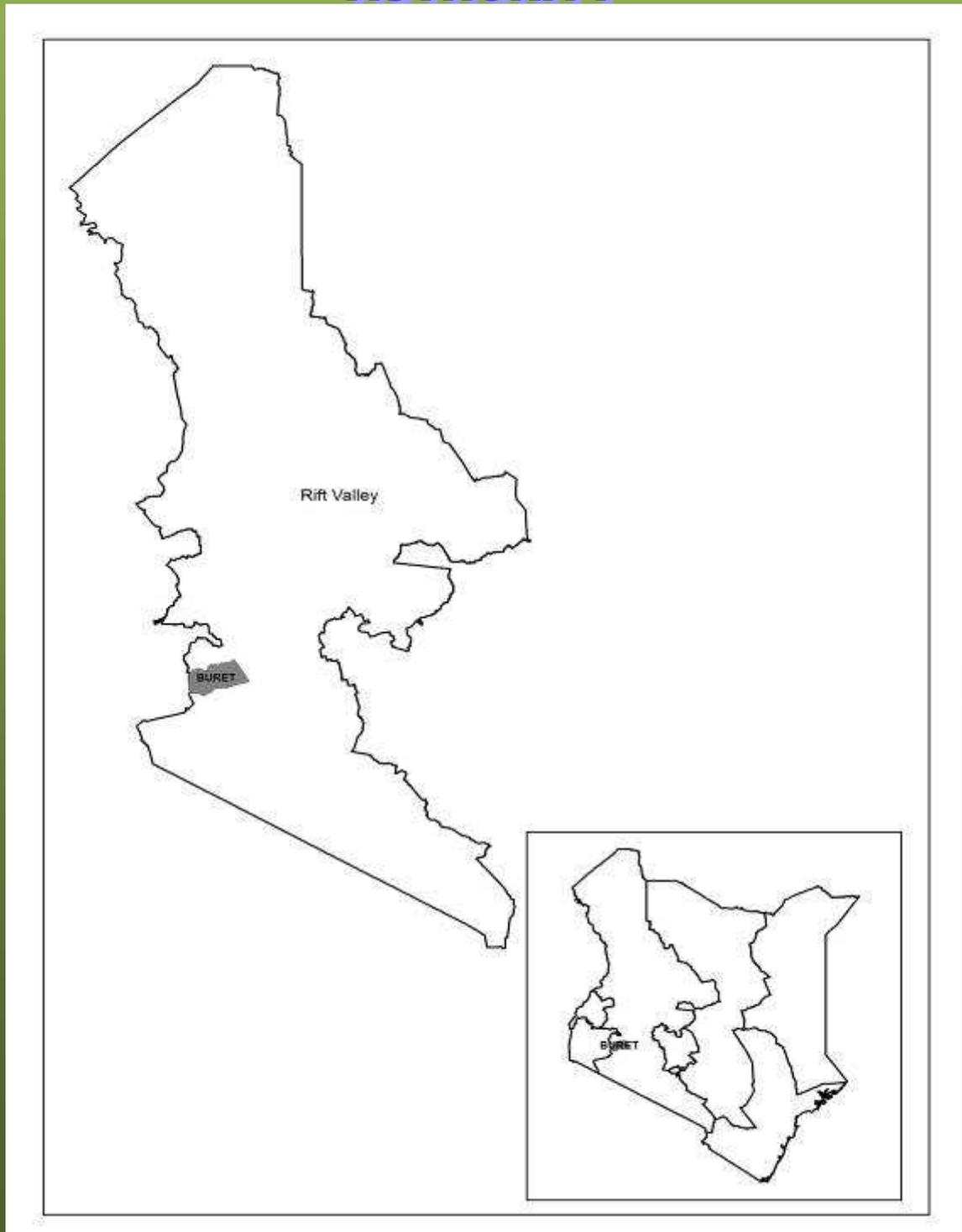




REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT AND MINERAL RESOURCES
NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY



BURET DISTRICT
ENVIRONMENT ACTION PLAN
2009-2013

EXECUTIVE SUMMARY

Economic growth and environment are closely intertwined in Kenya's development. Environmental Action Planning is a tool that aims at enhancing the integration of environment into development planning.

Bureti District faces many environmental challenges with some being unique to the District. Poverty has led to over-use and destruction of environment. Continued reliance on trees for fuel and wetlands for farming and its resources has led to deforestation and wetland encroachment. Annual flooding continues to destroy property and frustrate farming.

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

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

Chapter three discusses human settlements and infrastructure in Bureti District covering situation analysis, challenges and proposed interventions. Environmental challenges addressed include; waste management, sanitation, pollution, diseases, land use, demand for water, energy, materials for construction, land and wetlands degradation, policy and legislation, biodiversity loss and land tenure.

Chapter four addresses environmental aspects in tourism, trade, industry and services sectors. The key issues under this chapter are 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 floods.

Environmental information, networking and technology are discussed in chapter six. It emerges that environmental information and networking technology have continued to receive scanty attention.

Governance, Policy and Legal Framework as well as Institutional arrangements are highlighted in chapter Seven. The key issues addressed include; harmonization of environmental legislations and institutional mandates, incorporation of indigenous knowledge in environmental management. Chapter eight is the implementation Matrix.

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 Divisional 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 (MTP2008-2012). 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 DEAP for Bureti owes much to the technical and financial assistance provided by the NEMA. This support, which included innovative community and civil society

consultations, facilitation of DEC meetings, as well as final publication costs, is gratefully acknowledged

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 Vision 2030.

**Dr. Ayub Macharia (PhD),
DIRECTOR GENERAL (Ag)**

NATIONAL ENVIRONMENT MANAGEMENT

ACKNOWLEDGEMENT

Environment Action Planning is a multi disciplinary, multi stakeholder and multi-sectoral participatory process. In this connection, many institutions and individuals have contributed immensely to the preparation of this District Environment Action Plan. I take this opportunity therefore, to acknowledge all those who contributed to its preparation.

I particularly acknowledge with appreciation the participation of the District technical Committee charged with the responsibility formulating this action plan for their valuable input, participation and tireless effort to accomplish this task. I further thank the different departments NGOs, CBOs, Research institutions and individuals who provided information and data that was the building blocks for this plan.

I also acknowledge the support of NEMA headquarters and the board for facilitating the entire process through provision of appropriate guidance and finances respectively to complete the exercise. I am grateful to the Provincial Director of Environment – Rift Valley Province and the District Environment Officer Buret for the inputs and commitment to the entire process of preparation of this document.

It is my belief that this plan will be implemented for the betterment of our environment in Bureti District, the province and the country at large.

Dr. Kennedy I. Ondimu
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& RESEARCH CO-ORDINATION

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LIST OF ACRONYMS

ASALs	Arid and Semi Arid Lands
CBOs	Community Based Organizations
CDM	Clean Development Mechanism
DDOs	District Development Officers
DDPs	District Development Plans
DEAPs	District Environment Action Plans
DDC	District Environment Committee
DEOs	District Environment Officers
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
IK	Indigenous knowledge
MDGs	Millennium Development Goals
MEAS	Multilateral Environmental Agreements
MENR	Ministry of Environment and Natural Resources
MOH	Ministry of Health
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
PDEs	Provincial Directors of Environment
PEAP	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
UNEP	United Nations Development Programme
WC	Water Closet
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

CHAPTER ONE

1.0 Introduction

1.1 Preamble

The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 had a double mandate of finding ways to protect the global environment while ensuring that economic and social concerns are integrated into development planning. The Conference underscored the need to developing modalities for integrating environmental concerns into development policies, plans, programmes and 'projects. It agreed on the guiding principles and a global plan of action for sustainable development commonly called Agenda 21

The World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, reaffirmed the commitments of the international community to the principles of sustainable development contained in Agenda 21 and the Millennium Development Goals (MDGs) of 2000.

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 sustainable if it meets ecological, economic and social needs. This calls for the integration of environmental considerations at all levels of decision making in development planning and implementation of programmes and projects.

The Government of Kenya is committed to the achievement of sustainable development stated in Agenda 21, the Millennium Development Goals, Vision 2030 and the Johannesburg Plan of Implementation. This commitment to environmental protection and sustainable use of natural resources is well articulated in various Government policy documents including the Sessional Paper No.6 of 1999 on Environment and Development, the Economic Recovery Strategy for Wealth and Employment Creation (2003-2007) and the National Development Plan (2002-2008). These policies and plans recognize integration of environmental concerns into national planning and management processes and provide guidelines for achieving sustainable national development.

The 9th National Development Plan (2002-2008) states that *"The full integration of environmental concerns in development planning process at all levels of decision making remains a challenge to the country, the need to integrate environmental concerns in development activities should be given high priority"*. The Environmental Management and Coordination Act (EMCA) of 1999 provides for the integration

of environmental concerns into the national development process. The National Environment Management Authority (NEMA) is mandated to implement the Act and in particular coordinate the preparation of Environmental Action Plans (EAPs) at the District, Provincial and National level.

Poverty is a major challenge to the Goals of the sustainable development. Sound environmental and natural resources management should contribute to poverty reduction, food security and sustainable livelihoods, enhanced environmental quality and health, promotion of sustainable energy production, minimization of pollution and waste, improvement of shelter and habitats, promotion of eco-tourism and improved standards of living.

1.2 Challenges of Environmental Management

Kenya's economy primarily depends on natural resources where over 68% of the population live in rural areas and derive their livelihoods mainly from these resources. Economic activities derived from, the natural resources include agriculture, industry, tourism, energy, water, trade, and mining. The environment and natural resources have in the recent years been under, threat due to increased dependence on natural resources to meet basic needs. The situation is aggravated by the rising poverty levels from 42% in 1994 to 56% in 2002 and is currently estimated to be over 62%. The situation is even worse within the rural population. The population growth rate has over time become higher than the economic growth rate hence the pressure on these resources. This has also led to increased in-migration and over-utilization of fragile ecosystems. The immigration into marginal areas from high potential areas has contributed to unsustainable land use practices often resulting in resource use conflicts especially water and pasture.

Poverty often leads to over-use and destruction of the environment where short-term development goals and practices are pursued at the expense of long-term environmental sustainability. Once the resource base is degraded, poverty is aggravated because the capacity of the resource base to support the same population even with unchanged demand will have diminished. Therefore, there exist a close link between poverty and environment.

Rapid urbanization coupled with increased slum settlements due to rural-urban migration have resulted in urban decay, loss of environmental quality and health deterioration, water pollution, loss of biodiversity and encroachment of fragile ecosystems. In both rural and urban areas, access to safe drinking water and basic sanitation is a critical environmental and health concern.

The widespread accumulation of solid wastes and poor disposal of effluents in urban areas is also an environmental hazard culminating in air and water pollution and increased incidences of respiratory and water borne diseases.

About 88% of Kenya's land areas are classified as arid and semi arid lands (ASALs) which supports over 50% of livestock, about 30% of the population and most wildlife. Climatic variability has reduced the capacity of ASALs to support existing and emerging livelihoods thus further aggravating environmental degradation. This is evidenced by increased soil erosion, reduction in pasture and vegetation cover, food insecurity, increased conflicts and insecurity - all contributing to increased poverty

Prior to the enactment of EMCA 1999, environment management in Kenya mainly focused on administrative boundaries with little regard to trans-boundary and shared resource issues. Consequently, management of these resources has not been adequately addressed, including watersheds, wildlife and mountain ecosystems among others. The challenge is to develop integrated management plans for inter- and intra-districts, provinces, regional, national and international boundaries.

Indigenous management systems that are sustainable have largely been disregarded in the recent past leading to environmental deterioration. Sectoral regulatory instruments, which have been used to manage the environment before enactment of EMCA 1999, did not achieve the desired outcomes. This is largely attributed to lack of linkages, sectoral conflicts/overlaps, resource limitations, inadequate stakeholder involvement hence weak compliance and enforcement.

The challenge of managing environmental resources sustainably calls for the development of integrated management plans and, their implementation. Integrated planning enables harmonization of sectoral priorities, stakeholder involvement and participation, proper programming and budgeting system.

Section 38 of EMCA provides for the preparation of District, Provincial and National Environment Action plans every five years.

1.3 Provisions of EMCA on Environmental Planning

Part IV of the Environmental Management and Coordination Act (EMCA), 1999 deals with environmental planning at the national, Provincial and district level. Section 40 specifically deals with environmental planning at the district level and states in part:

Every District Environmental committee, shall every five, years prepare a district environment action plan in respect of the district for which it is appointed and shall submit such plan to the

chairman of the provincial environment action plan committee for incorporation into the provincial environment action plan proposed under section 39.

1.4 Objectives of District Environment Action Plan

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

1.5 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.

The District Environment Action Planning Committee spearheaded the preparation of the Buret DEAP. The committee requested for sectoral environment reports from the lead agencies and compiled the DEAP. The Buret District Environment Action Plan was further enriched through participatory planning approach in which consultation workshops were undertaken at the district

The preparation of the Buret DEAP has been realigned with Vision 2030, Mid-Term 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.

1.6 District profile

1.6.1 Geographical Location, Size and Administrative Units

Buret district is one of the nineteen districts in the Rift Valley Province. It borders Kericho to the North, Nakuru to the North East, Bomet to the East, Nyamira to the South West. It lies between 0.25° and 0.43° South of the equator and longitude 35° .05' and 35°35' East. It covers a total area of 1100km².

It is composed of five administrative divisions namely Buret, Roret, Kimulot, Konoin and Sotik.

Table 1: Area and Administrative Units by Division

Division	Area(km ²)	No. of locations	No. of sub locations
Bureti	185	10	28
Roret	144	5	14
Kimulot	308	5	11
Konoin	320	11	22
Sotik	143	7	23
Total	1100	38	98

Source: District Statistics Office

1.7 Climate and physical features

The landscape of the district is characterized by undulation topography that generally slopes towards the west. Rivers flow from the North East to the west. Most of the rivers originate from the South West Mau forest; traverse the districts before joining major rivers and eventually emptying into Lake Victoria. The altitude range is between 1800m and 3000m above sea level with the North East (Mau escapement) being the highest point and Sotik division being the lowest.

The district receives conventional type of rainfall which is well distributed throughout the year with a monthly average rainfall of 1700mm – 2020mm. There is a short dry spell in January and February while April and May are the wettest months. The temperatures in the district range from 18° c to 20° c. July is the coldest month with an average of 16° c while February is hottest with average temperatures of 20° c. Three major soil types are found in the district namely: clay (48.6 %), Loam, (34.9%) and black cotton soils (8.5%). 32,700 hectares of the South West Mau forest are found within the district. Fuel wood plantations and riverine forest reserves within the major multinational tea firms – Unilever Tea (Kenya), James Finlay K (ltd), Williamson Tea (K) ltd and Sotik Tea Company constitute 6500 hectares of forest land and also form.

1.8 Population size and distribution

By the 1999 Population and Household census, Buret district had a population of 316,882 persons. Males accounted for 162,703 and females numbered 154, 179. With an intercesal growth rate (1989-1999) of 2.7 % the population is projected to grow to 389,634, persons by the year 2010. The total fertility rate was calculated to be 6.0. The infant mortality rate for males was 37.8 and females 39.9. In 1999, the district had a population density of 332 persons per Km². It is projected to now stand at 409 persons/ Km². In 1999, the district had an urban population of 10679. This is projected to stand at 13,221 in 2006.

1.9 Social, cultural and economic characteristics

Buret and Kimulot Divisions have the highest number of poor in the district. The major cause of poverty in Buret division is scarcity of land while in Kimulot division most land is under tea plantation and a considerable portion is under natural forest thereby subjecting people to small pieces of land for subsistence agriculture.

CHAPTER TWO

2.0 Environment and natural resources

2.1 Land use and soils

The major soil types in Buret district are clay soils which occupy 48.6% of the land outside the forest reserve, loamy soils which cover 34.9% of the district while black cotton soils occupy 8.5% of the total district land cover. Soils in the district are generally fertile.

Land uses.

Land use type

Food crop production: -	maize, beans, millet, sorghum, potatoes
Industrial/cash crop production: -	tea, coffee, pyrethrum.
Horticultural crop production: -	pineapples, tomatoes, bananas, avocados, Cabbages, bulb onions, peas and kales.
Infrastructure development: -	construction of roads, water pipelines/ Communication masts, power generation lines.
Industrial and commercial development:-	Factories and urban centres
Public utilities: -	Schools, hospitals, health centres and Dispensaries, recreation parks, police stations, Government buildings.
Human settlement: -	Building of family houses and other Infrastructure.
Livestock production: -	cattle, sheep, goats, poultry
Quarrying	
Forestry	

Key environmental issues

- Soil erosion resulting from poor farming practices
- Environmental pollution (water, air, soil) as a result of effluents from factories and urban centres and agrochemicals, solid wastes.
- Biodiversity loss resulting from clearance of forests and encroachment on wetlands.
- Increase in water-borne diseases because of water pollution
- Release of harmful gases from factories.

Proposed interventions

- Educate farmers on appropriate farming techniques/practices
- Construct a central sewerage system for disposal of liquid waters.
- Proper collection and disposal of solid wastes in designated dumpsites.

- Educate farmers on proper use of farm chemicals.
- Enforce existing legislations on environmental conservation and protection e.g. EMCA 1999, Agriculture Act, Forests Act, Water Act 2002.

2.1.1 Regulatory and institutional arrangements governing soil

- The Agriculture Act (Cap 318)
- The Agriculture (Basic Land usage) Rules 1965
- The Chiefs Act.
- The Physical Planning Act – 1996
- The Land Control Act.

2.2 Land and land use changes

Types and status of land use

The district has a total area of 1100 Km². Of this, the total arable area is 873.9 Km² and a non-arable area of 226.1 Km². Gazetted forests covers 32.7 Km² while ungazetted forest cover is 6.5 Km². Urban areas occupy a total of 8.2 Km². Wetlands account for about 5.5% of the district area.

Most of the arable land in the district has been sub-divided into small units. The average farm size in the district currently stands at 2.0 hectares. The total land area under crops is 20,675 hectares. The land carrying capacity is 0.6 ° acres per livestock unit. Table 2 highlight the agro-ecological zones in the district

Table 2: Agro-ecological zones in the district.

Agro ecological zone	Potential land use	Current land use	Constraints	Mitigations
UH	Forest zone	Forestry, tea planting, food crops, settlement, flowers	Illegal logging. Human Settlement	Forest security patrols. Eviction of squatters

Agro ecological zone	Potential land use	Current land use	Constraints	Mitigations
UH1	Sheep- dairy zone Tea	Tea farming, dairy settlement, food crops	High cost of farm inputs	Subsidize cost of farm inputs
LH1	Tea- dairy zone	Tea, dairy, flowers, food crops	High cost of farm inputs	Subsidize cost of farm inputs
UM1	Tea – coffee	Tea, food crops, dairy pyrethrum, coffee	Lack of knowledge on crop and animal husbandry	Environmental education
UM2-3	Coffee- maize zone	Tea, food crops horticulture, coffee		Intensify agricultural and forestry extension.

2.2.1 Land Use Changes and Impacts

Over time, there has been a marked shift from subsistence agriculture to cash crop farming. Tea farming and horticultural production have gradually replaced subsistence farming. This has led to persistent food shortages. Buret district in spite of its high agricultural potential is now a food deficit district.

Most agricultural land in the district has been converted into urban settlements without adherence to physical planning regulations which has led to emergence of informal and unplanned structures which impact negatively on the environment.

Most steep hilltops that were previously thickly vegetated have been quarried and left bare and vulnerable to erosion. Wetlands that were in the past sources of clean water have been polluted and generally degraded by destructive cultivation, discharge of effluent and agrochemicals.

Gazetted forest land has been illegally invaded, occupied, cultivated, and wantonly logged resulting to loss of forest cover and biodiversity. Urban development has led to increased generation of waste which pollutes the environment

Key environmental issues

- Encroachment and reclamation of wetlands (swamps), for cultivation and planting of eucalyptus.
- Encroachment and deforestation of gazetted forest especially in south west Mau forest
- Environmental pollution resulting from discharge of waste into the environment.
- Environmental degradation of hilltops as a result of quarrying activities.
- Loss of biodiversity as a result of deforestation, destruction of wet lands.
- Climate changes because of declining forest cover and other destructive human activities

Proposed interventions

- Land use planning
- Enhance soil conservation measures
- Rehabilitation of degraded sites
- Encourage community participation in rehabilitation efforts
- Zoning and gazettement of buffer zones
- Build capacity on safe use of agrochemical
- Enforcement of relevant legislations, regulations and standards
- Intensification of agro forestry

2.2.2 Dry lands

No area in Buret district may be categorized as dry lands. However Sotik and Roret division with an average annual rainfall of 1500mm, which is not uniformly distributed throughout the year are relatively drier than the rest of the district.

The problems of seasonal rainfall shortage are however mitigated by the construction of pans and dams in this division. Kipsonoi and Chemosit rivers and several streams also transverse these divisions and ensures continuous supply of water throughout the year.

2.3 Agriculture

Farming plays an important role in Buret District both as an economic activity and for subsistence. The farming system ranges from large scale tea farming to small scale horticultural and flower growing farms. Farming activities involve use of a variety of chemicals which include

fertilizers, herbicides, acaricides, pesticides, which eventually end up in the environment. Mechanization in agriculture also impacts on the environment.

Processing of farm produce results in generation of waste and effluents which if not properly managed will impact negatively on the environment.

Agricultural production in Bureti district may be broadly categorized into the following types:

- Food crop Production- The main food crops grown are maize, sorghum, millet, beans, Irish potatoes, sweet potatoes.
- Cash/ Industrial crop production- The main cash crops grown in Bureti district are tea, pyrethrum and coffee.
- Horticulture crop production – The main horticultural crops grown in the district are pineapples, bananas, bulb onions, peas, pumpkins and avocados.

2.3.1 Production patterns

There are two planting seasons for the major cash crop in the district. The main crops are planted in the period of February – March and harvested in July – August. The short season crops are planted in September and harvested in January – February. Horticultural and cash crop production do not follow any pattern but is continuous throughout the year.

2.3.2 Regulatory and Management Arrangements

Food crop production is undertaken by individual farmers on a small to average production scales. The government through the relevant arms of government like ministry of agriculture, the Kenya seed company regulates the quality of seed to be planted.

Cash crop production is mainly regulated through the relevant statutory bodies namely the Kenya tea development agencies, the umbrella body Kenya tea growers association and the Kenya tea board. A number of farmers have also formed co-operatives societies to assist in the marketing of their produce.

Key environmental issues

- Discharge of effluents into the environment pollutes water.
- Use of agrochemicals pollutes water bodies and harms biodiversity.
- The need for fuel wood to fire boilers in tea factories leads to unsustainable tree cutting and encroachment of wetlands to plant eucalyptus.
- Scarcity of land has led to cultivation on steep slopes and reclamation of wetlands.
- Generation of wastes which pollutes the environment – Polythene and plastics, obsolete chemicals among others.

Proposed interventions

- Factories should properly treat effluent before discharge into the environment
- Train farmers on proper use of agrochemical to avoid environmental pollution.
- Tea sector stake holders should draw up a sustainable fuel wood production plan
- Forest extensions services should be intensified to educate farmers on appropriate fuel wood species and planting niches.
- The agriculture Act should be enforced to deter farmers from cultivating on steep slopes
- Enforce the Water Act, EMCA 1999, Agriculture Act and other relevant Acts to deter farmers from encroaching on wetlands.

Table 3 shows the types and status of farming systems in the district

Table 3: Types and status of farming systems

Type of farming system	Agricultural product	Extent (hectares)	Distribution	Location	Current production level kg/ha	Challenges
Food crops production	Maize	21480	73.6		751800	-Pollution from agrochemical -Pollution from discharge of effluent -Encroachment and reclamation of wet lands -Encroachment and destruction of forest and hilltops.
	Beans	8165			65320	
	Finger millet	5407			3780	
	Sorghum	480			3360	
	Irish potatoes	1210			11950	
	Sweet potatoes	450			27000	
Total		37192				
Cash crop production	Tea	9311	18.6			
	Coffee	60.5				
	Pyrethrum	28.4				
Total		9399.9				
Horticultural crops	Pineapple	1765				
	Bananas	145				
	Avocados	59				

Type of farming system	Agricultural product	Extent (hectors)	Distribution	Location	Current production level kg/ha	Challenges
Total	Cabbages	750	7.7			
	Kales	780				
	Tomatoes	350				
	Bulbs	27				
	Onions	27				
	3903					

Table 4 shows the types of waste and their associated environmental issues

Table 4: Pollution waste and degradation associated with agriculture.

Types of waste effluents	Source	Status effluents discharge into the environment	Environmental Issues water pollution	Impact	Mitigations treatment of effluent before discharge
Solid waste	Factories, farms		Heap of an collected garbage	Loss of esthetic value	Proper collection & disposal
Basques emission	Factories		Ozone depletion	Respiratory Disease	Install Smock Stacks

2.4 Livestock production

The major livestock types in Buret district are shown in Table 5.

Table 5: Types of livestock in Buret District

Type	Population	% of total	Location	Livestock products	Status	Challenges	In servant proposal
					Current production		
-Dairy Cattle	145,060	33.75	”	-Milk	71,160,237	-Pest and Diseases,	
-Beef	42180	9.5		-Beef hide skins	10,585 17,319(kgs)	-High cost of inputs	
-Sheep	31919	7.21		-Wool, mutton& skin	6234 7966	Inadequate feeding esp. dry spell	

-Goats	28014	6.3		-Milk/meat/ Skins	5730 6956	” Expensive inputs	
-Chicken	188,562	45.58		-Eggs/ meat	6,555,720		
Turkeys	250	0.05		Meat, Eggs		Diseases and	
Ducks	1254	0.2		”		pests	
Geese	385	0.08		”		Poor Infrastructure Lack of credit facilities	

2.5 Water resources

Close to 5% of the total district area is covered by surface water. The districts water resources include rivers, streams, springs, pans and dams and swamps. There are five permanent rivers in the district namely: Chemosit, Kipsonoi, Kiptiget, Mara Mara and Itare. Numerous tributaries and seasonal streams feed into these rivers. The ground water potential in the district is quite low but nonetheless, a number of boreholes have been dug to tap this resource.

The main water catchment for the district is the Mau Forests Complex, which is the source of all the major rivers in the district. The numerous swamps in the various locations in the district are also important catchments for the major rivers. Most of the water consumed in the district is drawn directly from the source before any treatment. A number of private and institutional water schemes also operate in the district and treat water to acceptable standards before supplying to the public for use. According to the water Act, 2002, all water resources belong to the state. A permit must be issued before any abstraction for any purpose. The water resources management Authority is the government agency responsible for management of water resources in the district.

The regional water services board is responsible for provision of water supply services in the district. The major uses of water in the district include domestic, agricultural, power generation, industrial small scale irrigation, livestock, recreational and cultural uses. 35.2% of the district population has access to piped water, while 0.8% gets their water from tanks.

Key Environmental Issues

- Pollution of water resources by municipal and factory effluents,
- Eutrophication resulting from use of agrochemicals,

- Siltation from inappropriate farming practices and
- Destruction of water catchments areas.

Proposed interventions

- Construction of a central sewerage system for the district to handle water from urban centres.
- Education of farmers on proper fertilizer and other chemicals use to avoid water pollution. Farmers should use more environmentally friendly fertilizers like compost and other farm yard manure.
- Educate farmers on appropriate agricultural techniques to curb erosion which causes siltation
- Curb further destruction of natural forest and encourage planting of more trees.

The sources and status of water sources in the district are shown in Table 6.

Table 6: Sources and status of water resources.

Source	Status		Usage	Management system	Environment threats	Proposed interventions
Kiptiget river	Quantity Abstracted	Quality				
	1000 M ³ per day	treated	domestic	NWCPC	Deforestation of catchments, siltation	Rehabilitation of Mau forest, Appropriate farming practices
Itare river	9120M ³ per day	Treated	Domestic	NWCPC	Deforestation of catchments, siltation	Rehabilitation of Mau forest Appropriate farming practices
Kipsonoi	400M ³ per day	Treated	Domestic	NWC&PC	Siltation, Destruction	Rehabilitation of Mau

Source	Status	Usage	Management system	Environment threats	Proposed interventions	
				of source/ catchment.	forest Appropriate farming practices	
Chemosot	20M ³ per day	Raw	Domestic	Community	Siltation, Destruction of source/ catchment	Rehabilitatio n of Mau forest Appropriate farming practices
Ainapkoroi ti	25 M ³ per day	Raw	Domestic	Institutiona l	Siltation, Destruction of source/ catchment	Rehabilitatio n of Mau forest Appropriate farming practices
Chemery	50M ³ per day	Raw	Domestic	Institutiona l	Siltation, Destruction of source/ catchment	Rehabilitatio n of Mau forest Appropriate farming practices

Apart from the major rivers there are eight (8) boreholes in the district. There are also several protected and unprotected springs in the district.

Key environmental issues

- Destruction of water catchments areas
- Water pollution
- Siltation

Proposed Interventions

- Restoration of degraded forest area

- Increased forest surveillance to check illegal entry.
- Public sensitization on environment conservation.
- Construct a central sewerage system for the district.
- Use appropriate agricultural practices

2.6 Forestry

There are two major forest types or categories in Buret district. These are namely the gazetted government forest and private forest plantations. The gazetted forest cover has a total area of 32700 hectares. This forest is of mixed bamboo and other tree species. The total area of non-gazetted forests is 6.500 hectares 0.5% of the district population is engaged in forest related activities, saw mills and furniture works. Most of the non gazetted forests are found as fuel wood plantations of eucalyptus species in the large scale tea farms. Natural forests are also found within the tea estates along rivers streams and on steep slopes.

The south-western Mau forest reserve is mostly composed of natural forest of mixed bamboo and other indigenous tree species. It is conserved as a water catchments area with limited commercial exploitation. However, sections of this forest have been degazetted and demarcated as human settlements. A large portion of approximately 5000 hectares was destroyed by illegal squatters and loggers. They have since been evicted and rehabilitation measures are now in place. In areas that have been degazetted and settled, the government has lifted the ban on logging to allow the forest department harvested trees.

The forest within the large scale tea companies are managed based on management plans to ensure sustainable supply of fuel wood, timber for construction and other requirements.

A number of tree species are used as sources of indigenous medicines. Examples include *Prunus africanus*, *Warbagia ugandensis* and *erythrinee abyssinica*.

Key environmental issues

- Encroachment, settlement and deforestation – south-west Mau forest.
- Illegal removal of forest produce
- Forest fires
- Pests and diseases.

Proposed interventions

- Eviction of squatters

- Secure forest boundaries by regular surveillance and patrols
- Intensify environmental awareness creation among public.
- Reforestation of deforested areas.

The Districts forest types and status are shown in table 7.

Table 7: Types and status of forests.

Type of forest	Extent (Hectares)	Distributio n % of totals	Locatio n	Use	Status		
					Gazette d	Non Gazette d	
Natural forest reserve	32700	86%	South west Mau forest	Catchments conservatio n -timber -Medicine -Recreation -Wildlife - conservatio n	Gazette d		- Encroachme nt -settlement & destruction -Poaching -Forest fire -Pest & Disease
Non gazette d forest	6500	14	-Sotik tea co. -James Finlay - Unileve r tea	-Fuel wood -timber -Electricity -Poles - Windbreaks		Non Gazette d	

Key environmental issues

- Settlements and deforestation
- Pest and diseases

- Forest fires

Proposed interventions

- Replanting of deforested areas
- Public sensitization on environment conservation.
- Enforce existing legislations
- Involve community in forest management
- -Promote agro forestry and farm forestry

2.7 Biodiversity conservation

Types

Biodiversity can be categorized into three:-Species, Genetic and Ecosystem. The major category of species and genetics includes animals and plants. Ecosystem diversity can be categorised into terrestrial and aquatic ecosystem.

Extent and status

There is a great diversity in the number and species of plants and animals in the district. Some species of plants and animals are over exploited for different uses threatening the ecosystems.

Threatened species

Prunus africanus, an indigenous tree species that is used as a source of medicine for treatment of a number of ailments including prostate cancer and venereal diseases. In the early to mid eighties it is reported that there was foreign company purchasing the bark of the tree. As a result a large number of this species was debarked and dried. It is now protected under the presidential decree banning further exploitation of indigenous trees.

Juniperus procera, (East African pencil cedar) is valued for its durable timber, has a very poor regeneration and takes very long to mature. Continuous harvesting for timber has threatened the existence of this species. However, it is protected under the presidential ban on exploitation of indigenous species. Destruction of habitat has also threatened the existence of certain animal species. Examples are the crested cranes which usually breeds on swamps and other wet lands. The reclamation of wetlands and conversion to cultivatable lands has greatly disrupted the breeding habits and grounds of these birds and they are increasingly becoming threatened. Destruction of natural forest has threatened the existence of the collobus monkeys. They are now only confined to riverine forest in the large scale tea farms. A number of environmentally significant areas are found in the district. These include wetlands and hill tops. Hilltops have been quarried and left vulnerable to soil erosion while wetlands have been reclaimed and converted to agriculture.

Utilization and beneficiaries

- Biodiversity is useful to man in a number of ways:
- Livestock: Provide food and income, manure, cultural
- Agriculture: Provide food and income.
- Forest: Timber, soil erosion, water catchment, food, fodders, fuel wood, carbon
- Sidles, cultural uses, medicinal.
- Wetlands: water reservoirs, dry season grazing, thatch grass, wetland vegetation, and
- Purifies water, cultural.
- Hilltops: Road construction murrum, pasture, thatch grass
- Wildlife: Wild life habitat, tourism and foreign exchange.

Regulatory and institutional arrangements

Different institution and regulations administer different resources.

Most wetlands and hilltops are public utility lands held as trust lands by the local authorities. A number of other legislations govern the management of these resources. These include; the Agriculture Act, cap318, the Water Act, 2002 and EMCA, 1999.

The Forest act, cap 385, spells out the guidelines for the management of state forests.

The wildlife conservation Act governs the management of wildlife in Kenya.

Because of the interdependence and complementary roles of each resource, there is an interdisciplinary approach to management of resources. Table 8 highlights the status of biological resources in the district.

Table 8: status of biological resources

Ecosystem	Key species	Threats	Status	Proposed intervention
Gazetted forest	<i>Bamboo</i> <i>Podocarpus</i> <i>Gracillior</i> <i>P. facatus</i> <i>juniperus procera</i> <i>Procera</i>	Deforestation Human settlements Illegal logging Forest fires	Threatened	Reforestation - Increased security patrols - Public education on environmental management

Non gazetted	- <i>Eucalyptus</i> - <i>Grandis</i> - <i>E.Saligna</i> - <i>Pinus Patula</i> - <i>Cupressus</i> <i>Lusitanica</i>		Strictly managed On sustainable management plan with well define planting and felling cycles.	
Inland water Rivers	Fish and other aquatic life	Pollution		Enforce EMCA,1999, Water Act,2002 and public education.
Swamps	Fish and other aquatic life	Pollution, Conversion to agriculture	Threatened	Enforce EMCA,1999, Water Act,2002 and public education.

Key Environmental Issues

- Low awareness on bio diversity conservation
- Deforestation as a result of rampant logging, cultivation, settlement and charcoal burning.
- Agriculture – Indigenous species are eliminated through cultivation and farm clearing through burning.
- Annual wetland burning by local communities
- Introduction of exotic species mainly in Forestry and agriculture in preference to indigenous.
- Pollution in water affecting aquatic life.

Proposed interventions

- Setting up arboretums for species conservation
- Education of the public
- Encourage domestication and propagation of wild vegetables and fruits

- Preservation of water catchment areas and enriched by planting more indigenous species
- Domestication of biodiversity conservation plans.
- Creation of recreation sites
- Encourage tourism in the district
- Support ongoing conservation efforts like the Krugger ranch and Naiberi campsite.

CHAPTER THREE

3.0 Human settlement and infrastructure

3.1 Human settlement and planning

The following are the main types of tenure in Buret district:

- Freehold or private ownership
- Trust lands
- Government land: - Gazetted government forests Land on which government buildings and infrastructure stand.

Land use types

- Agriculture and livestock farming
- Human settlement
- Infrastructure development
- Recreation and public utilities
- Urban development
- Industrial development.

Human settlements

There are two major types of settlement in Buret district.

These are namely; rural and urban settlements.

Over 80% of the district population resides in rural areas. Urban settlements account for approximately 10% of the district population. The remaining 10% of the district population is concentrate in labour lines in tea factories and estates and in other institutions in the district.

Housing types

Housing structures can be classified as permanent, semi-permanent and temporary.

The type of housing is determined by a number of factors which include:

- Availability of building materials
- Cultural factors
- Physical factors
- Economic factors

Key Environmental Challenges

- Deforestation resulting from use of timber as the main construction material
- Environmental degradation resulting from quarrying, brick making, sand harvesting etc.
- Generation of wastes from human settlements

Proposed interventions

- Intensify tree planting programmes
- Install waste management infrastructure
- Regulate the exploitation of natural resources such as sand, quarrying and rehabilitate sites after use.

3.2 Human and Environmental Health

Common environmental diseases in the district include: Malaria, HIV/AIDSs, cholera, typhoid, diarrhoea, upper respiratory tract infections and Eye infections.

Interventions

- Increased anti-malaria campaigns
- Increased anti-HIV/AIDSs campaigns, Establishment of voluntary counselling and testing centres
- Increased public health awareness especially on personal hygiene and sanitation

3.2.1 Pollution and waste generated from human settlement

The major sources of pollution from human settlement include:

- Domestic effluents
- Solid wastes
- Obsolete chemicals
- Gaseous emissions e.g. carbon monoxide

These pollutants impact negatively on the environment by polluting water, air, and land.

Proposed interventions

- Intensify public health campaigns on importance of hygiene and good sanitation.
- Timely, efficient collection and disposal of solid wastes
- Educate public on safe disposal of chemicals.

3.3 Communication Networks

a) **Roads:** Buret district is served by a fairly extensive, well distributed, fairly maintained road network (Table 9).

Table 9: Road network

DIVISION	ROAD TYPE			TOTAL
	Earth	Murram	Bitumen	
	(Km)	(Km)	(Km)	Km
Bureti	34.4	87.9	18.0	140.3
Konoin	31.4	88.0	6.0	125.4
Sotik	32.0	57.5	7	96.5
Roret	25.4	53.6	7.0	86.0
Kimulot	38.0	43.7	-	81.7
TOTAL	161.2	330.7	38.0	529.9

b) **Telephony:** By 2002, the total number of households, private and public organizations with fixed telephone (Landline) connections was 654. The mobile phone service network covers the whole district but statistics on actual persons connected too this service is not documented.

c) **Postal Services:** There are six post/sub post offices in Bureti district. These serve all the divisions in the district. Whereas postal services are found in all divisions access to this service remains poor because in some instances a person has to travel long distances to the nearest postal facility.

d) **Radio (communication):** Radio is the most common mode of receiving information in the district.

Apart from Radio communication that transmits through the openair signals, a number of other institutions such as the police, security firms and the multinational tea companies have their own transmission signals/ frequencies for internal communication.

e) **On-line communication-** The major post offices in the district offer internet/email services. A number of institutions and individuals have also subscribed for internet services.

f) **Courier services:** A number of firms that offer courier services operate in the district. But coverage remains limited to the major urban centres.

g) **Fax-** Available in major post offices and in private institutions.

No railway lines traverse the district.

Key Environmental issues

- Land degradation by quarrying
- Waste generation
- Harmful radiation from communication equipment

Proposed Intervention

- Undertake EIA
- Rehabilitate degraded areas
- Enhance public education and participation in conservation efforts
- Develop and adopt effective waste collection and disposal
- Reuse, recycle, and reduce waste

Key environmental Issues

- Quarrying for murram for road construction leads to environmental degradation.
- Communication equipment is source of radioactive rays, particles which may cause harm to man.
- Increased generation of waste (plastics, polythene packaging, discarded communication equipment/parts, chemical ingredients etc), which pollute the environment.

Intervention measures

- Undertake EIA for any project/activities with a potential to have adverse effects on environment e.g. quarries, communication equipment etc.
- Rehabilitation of quarried sites upon completion of operations.
- Public awareness creation on good environmental practices.
- Enforce existing legislations on public health, environmental protection etc

3.4 Social economic services and infrastructure

Table10 shows the distribution of households in relation to source of water in Bureti district.

Table 10: Distribution of households by source of water

	Dam	River	spring	well	Borehole	Piped	Roof catchments
No.	144	29472	3285	3589	1118	22652	491
%	0.2	45.8	5.1	5.6	1.7	35.2	0.8

Source: Analytical Report on Housing Condition and Household Amenities Vol X, CBS.

The average distance to the nearest portable water point is 0.5 Km.

Pollution and Waste generated from Human Settlement.

The rapid population growth has increased demand for urban, agricultural and industrial activities hence the generation of vast amounts of wastes into the environment. In Buret district major pollution sources include; market centres, hotels, bars, sand scooping areas and quarries.

Types of waste generated include both solid and liquid. Polythene bags and organic waste are prominent. The county council does not have a designated dumping site for wastes. Liquid waste is a serious problem due to lack of sewerage system in all urban centres in the district. The effluents eventually end up in the water systems.

The public and private hospitals in the district do not have proper waste management systems in place thus medical waste in a major environmental issue. Other sources of waste include, Posho mills, wood workshops, washing of vehicles at riverbanks, open river bathing and clothe washing. Generally there are no suitable liquid and solid wastes management infrastructures in the district.

Key environmental issues

- Destroying the environmental aesthetic value.
- Clogging/ blocking existing drainage facilities,
- Plastics effect on animal health.
- Air pollution through production of Green House gases from dumpsites.
- Water pollution through surface run offs.
- Contamination of soil and underground water through seeping and leaching
- Odours that cause respiratory tract infections.

Proposed Interventions

- Planning of the towns and urban centres to prioritise disposal facilities of wastes and sewerage plants
- Intensification of awareness creation to enlighten the community on their role in waste management.

- Investment in recycling of plastics to reduce its menace, provide employment and produce products
- Enforcement of waste management and water quality regulations 2006

Energy supply

The major sources of energy in Buret district are firewood, charcoal, paraffin, gas, electricity and solar. Table 11 shows the distribution of Household by main type of fuel.

Table 11: Distribution of Household by main type of fuel.

Numbers	Electricity	Paraffin	Gas	Firewood	Charcoal	Solar
Number	1119	2645	306	56436	2621	1118
%	1.7	4.1	0.5	87.7	4.1	1.7

Source CBS

Apart from households, the major consumer of energy is factories Commercial enterprise and institutions.

Key Environmental Issues

- Use of firewood and charcoal leads to increased destruction of the district forest cover.
- The need for firewood to fire boilers in tea factories has lead to encroachment of wetlands for planting of eucalyptus species.
- Oil spillages from service stations, automobile garages, vehicles, factories pollute soil and water.
- Petrol and other fossil fuels contain heavy metals which are harmful to man.
- Use of kerosene, charcoal-making results in harmful gases such as carbon monoxide emission, which contribute to depletion of the ozone.
- Widespread use of polythenes and plastics in the packaging of charcoal, kerosene and other fuels result in increased environmental pollution when plastics/polythenes are not properly disposed.

Proposed Interventions

- Enhance public awareness on good environment practices.
- Intensify tree planting campaigns
- Encourage use of unleaded fuel
- Increase security patrols to ensure no encroachment on public/gazetted forest
- Timely collection and proper disposal of wastes-polythenes and plastics.

3.5 Energy sector

The types of energy sources in the district include electricity, fossil fuels (petrol, diesel, paraffin), gas, solar, firewood and charcoal. Some forms of energy are cheaper and more readily available while others are scarce and highly unaffordable. Energy has various uses which include heating and lighting, cooking, and power to operate machines. The table 12 summarizes the distribution of households in the district by the main type of cooking and lighting fuel.

Table 12: Distribution of households by main type of cooking fuel.

Source of energy	Electricity	Paraffin	Gas	Firewood	Charcoal	Solar	Other
Number	1119	2646	306	56436	2621	1118	130
%	1.7	4.1	0.5	87.7	4.1	1.7	0.2

The Ministry of Energy has supplied electricity to 598 households and nine market centres. The distribution of households by main types of lighting is shown in Table 13

Table 13: Distribution of households by main type of lighting.

Source of energy	Electricity	Pressure lamp	Lantern	Tin lamp	Fuel wood	solar	Other
Number	3198	813	33292	24697	564	634	1178
%	5.0	1.3	51.7	38.4	0.9	1.0	1.8

Most of the electricity in the district is generated through hydropower. It is supplied and distributed by the Kenya power and lighting company. However, the pace of rural electrification remains slow and electricity is quite unaffordable to most residents of the district.

Hydro-electric power is also produced by private companies such as the multinational tea companies. Examples are Unilever tea Kenya and James Finlays (k) ltd. A self- help group has also applied and been granted permission to generate hydroelectric power to supply energy to the local community in Roret division.

Energy requirements for tea processing is mainly from electricity, fossil fuels and fuel wood plantations in the large tea firms or from private farm lands in the small scale tea farms.

Key environmental issues in the Energy sector.

- Deforestation: Production of firewood and charcoal leads to cutting of trees.
- Heavy metals in fossil fuels: Harmful heavy metals like lead are common ingredients of fossil fuels such as petrol.
- Radiations from power generation equipments: Emission of radio-active particles which may cause harm to human beings.
- Production of harmful gases: production and consumption of charcoal releases harmful oxides of carbon
- Global warming: due loss of forest cover and releases of ozone depleting substances/ gases into the atmosphere.

Proposed Interventions

- Intensify campaigns for rural households to plant more trees
- Use of energy saving devices.
- Promote use of solar energy,
- Promotion of alternative energy source e.g. Solar wind biogas
- Increase financial support to institutions that are piloting the use of renewable energy sources such as solar & biogas

3.6 Sanitation

The most common sanitation facility in the district is the pit latrine, which is used by at least 88% of the population. Other sanitation structures include; septic tanks, main sewer, bucket latrine. About 8% of the residents of Bureti district use “bush” to answer calls of nature. Table 14 shows the distribution of households by main types of waste disposal.

Table 14: Distribution of households by main type of human waste disposal.

	Main Sewer	Septic Tank	Pit latrine	Bucket latrine	Bush	Other
Number	1473	542	56705	223	5228	205
%	2.3	0.8	88.1	0.3	8.1	0.3

Only Sotik town has a central sewerage line, but this does not serve the whole town.

Key environmental issues

- Water pollution: Improper waste disposal such as use of bush/land to dispose off wastes results in water pollution
- Human faecal matter openly disposed presents eye sore and bad odours.
- Poor sanitation leads to disease outbreaks eg cholera and diarrhoea.

Interventions

- Enhance public education on proper waste disposal
- Enforce existing Legislations
- Install central sewerage systems

Educational facilities

The district has the following learning institutions: 209 public primary schools, 59 private schools, 4 non-formal learning centres, 54 public secondary schools and 8 private secondary schools.

The teacher to pupil ratios at the different levels of learning is 1:34 and 1:21 for primary and secondary schools respectively. The school enrolment and dropout rates are shown in Table 15.

Table 15: School enrolment and dropout rates

Enrolment			Drop Out	
Gender	Male	Female	Male	Female
Primary	38,502	38,493		
%	100	96	14	16
Secondary	5,842	5,105		
%	43	30.5	12	13

Key Environmental challenges

- Increased generation of both solid and liquid wastes which pollute the environment.
- Increased demand for natural resources namely sand, water and tree products like timber, firewood and pulpwood for paper production.

Proposed Interventions

- Schools should install better waste management infrastructure to manage wastes.

- Increase land under forest/tree cover to cater for increased need for timber, fuel wood and pulpwood for paper.
- Schools should undertake environmental audits and implement their management plans.
- Increase environmental awareness creation in schools by introducing environmental education in the curriculum and encouraging the formation of environment clubs in schools

CHAPTER FOUR

4.0 Industry, trade and services

4.1 Industrial Sector

The industrial sector in the district is poorly developed. Bureti district has very few industries, though it has both agricultural and natural resources that remain untapped.

Industrial sector

The types and trends in the district industrial development are shown in table 16.

Table 16: Type and Trends in Industrial Development.

No.	Type of Industry	1991-1995	1996-2000	2001-2005	Projections for 2010
1	Tea Processing	7	8	9	12
2	Milk processing	1	1	1	3
3	Mining/quarrying	-	2	2	2
4	Mineral water	-	-	1	3

The industries in the district include:

- Kapkatet tea factory
- Sotik tea factory
- Litein tea factory
- Mogogosiek tea factory
- Kapset tea factory
- Maramara tea factory
- Kimulot tea factory
- Koruma tea factory
- KCC Sotik
- Roret coffee factory
- A Jiwa shamji quarry
- Siriat quarry

- Kelunet mineral water and
- Maramara green tea factory

The impacts of the industries in the district are highlighted in table 17.

Table 17: Type and impact of industries on environment.

No.	Type of industry	Raw materials	product	Wastes & pollutants	Key environmental impacts	Mitigation measures
1	Tea processing	Green tea leaves	Made tea	-waste water -Leaf spillages -office wastes Gaseous emissions	-Discharge into streams and rivers -Noise pollution -Atmospheric air pollution	-Treat wastes before discharge -Undertake annual EA
2	Coffee processing	Cherries	Coffee beans	Coffee husks, effluent	-Water pollution -Air pollution (odours)	Treat effluent before discharge
3	Milk processing	Milk	Cultured milk, fresh milk etc	-Waste water -Solid wastes		Treat effluent before discharge -Collect & burn
4	Mining/Quarrying	Rocks	Ballast	Chippings	-Noise -Dust Environmental degradation of quarried sites	-Signage -Use earmuffs -Backfill after completion of quarrying -Undertake annual Environmental audits
5	Mineral water	water	Mineral water	-plastic containers	-Environmental pollution	-collect and disposer appropriately

4.2 Trade sector

Trades in bureti district could be set in the following broad categories t:

B1 – wholesale, B2, - caterers, B3 – Motor vehicle repairs, B4 – retail, B5 – miscellaneous import/Export, B6 – Manufacturers.

Traded goods include: foodstuffs, construction materials, footwear and clothing, electronics, furniture, toiletries, motor vehicle spares and other hardware.

Table18summarizes the impacts of trade on the environment

Table 18: Type and impact of trade on environment.

No.	Type of trade	wastes	Key environmental impacts	Mitigation measures
1	Wholesale	Polythenes & plastics	<ul style="list-style-type: none"> • Blockage of drainages • Death of livestock • Eyesore 	<ul style="list-style-type: none"> -Collection and disposal -Adopt clean production
2	Caterers	Effluents	Pollutes water, generate odours	<ul style="list-style-type: none"> -Construction septic tanks -Construction sewerage line
3	Motor vehicle Repair	-Solid wastes e.g scrap metal, plastics -Oil	Pollution of the environment – land and water	-Collect and dispose scrap metal and other solid wastes
4	Manufacturing	Solid waste Liquid waste	Environment pollution Water pollution	Proper collection and disposal. Treat before discharge
5	Service	Waste oil and spillages plastic and polythenes		<ul style="list-style-type: none"> -Install oil filters Proper collection and disposal.

4.3 Tourism

Tourism can contribute immensely to the socio-economic empowerment of the local population if properly exploited. Buret district does not have well developed tourism facilities and publicity for the existing tourist attraction remains poor. The tourism potential in the district should be exploited as this will create employment and help alleviate poverty.

Tourism attractions

Some of the Eco-tourism attractions include:

- The vast tea plantations that provide scenic beauty and are a major tourist attraction.
- Fishing: clubs of employees of the multinational tea companies have dams where they rear fish for sport.
- Nature walk: Chebangang nature walk owned by a local tea company a local tourist attraction.
- Conference tourism: A few hotels in the district offer conference facilities.
- Sport: A few sports clubs exist in the district and act as tourist attractions.
- Wildlife – Monkey sites, collobus monkey.

Trends in tourism development.

In the past fishing and nature walks were the major tourist attractions attracting mainly employees of the tea estates. The two attractions have declined because of lack of publicity and inability to develop them further.

Sport and ecotourism are increasingly becoming more popular.

Key Environmental issues

- Inadequate community awareness on tourism potential,
- Inadequate rules and regulation to govern natural resources in the area.
- Inadequate compliance to regulations for natural resources management.
- Inadequate information on the tourism potential in the area.
- Inadequate alternative viable livelihood options.
- Institutional and regulatory arrangements and management challenges

Proposed interventions

- Community sensitisation.
- Harnessing of eco tourism.
- Compliance to the set regulations and guideline and standards governing the tourism sector.
- Development of tourism information centres.

The types of tourism and their location are shown in table 19.

Table 19: Types of tourism and attraction.

	Type of tourism	Attraction	No. of attraction	Geographical location	Environmental impact
1	Ecotourism	Tea plantations, natural forests	4	Kimulot, Changoi, Sotik	Pollution of water by agrochemicals clearance of forest cover Discharge of effluents into environment
2	Fishing	Dams and fish	1	Kimulot division	Waste generation
3	Nature walks	Natural forest	1	Kimulot division	-Forest clearance -Waste generation
4	Conference tourism	Hotels, guest houses	9	Sotik, Litein	Waste generation
5	Sport	Athletics football, other sports	-	District wide	Waste generation

4.4 Mining and quarrying

4.4.1 Mining

There are no mineral mining activities in Buret district.

4.4.2 Quarrying

Quarrying activities are common in Buret district. Quarrying is primarily undertaken to provide building stones, gravel and ballast for the construction industry. Quarrying also provides murrum for road construction.

There are two registered quarries in the district – Kaplong and Siryat quarries. Some locals engage in informal quarrying activities to earn a living. Road construction contractors also engage in quarrying activities.

Road construction quarries are perhaps the most common in the district and are major cause of environmental degradation. In several cases the road construction has been completed and the contractor has left the site. However, backfilling has not been undertaken and these sites are now vulnerable to erosion and pose danger to both human beings and livestock which may fall into these quarries.

Key Environmental issues

- Loss of vegetation cover and other biodiversity during opening of quarries.
- Soil erosion on open quarry sites on hill slopes.
- Loss of human life and livestock resulting from falls into quarry pits.

Proposed interventions

- Backfilling after completion of quarrying activities
- Replanting of vegetation- trees and grass
- Design and installation of soil conservation structures to curb further soil loss.
- Undertake EIA before opening up new quarries.
- Undertake annual EA on existing quarries.

Table 20 shows the types of quarrying and methods used.

Table 20 Types of stones and methods.

No	Type of Quarry	Method of Quarrying	Ecosystem	location	size	Regulatory agency	Environmental impacts
1	Stone, ballast, gravel	Explosives	Agricultural land	Kaplong Sotik	12 hectares	Ministry of trade	Land degradation- open crater,

No	Type of Quarry	Method of Quarrying	Ecosystem	location	size	Regulatory agency	Environmental impacts
							sharp cliff, loss of aesthetic value
2	Stone, murrum	Mechanical, manual	Hill-top	Monoru, Tulwet, Liitik, Kapkisiara	20 hectares	Bureti county council, ministry of public works	Land degradation Soil erosion Loss of biodiversity Health & public safety hazard – steep cliff.
3	Stone murrum	Mechanical, manual	Rocky farmland	Kusumek, Itare, Siryat, Simbi	-	Private land owners, ministry of public works	Land degradation Loss of agricultural land Soil erosion Biodiversity loss

Management challenges.

- Sustainability of quarrying – Limited suitable sites for opening up of quarries.
- High costs of operations.

Current mitigation measures.

The local authorities and other stakeholders are currently rehabilitating disused quarries

Operating quarries have undertaken EA (Kaplong quarries) to ensure adherence to environmental regulations

4.5 Sand harvesting

There is no sand – harvesting activities in the districts sand is acquired from neighbouring district.

CHAPTER FIVE

5.0 ENVIRONMENTAL HARZARDS AND DISASTERS

5.1 Overview

A disaster can be defined as a serious disruption of the functioning of a society, causing grave human, property, socio-economic and environmental losses which exceed the ability of the affected society to cope using available resources. Environmental hazards and disasters in the district are climate or weather related. Most of them are natural rather than man-made. The most probable natural disasters in the district include:

- Lightening
- Fire outbreaks
- Floods
- Wind
- Droughts

Their occurrences have led to the destruction of livelihoods and environment. The causes of landslides and floods can be attributed to large scale deforestation in the upper regions, where rivers originate and lower areas where it is accelerated by brick making, charcoal burning, poor cropping patterns, overgrazing, sand harvesting and inadequate conservation techniques.

5.1 Extend and trends of environmental hazards and disasters

Land Profile: Buret district lies between the altitude ranges of 1800-3000metres above sea level. The general train of the land is gentle, undulating topography from the northeast to the west. The predominant soil clay, loamy soil, and black cotton soil, Except where the gradient/ slope is too steep, or where human activities have destabilized the natural balance, these soil are general stable and not prone to landslides. There are several steep hills especially in Konoin and Roret division. These areas are vulnerable to rock and landslides.

The district is served by a fair well-maintained, well distributed road network.. Hazard Mapping and Vulnerability: Kimulot and Konoin division are prone to frost bite and hail damage. Frost usually occurs in the month of January-February when the diurnal temperature rangers are high. The worst incidence of frost occurred in February 2000 leading to death of tea bushes and other

Biodiversity. Hailstorms damage tea bushes injure or kill wildlife and therefore lead to substantial losses to the tea sector and wildlife. Sotik and Roret divisions are drier and more vulnerable to drought. Drought is usually more pronounced in the period of January and February. The best forest of the districts is also prone to drought. Kimulot division are vulnerable to forest fire. Fires are also sources of disasters in urban areas.

Hilly areas in Roret division have been severally quarried and are prone to soil erosion. The HIV-AIDS pandemic affects the whole districts. HIV AIDs has now overtaken malaria as the leading course of death in the success of the anti- malaria campaign and not an increase rate of HIV infection in the district.

Coping mechanisms

Farmers in drought prone areas preserve pasture for use during dry period. Movement Of livestock to less drought stricken areas is also practiced in the tea sector. Pruning of tea bushes is usually timed to coincide with the dry season. This not only reduces losses but also ensures faster healing because water does not enter pruned parts and lead to rot.. In cases of severe hail damage, or frostbite, the entire field is pruned to facilitate fast healing and rejuvenated growth.

The forest department and other large scale forest management firms like the tea estates maintain firebreaks in their plantations to reduce damage in cases of outbreak.

The forest department declares fire season and uses signage to warn members of the public of the high fire risk during the dry season. During the fire season, the forest department issues strict regulations with respect to entry into forests and setting of fires. Factories, schools and other institutions that are vulnerable to fires have installed fire fighting equipments in readiness for any accidental fires. Large scale tea companies have well trained well equipped fire fighting department. Sector specific disasters and severity in the district are shown in Table 21..

Table 21: Sector specific Disaster and severity.

Sector	Year	Type of disaster	Property damage	Infrastructure damaged	Environment damage	Intervention
Agriculture and livestock	2005-06	Drought	Agriculture and livestock	Reduced water flow	Death of tea bushes Failure of crops	Use of hay and other feed supplements

Sector	Year	Type of disaster	Property damage	Infrastructure damaged	Environment damage	Intervention
	2000	Frost damage	Agriculture	15000 hectares of tea and livestock	Death of tea bushes	Replanting of lost bushes
Human settlement	2005	fire	Sotik law courts Kaptebengwet shopping centre	Court files and other records Business premises	Release of gases Loss of property	Relocation of offices
Health	1984-date	HIV/AIDs	Human life	Labour force	Loss of productive persons High dependency ratio	Public sensitization on HIV/AIDs Voluntary testing and counselling
Forestry	2005	Fire	Forest	-	Loss of tree cover and biodiversity	Public awareness creation Use of signage replanting.

Sector capacities for disaster preparedness and Response.

Sector	Type of disaster	Human resources	Technical equipment	Financial	Coordinating mechanism (logistic)	Lead agency
Agriculture and livestock	Drought, frost and hailstorm	Ministry of agriculture staff	Irrigation equipment Water tanks	-	Ministry of agriculture	Ministry of agriculture

Sector	Year	Type of disaster	Property damage	Infrastructure damaged	Environment damage	Intervention
Human settlement	fires	Public	Fire fighting equipment	-	Individual or fire department of local authorities	Local Authorities
Health	HIV/AIDS	Medical staff volunteers	medical equipment	-	Medical health department public health	Ministry of health
Forestry	fires	Forest department staff, public	Fire fighting equipment, firebreaks	-	Forest department	Forest department

5.2 Status of early warning and preparedness

For efficient management disasters, a District Disaster Management Committee has been formed. This committee's function is to prevent or deal with disasters as they occur. Information, resources and sources of aid are very important in averting disasters. The information includes early warning systems where the community is encouraged to put in place resources such as food, escape mechanisms, health facilities, dams and pans that are sustainable. The committee also identifies local agencies and individuals who can offer quick assistance on the spot (Table 22). Red Cross which has a satellite office in the District play a leading role in disaster mitigation in the district

Table 22: Sector capacities for Disaster preparedness and response

Sector	Disaster	Human resource	Technical (equipment)	Coordinating Mechanisms (logistics)	Lead agency
Health	HIV/AIDS, disease outbreaks	1: 34,760 doctor-patient ratio	18 dispensaries, 4 health centres, 2 hospitals, 13 pharmacies	Record keeping of patient	Ministry of health
Agriculture	Droughts, livestock & crop disease	Veterinary officers	Extension offices in every division	Extension services	Agriculture, Livestock ministries
Forest	Fires	Forest guards	Cars and hand tools	Telephones	FD
Quarrying	Collapse, land derelictions	-	-	-	Las
Land	Boundary disputes Clashes	Surveyors, Planners	Surveyor's tools	District offices,	Ministry of land, security
Transport	Accidents	Police officers	Pull vehicles	Telephones,	Traffic police

5.3: Proposed Disaster mitigations

The effects of drought can be minimized by planting drought resistant crops, and fodder for preservation of forest reserves, encouraging the community to store adequate food, preservations and protection of water catchments and river banks and de-stocking at the onset of dry season. Floods control is through reforestation, soil and water conservations in dam and rivers. Forest fires are minimized through awareness creation and training on fire fighting technologies and control of grazing on forests during high fire risk droughts. Diseases and pest control are dealt with through provisions of vaccines and sera, improvement of buffer zones in livestock disease control, imposition of quarantine, use of certified seeds and introduction of disease resistant species via research.

5.4 Environmental challenges in disaster management

Due to the difficulty in disaster nature and frequency predictions, many challenges are likely to be encountered over the plan period. These include inadequate food reserves as a result of poor harvests or poor storage methods; population increase, depletion of vegetation in catchments areas; high cost and demand of medical services for accident victims; loss of livestock to droughts, increased demands and cost of drugs and vaccines due to pest and disease outbreaks; loss of productive resource to HIV/AIDS epidemic; increased demand for good road network for disaster relief activities; human conflicts as the community jostle for water and pasture in droughts; reduced development activities as people concentrate on handling disasters and lack of capacity for the district to handle expansive disasters.

Key Environmental issues

- Drought
- HIV/AIDS pandemic management
- Road of accidents
- Forest fires control
- Control of livestock pests & diseases

Proposed interventions

- Development of drought warning systems
- Awareness creation among youth
- Awareness on road safety
- Clear road signs displayed
- Fire station established
- Community involvement in prevention strategies
- Improved extension services
- Restricted livestock movements

CHAPTER SIX

6.0 ENVIRONMENTAL EDUCATION AND TECHNOLOGY

6.1 Status of Environmental Education

In the endeavour to participate in conservation efforts, there are a number of initiatives started by various groups to promote environmental educational programmes in the district.

Various schools, both secondary and primary have initiated clubs like Wildlife Clubs of Kenya, 4K clubs and Environmental clubs to promote conservation of the environment in and around their schools. There are over 5 schools with such initiatives and the District Environment Officer is co-ordinating their activities. Table 23 documents the environmental programmes and challenges in the district

Table 23: Environmental Programmes and Challenges in the District

Environmental Programmes	Key players	Challenges	Proposed Interventions
Environmental Amelioration	Forest Dept, Schools, NEMA	Lack of materials to sensitise the public	Develop appropriate materials for sensitisation
Tree planting and nursery establishment	Forest Dept, Schools,	Lack of appropriate seeds and technical capacity	Training farmers Extension services

Source: District Environment Office 2007 - Buret District

Key Environmental issues

- Lack of awareness creation materials (resource / documentation centre)
- Poverty and ignorance and lack of awareness
- Poor infrastructure.

Proposed Interventions

- Develop materials for awareness creation
- Collect and gather materials that are appropriate to priority environmental issues
- Share and disseminate pertinent information among the stakeholders
- Improve infrastructure.

6.3 Public awareness and participation

When information on the environment is made available to the public it enhances internalization of values that support sustainable environmental management.. Some of the key players in environmental awareness and public participation in the district include:

- Community self help groups
- Provincial administration – organise public meetings
- Forest department – collaboration with farmers and stakeholders
- Ministry of Agriculture – provision of extension services
- NEMA – environmental awareness and sensitisation

6.3.1 Challenges in Creating Environmental Awareness

- Lack of awareness creation materials (resource / documentation centre)
- Incomplete adjudication process and land disputes creating conflict zones
- Poverty and high levels of illiteracy
- Community apathy
- Transport and accessibility
- Politicisation of some key environmental resources

6.4 Technologies

Technologies can contribute to economic development and environmental conservation when used appropriately. The level of application of modern technology in the management of the environment is limited, and includes construction of gabions and other modern structures. People still largely depend on indigenous technologies, innovations and practices which include that are diverse and include soil and water conservation structures like trenches, benches and lining up crop residue, rotational cropping, preservation technologies and others.

Key Environmental Issues

- Lack of awareness creation materials (resource / documentation centre)
- Poverty and high levels of illiteracy
- Community apathy
- Poor infrastructure
- Low adoption of appropriate technology

Proposed Interventions

- Development of relevant materials
- Development of a resource centre

- Poverty alleviation programmes and education
- Community sensitisation and awareness
- Reach out to people in accessible area
- Infrastructure rehabilitation
- Community training and education
- Enhance technology transfer through demonstration
- Provision of extension services

6.5 Environmental Information Systems

The broad challenge in harnessing environmental information and communication technology include inadequate resources and capacity for information collection, analysis, storage and dissemination; inadequate awareness among environmental managers and the public; and lack of knowledge sharing networks at grass root level.

6.5.1 Types and Sources of Environmental Information

Most of the information available in the district is scattered among the different organisations and institutions and in different forms and types and is available mostly as:

- Research and surveys reports
- Departmental progress reports
- Population Census data and household surveys results
- Maps and drawings
- Books

Some information is not documented at all, especially that which relates to indigenous conservation knowledge and natural resources utilisation among others.

Institutions where the data is available

- GOK departments on sector specific information and data
- Institutions like schools and hospitals
- Among the civil society organisations and community groups

All documented data and information is freely accessible to the public, the only hindrance being the level of literacy among the population. Access to digitalised information is limited.

Table 24: Information and Data Types in the District

Sector	Type of Information	Form of Information	Institutions	Access conditions/ policy	Users	System Of updating
Agriculture	Crop development and husbandry Agro-chemicals Agro industries Soil and water conservation Marketing	Reports Posters Maps Leaflets	Dept of Agriculture	Free	CBO Farmers Extension workers Staff	Annual
Land	Land adjudication Land registration process Land sizes Parcel numbers Conservation areas	Maps Reports Plans and drawings	Land Adjudication	Consultation	Farmers Planners Surveyors Staff Business people	Periodical
Health	Prevalence of diseases	Hospital reports	Hospitals Health centres Dispensaries and clinics	Restricted	Health workers	Manual and periodical
Forestry	Forest types Gazetted forest Non – gazetted forests Plantations Exotic species Biodiversity Catchments	Maps Reports	Forest Dept	Free and accessible	Community Staff Other departments Industries CBOs NGOs	Periodical
Industry	Types Processing Raw materials Products Waste and by-products	Reports Diagrams	Industries	Free	Staff Interested persons Government officials Farmers	
Wildlife	Conservation areas Wildlife dispersal areas Cases of conflicts Animal numbers, status, behaviour	Maps, Reports,	KWS	Free	Staff Tourists Conservationists Planners Environmentalists Community	Periodical
Quarrying	Quarry sites Rehabilitated quarries Abandoned quarries Materials quarried		NEMA	Free	Local Authorities Contractors Quarry owners	
Fisheries	Types of fish Fishing areas	Maps Magazines	Fisheries Dept.	Free	Fish farmers Staff	

Sector	Type of Information	Form of Information	Institutions	Access conditions/ policy	Users	System Of updating
	Marketing of fish Rivers with fish Fish ponds Fish farmers	reports				
Water	Rivers Water accessibility Boreholes Drainage patterns Water availability Irrigation schemes Water uses Abstraction levels	Maps Reports Diagrams	Water Dept	Free	Water users association Water projects Community Staff Other dept Industries Farmers	
Climate and weather	Rainfall and temp	Tables Reports		Free	Staff Farmers Community	Regular

Source: District Respective Departments 2007 - Buret District

6.5.2 Status of Environmental Information Management Systems

The sharing of information among institutions/lead agencies communities, taskforces is complicated due to the nature in which this information is stored. There are bulks of filed reports and booklets that contain different pieces of information and data and this can be cumbersome and time consuming. Though the channels are open most information is not available to end users in a form that is easily consumable. Stakeholders usually organise meetings to share out information on specific issues and this ought to be encouraged.

There is also very limited capacities among institutions to generate analyse and store data and information in a form that can easily be shared out among the stakeholders. This is mainly due to inadequate skills in information technology among the producers of data and the users of the same. There are also limited skills the use of computers and other information management skills as well as lack of equipment and expertise in the same.

There is no centralised documentation centre, archive or library in the district, information is scattered in different places depending on sectors and issues of interest.

There are a number of newspapers, local publications and magazines in circulation in the district that help in the dissemination of information.

Key Environmental Issues

- The high level of illiteracy
- Limited skills in environmental information management
- Inadequate ICT infrastructure

- Low level of adoption of IT
- Lack of central information dissemination centre

Proposed interventions

- Enhance training in ICT
- Construct and equip the DIDC
- Facilitate access to internet services for schools, hospitals, institutions and government departments
- Create an environmental information database

6.6 Indigenous knowledge

Buret district is inhabited by the Kipsigis sub-tribe of the Kalenjin ethnic group. The way of life in the past enabled them to exist harmoniously with the environment. This is because of a number of cultural and social norms, rules, laboos and regulations that the community observed in different sectors of the environment. Examples of environmentally and sustainable practices among the Kipsigis include:

- -Agriculture: the Kipsigis practiced slash and burn shifting cultivation and livestock keeping. Virgin land was opened up and used for crop production. Once fertility exhausted, land was left fallow and used as grazing fields. The farmyard manure enriched soils and ensured no use of agrochemicals. There was also use of minimum tillage which reduced chances of erosion.
- -Human settlement – Construction of houses was by use of simple locally available materials which were environmentally friendly. Houses were made of wood, mud and thatch. This avoided use of sand or stone which leads to sand harvesting and quarrying. Which degrades the environment?
- Households utensils: - Used biodegradable materials such as gourds, animal horns and skins which once disused easily biodegraded in the environment. Health and medicine – There was no use of synthetic chemicals and medicines but herbs and other forms of treatment which did not generate harmful wastes.
- Energy: The only source of energy used by the Kipsigis was wood fuel. Regulations were not formally put in place, but the tradition was to collect only dry, fallen branches and twigs and not fell any trees. These ensured forests were conserved.
- Environmental hazards and disasters- The migration of certain birds or the flowering of certain trees species signified the onset of different types of weather phenomena. For examples, the migration of the flamingos signified the onset of rains and hence the

beginning of the planting season; the cries of certain birds in the morning signified if would rain in the day.

The types of Indigenous Knowledge and experienced challenges are highlighted in table 25.

Table 25: Types of IK, Key players and Challenges

Sector	Types of IK	Form (Oral, Music, artefact)	Institution / individual holding	Access conditions / policy	Users
Agriculture	Food crops Crop and Animal husbandry Preservation of food	Oral	Community elders	Free	Community Farmers
Land	Ownership Extent Succession Fertility Land use	Oral	Community elders	Free	Farmers
Health	Diseases Herbal medicine Processing and preservation of medicine	Oral	Community elders	Free	Parents Community Patients Herbalists Elders
Information and communication	Literature Forms of communication Tools	Oral Music Artefact (horn)	Community elders	Free	Community
Trade	Forms of trade Currency development	Oral and practice	Community elders	Free	Traders Community
Energy	Forms of energy Uses of energy Availability Preservation and conservation	Oral and practice	Community elders	Free	Community
Forestry	Uses Herbal value Conservation Worship status Shrines	Oral and practice	Community elders	Free	Community Herbalists Conservationists
Industry	Tools development Processing techniques Preservation techniques	Oral	Community elders	Free	Community
Wildlife	Wildlife movement Habitat Migration Animal behaviour	Oral	Community elders	Free	Community Conservationists

Sector	Types of IK	Form (Oral, Music, artefact)	Institution individual holding	Access conditions / policy	Users
	Prey and predators				
Water	Availability Accessibility Uses Therapy	Oral	Community elders	Free	Community
Climate and weather	Drought Weather cycles Historic Climatic Changes	Oral	Community elders	Free	Community Farmers Traders

Source: District Respective Departments 2007 - Buret District

6.6.1 Constraints/challenges in the utilization, documentation and dissemination of indigenous knowledge (IK)

- Most of the IK is not documented
- There exists a gap between the custodians of IK and the elite who have the skills and the capacity to collect and document this data and information
- The general altitude of looking down upon IK as inferior by the elite in society
- Some IK has been overtaken time and therefore not practical
- Some IK is not scientific in nature (belief – based) and therefore cannot be verified and authenticated and therefore not applicable across the board or replicated elsewhere.

Key Environmental Issues

- Lack of central information dissemination centre
- Limited skills in environmental information management
- Lack of IT equipment like computers and internet connectivity
- Low level of adoption of IT
- The high level of illiteracy

Proposed interventions

- Inter-sectoral sharing of information
- Construct and equip the DIDC
- Enhance training and create opportunities for people to gain IT skills
- Facilitate access to internet services for schools, hospitals, institutions and government departments
- Emphasize on the importance of generating, sharing and disseminating relevant information
- Offer training and education opportunities

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CHAPTER SEVEN

7.0 Environmental governance and institutional arrangements

With the enactment of EMCA, 1999 comprehensive environmental governance has been enhanced unlike in the past where environmental matters were governed sectorally under several legislations. EMCA seeks to coordinate all the environmental sectors and where there are conflicts between provisions of any Act governing a sector and EMCA, the provisions of EMCA overrides the provisions of the said Act.

EMCA has created NEMA and several other statutory bodies, whose functions compliment each other as shown in the figure 1.

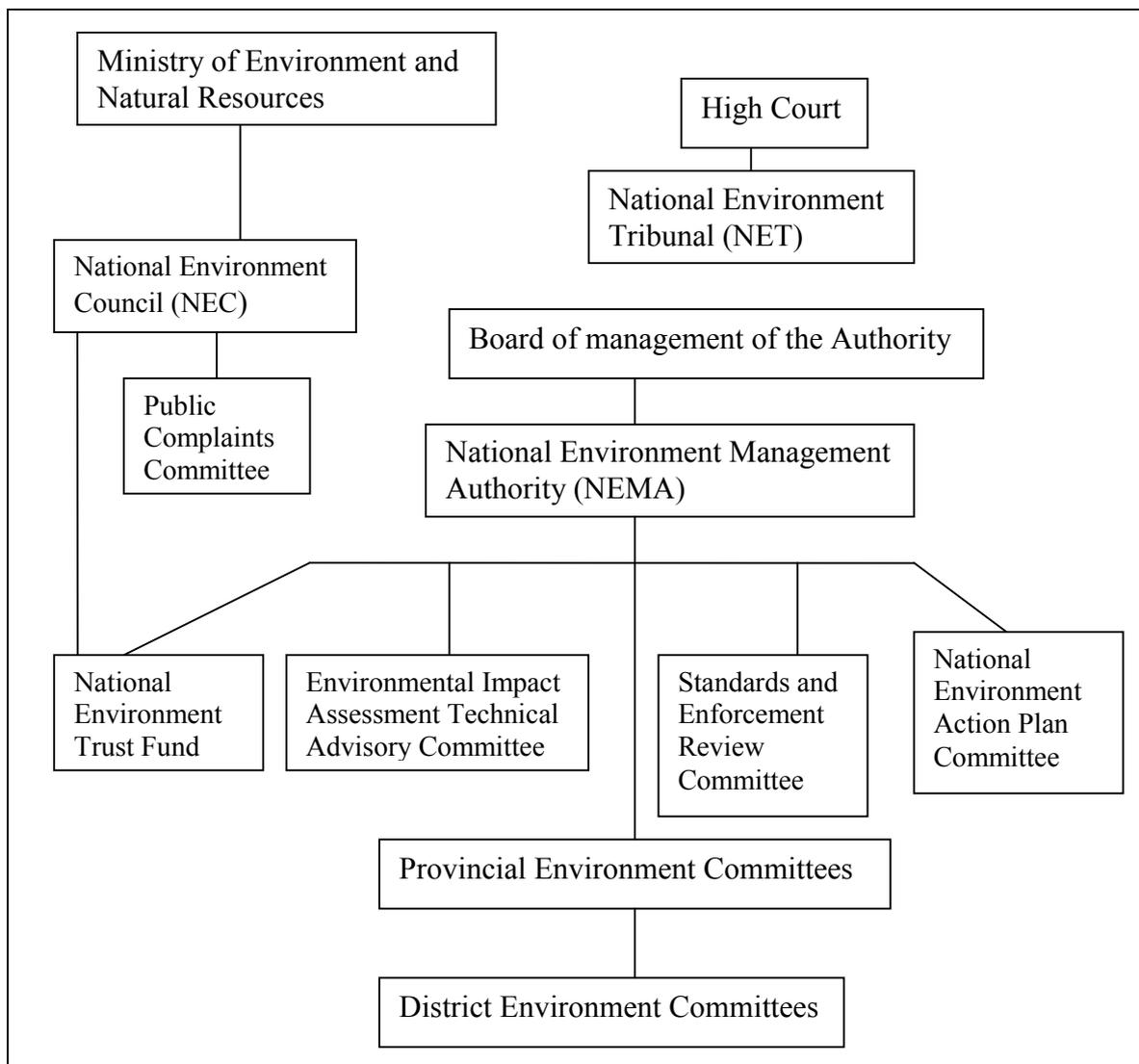


Figure 1 Institutional Structure under EMCA, 1999

7.1 Regulatory and management tools

Laws, regulations, policies and conventions are necessary for the harmonization of multi-sectoral interests and practices in the District, Provincial and National Levels. These laws give mandate to stakeholders, local community, local authorities, government departments and development partners in implementing the action plan. Observance of these laws will enhance participatory approach in decision-making, ecosystem approach in management and provide legitimacy to stakeholder involvement. It is important to note that these laws are not exclusive and other rules and regulations can be developed in the form of codes of conduct and by laws.

7.2 The Environmental Management and Coordination Act (EMCA), 1999

The law is based on the principle that everybody is entitled to a healthy and clean environment. The Act provide for the preparation of Environmental Planning in the form of DEAPs, PEAPs and NEAPs. This Act requires Environmental Impact Assessment be conducted before commencement of any new development to minimise negative environmental impacts. For ongoing activities, the Act prescribe the carrying out of an Environmental Audits to ascertain if these activities have significant environmental effects

7.3 The Local Government Act CAP 265

This law empowers a local authority to apply through the Minister for land to meet its different development purposes. Such requests and purposes are deemed to be public purposes within the meaning of the Land Acquisition Act (Cap 295). Such a local authority may, within such land, establish and maintain a conservation area. It may also take measures necessary for the prevention or control of bush fires or quarrying for minerals, sand, gravel, clay, or stones.

7.4 The Public Health Act

The Act safeguards the general public health. When read with the Local Government Act, it gives responsibility to local authorities to remove nuisance within their jurisdiction. Thus it provides for safe collection, transportation and disposal of wastes

7.5 The Forest Act 2005

The Forests Act 2005 of the Laws of Kenya provides for the establishment, control and regulation of forests and forest areas in Kenya. The Act, therefore, applies not only to state plantations and land controlled and managed by the Forestry Department for research purposes or for establishment of commercial timber plantations, but also areas which have been set aside for the conservation of fauna and flora, for the management of water catchment area, for the prevention of soil erosion or for the protection and management of indigenous forests on alienated Government land.

7.6 Water Act 2002

The Water Act seeks to provide better conservation, control, apportionment and use of the water resources in Kenya, and -for purposes incidental thereto and connected therewith. The Act vests ownership and control of water in the Government subject to any rights of user. Under this provision, therefore, Water Department has the responsibility to regulate access, use, and control pollution of water resources.

7.7 Mining Act of 1972 (revised in 1987)

The Act primarily stipulates the terms of mining as a commercial operation. The Act prohibits any nuisance or disturbance of the rights of the owner or occupier of any adjoining land. It similarly prohibits damage to such land, trees, crops, buildings, stocks, or works thereon. A holder of a mining lease who extracts minerals other than, which is in the lease, undermines the conservation options. Any person who abandons his location or any part thereof, or exclusive prospecting license area or any part forthwith fill up, or secure satisfactions of the commissioner, all shafts, pits, holes and excavations.

7.8 The Wildlife (Conservation and Management) Act

This is the principal Act regulating wildlife conservation and management in Kenya, and provides guidelines for wildlife resource management in the plan area. The Act establishes National Reserves and stipulates permissible activities inside the reserve.

7.9 The Agriculture Act

The Agriculture Act Cap 318 of the Laws of Kenya seeks to promote and maintain a stable agriculture, to provide for the conservation of the soil and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry.

7.10 Physical Planning Act 1996

This Act provides for the preparation and implementation of physical development plans and establishes the responsibility for the physical planning at various levels of Government in order to remove uncertainty regarding the responsibility for regional planning. The Act also promotes public participation in the preparation of plans and requires that in preparation of plans proper consideration be given to the potential for economic development, socio-economic development needs of the population, the existing planning and future transport needs, the physical factors which may influence orderly development in general and urbanization in particular, and the possible influence of future development upon natural environment.

7.11 Land Control Act CAP 406

This law provides for the control of transactions in agricultural land, especially the machinery of the Land Control Boards

7.12 The Kenya Tourist Development Corporation Act

This regulates tourism in Kenya as contained in the Tourist Development Corporation Act Cap 382 of the Laws of Kenya which establishes KTDC as a parastatal body. The functions of the KTDC include, *inter alia*, provision of travel, expedition of tours, whether hunting, fishing, photography or otherwise. The corporation may also plan the development, preservation, or study of the wild and natural life, flora and other vegetation.

7.13 Non-Governmental Organisations' (NGO) registration Act

This Act will provide for the registration of NGOs, the laws and regulations that govern them. A coordinated NGO front provides great opportunities for resource mobilization and optimum utilization of these resources for the benefit of stakeholders.

7.14 Multilateral Environmental Agreements (MEAs)

Agenda 21

This is a global programme of action for sustainable development whose goal is to establish a new and equitable global partnership through the creation of new levels of cooperation among states, key sectors of societies and people. Millennium Development Goals are also listed in the agenda and requires every member country to domesticate these goals.

Convention on Biological Diversity, 1992

Kenya is a signatory to the Convention on Biological Diversity, which in Article 8, obliges member states to: Establish a system of protected areas, Develop guidelines for the selection, establishment and management of protected areas and promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Kenya is a party to CITES, which obliges member states to adhere to the recommendations of the Conference of Parties with respect to trade in endangered species.

Ramsar Convention on Wetlands 1971

The Ramsar Convention on Wetlands emphasises the need to conserve wetlands and requires member states to include at least one wetland on the list of Wetlands of International Importance.

Convention on migratory species of wild animals (CMS)

Realising that animal migration is a global phenomenon in response to biological requirements, several countries have come together under the CMS, also known as the Bonn Convention, to cooperate in the conservation of animals that migrate across national boundaries and between areas of national jurisdiction and the sea. The Convention aims to improve the status of all threatened migratory species through national action and international Agreements between range states of particular groups of species. Agreements can range from legally binding multilateral treaties to less formal memoranda of understanding. The object of such agreements is to restore the migratory species to a favourable conservation status or to maintain it at that status.

Environmental NGOs/ CBOs engaged in environmental activities in district

- Nature's Wisdom
- Friends of Mau watershed
- Riverzone environmental programme
- Kipajit central Environmental group
- Bureti Environmental coalition
- Mitipanda group
- Ronced Foundation
- Konoin Environment coalition

Donor organizations.

- Swedish International Development Agency
- Danish International Development Agency
- Organization of oil Exportation Countries
- AMREF
- Community Development Trust fund

Private sector organizations engaged in environmental conservation activities in the district include all the large scale tea companies of James Finlay, Unilever, George Williamson, Sotik tea companies.

CHAPTER EIGHT

8.0 Implementation strategy

8.1 Overview

The objective of this Environmental Action Plans is to integrate environmental concerns in development planning and implementation and this chapter focuses on the monitoring and evaluation system that will be used to assess the project implementation process during the plan period. It also presents implementation, monitoring and evaluation matrix, that the district will put in place to ensure that the implementation of the plan is carried out to achieve the objectives. Environmental concerns are cross-cutting in nature and their impacts are felt at the local level, district, regional, national and global level. Their integration in development process at all levels is essential hence the preparation of the DEAPs, PEAPs and NEAP. Their preparation and implementation is a statutory requirement under EMCA (1999) Section 38.

8.2 Stakeholders involvement

The implementation Strategy of the Environment Action Plans should involve as many stakeholders as possible. These include all Government Departments, agencies, State Corporations and any other organ of Government as well as Civil Society Organizations, private sector and individuals.

The participation of stakeholders in the implementation is guided by their statutory mandate, their capacities and priorities. They should be involved at all stages of preparation and implementation including monitoring and evaluation. Participatory approaches to their involvement may be applied.

8.3 Monitoring and evaluation

The Monitoring and Evaluation of the implementation of the Environmental Action Plans will be carried out using participatory approaches where stakeholders are involved at all stages. Monitoring will mainly be undertaken on continuous basis through meetings and field visits. Reports will be discussed at all stages but quarterly reports will be prepared and reviewed. Evaluation will be undertaken periodically preferably on annual basis in line with the Performance Contracting period in the Public Service.

The purpose of Monitoring and Evaluation of the Environmental Action Plans is to ensure their efficient and effective implementation as well as ensuring that environmental concerns have been addressed and integrated in development process. It will involve documentation of "Best Practices" for purposes of replication

MENTATION MATRIX FOR BURETI DISTRICT 0722761501

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Water Resources	<p>To reduce degradation of water resources</p> <p>To reduce/Avert Water pollution</p> <p>To increase community participation in water resource management</p>	<ul style="list-style-type: none"> • Improved water resource management • Increased community participation in water resource management • Decreased degradation of water resources 	<ul style="list-style-type: none"> • Protect and conserve water resources • Regulate river water abstractions • Protection of spring, streams, riverbanks and the riparian reserves • Undertake appropriate soil conservation measures • Afforestation & Re-afforestation of water catchments including hill tops • Promote roof water catchments • To establish water resource users associations(WRUAs) 	<p>WRMA</p> <p>Local Authorities</p> <p>Min of Public Health and Sanitation</p> <p>NEMA</p> <p>Min of Water</p> <p>Min of Agriculture</p> <p>DEC</p>	2009-2013
Forestry	<p>-To conserve and protect the existing vegetation in gazetted areas, rangelands and cultivated areas</p> <p>-To re-afforest degraded areas with suitable tree species</p> <p>-To build capacity of</p>	<ul style="list-style-type: none"> • Increased forest cover • Sustainable use of forest resources • Communities organized into conservation groups and committees / users group • CFAs Protection committees • Reduced charcoal burning • Sustainable utilisation of forest resources 	<ul style="list-style-type: none"> • Replanting /Enrichment planting in gazetted areas • Tree nursery development • Identify and map degraded/deforested areas/ sites • Tree planting in degraded sites • Promotion of Farm forestry / agroforestry • Awareness creation Trainings • Formation of forest / environment protection committees and groups / users association • Enactment of by laws restricting use of cedar in construction • Policy on charcoal burning • Stakeholders meeting • Regulation of herbalists 	<p>KFS</p> <p>MOA</p> <p>Bureti county Council</p> <p>Bureti Town Council</p> <p>KVDA</p> <p>NEMA</p> <p>OOP</p> <p>DEC</p>	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
	<p>communities on conservation forestry</p> <p>To regulate use of forest resources</p> <p>To stop Encroachment, settlement and deforestation – south-west Mau forest.</p>				

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Land: Agriculture, Soils degradation	To reduce High rate of soil erosion and low crop yields	<ul style="list-style-type: none"> Reduced soil erosion/Land degradation Increased crop productivity/food security 	<ul style="list-style-type: none"> Initiate appropriate soil conservation measures Tea sector stake holders should draw up a sustainable fuel wood production plan Promote use of mulching Build gabions Afforestation and Re-afforestation Plant cover crops Promote roof water catchment Plant drought tolerant crops Promote use of certified seeds promote timely land preparation and planting Initiate appropriate soil conservation measures Promote indigenous crops Promote use of farm yard manures Promote Agroforestry Use push pull technology to reduce <i>striga</i> weeds Crop Diversification Plant early maturing crops <p>Promote storm water harvesting e.g. construct water pans</p>	Min. of Agriculture KFS DEC	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Wildlife, Biodiversity & Tourism	To reduce Human – wildlife conflict To utilise Untapped eco-tourism potential	•	<ul style="list-style-type: none"> Construct Embomos tourist camp Establish wildlife buffer zones Preserve the biological diversity in the district Strengthen District Compensation Committee Sensitize communities to appreciate the importance of conserving wildlife Involve the communities in wildlife management Carry out an inventory of existing/potential tourism sites 	NEMA KFS, KWS Min. of Tourism	
Biodiversity	To avert Loss of biodiversity	•	<ul style="list-style-type: none"> Conserve biodiversity - significant areas Regulate activities of herbal doctors with regards to access to genetic resources Operationalise Biodiversity regulations at the District Level Plant indigenous trees Stop illegal logging Preserve indigenous tree species Protect natural ecosystems Apply and enforce EMCA 	KFS, KWS Min. of Tourism	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Climate & related environmental hazards	To reduce Frequent Drought /Famine To mitigate Flooding To manage Forest Fires	<ul style="list-style-type: none"> Fire breaks in the forests/especially in gazetted forests 	<ul style="list-style-type: none"> Establish an active District Disaster committee Delineate Riparian Afforestation and Re-afforestation Initiate appropriate soil conservation measures Improve farming methods Peg river banks Construct drainage channels Promote drought tolerant crops Forest patrols maintain firebreaks, install fire hydrants & extinguishers where necessary, 	<p>OOP NEMA Min of Special Programmes Min. of Fisheries WRMA KFS Min. of Agriculture DEC</p>	
Environmental Health	To reduce Prevalence of waterborne diseases		<ul style="list-style-type: none"> Construct a proper drainage and sanitation facilities Apply and enforce Public Health and Sanitation Act Promote treatment of drinking water Protect water sources Apply and enforce waste management and Water quality regulations Construct latrines /sewer treatment facilities Create awareness on proper hygiene Promote use of treated mosquito nets 	<p>Min. of Public Health and Sanitation, Local Authorities WRMA WRMA, Min. Agriculture DEC</p>	
Wetlands	To reduce Degradation of wetlands	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Regulate the usage of wetlands resources Educate communities on the importance of conserving wetlands Draw management plans for wetlands Map and protect wetlands and other fish spawning areas 	<p>WRMA, Min. Agriculture, Min of Lands, Min of Fisheries DEC</p>	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Air pollution	To reduce air pollution	•	<ul style="list-style-type: none"> Control burning garbage Promote recycling of waste Apply and enforce Public Health and Sanitation Act on disposal of dead animals Designate an area for dumpsite in urban areas 	Min. of Public Health and Sanitation, Local Authorities Local Authorities Min. of Public Health and Sanitation, Local Authorities DEC	
Energy	<p>To reduce Overdependence on wood fuel</p> <p>To reduce Shortage of wood fuel</p> <p>To increase supply of Energy</p>		<ul style="list-style-type: none"> Enhancement of Rural electrification Promote planting of quick maturing trees Introduction of solar technology Promote use of energy saving devices Promote use of alternative sources of energy eg biogas, solar Energy conservation awareness Promote Agro forestry Establishment of On-farm woodlots 	Min. of Energy KFS DEC	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
Environmental Education & Awareness	<p>To increase levels of awareness on environmental education</p> <p>To integrate Indigenous knowledge in management of Environment</p>		<ul style="list-style-type: none"> Enhance technology transfer through demonstrations Prepare and Disseminate relevant environmental information Promote public participation in environmental plans, programmes and activities Sensitize communities/opinion leads to abandon cultural beliefs that inhibit environmental conservation Integrate environmental issues in Schools & Adult/Public Institutions and literacy Centres Increased awareness on environmental laws through <i>Barazas</i>, seminars, workshops <ul style="list-style-type: none"> Construct and equip the DIDC Enhance training and create opportunities for people to gain IT skills Facilitate access to internet services for schools, hospitals, institutions and government departments Emphasize on the importance of generating, sharing and disseminating relevant information Offer training and education opportunities 	<p>NEMA</p> <p>Min of Education</p> <p>Local Authorities</p> <p>OOP</p> <p>Social Development Officers</p> <p>DEC</p>	
Industry & Other Business Activities			<ul style="list-style-type: none"> Promote use of cleaner production technologies Recycle polythene materials 	<p>Min. of Public Health and Sanitation,</p> <p>Local Authorities</p> <p>Min. of Energy</p> <p>Min of Industry</p> <p>DEC</p>	
Livestock & Grazing	<p>To reduce land degradation</p> <p>To reduce Overstocking</p> <p>To increase</p>		<ul style="list-style-type: none"> Improved pasture/seed stock improvements at Kimose sheep and goats Hold livestock marketing stakeholders meeting Streamline livestock marketing Activate all sale yard committees Controlled / deferred grazing 	<p>Min. of Livestock DLPO</p> <p>SCC</p> <p>MTC</p> <p>ALRMPII</p> <p>KVDA</p>	

Priority Issue	Objectives	Output	Activities	Responsible institution	Timeframe
	livestock Productivity		<ul style="list-style-type: none"> • Support establishment of grazing committees • Enact policy on proper livestock stocking rates • Support to livestock off take programmes Reduce the stocking rate • Undertake research on tsetse fly control tsetse through suppression, spraying and traps • Control animal diseases • Train the communities on tsetse fly control • Train farmers on good animal husbandry • Plant fodder crops/trees • Construct cattle drinking water points • Make hay for use during the dry season 	DLMC R.P.K	
Mining & Quarrying	To manage Open mining pits	Prospects for geothermal energy	Rehabilitate and restore quarried areas Fence mining areas and pits	NEMA Mines and Geology Dept. Local Authorities DEC	
Settlements & Infrastructure	To reduce Unplanned settlements To manage Poor sanitation To reduce prevalence of Diseases	•	<ul style="list-style-type: none"> • Prepare urban development plans • Construct latrines • Promote community education on good hygiene and sanitation • Apply and enforce Public Health and Sanitation Act • Apply and enforce waste management regulations • Apply and enforce Physical Planning Act and Council Bylaws • Improve existing roads • Promote land use planning • Construction of sewerage system • Designate waste disposal sites 	Min. of Public Health and Sanitation, Local Authorities Min of lands DEC	

Activity	OVI (objectively verifiable indicators)	MoVs (Means of Verification)	Reporting schedule	Implementers	Responsible institutions for M&E	Remarks
Forest patrols	Increased vegetation cover Reduced cases of logging	No of patrols Illegal cases of logging reported Reports	Quarterly	KFS	KFS K.W.S	
Establishment of tree Nurseries	Number of seedlings raised	No. of tree nurseries established	Quarterly	KFS Community	KFS	
Tree Planting and re-forestation programmes	No. of hectares afforested	No. of trees planted	Quarterly	KFS Community	KFS	
Community sensitisation and awareness on wetland conservation	No of people sensitised	No. of trainings conducted Reports	Quarterly	Water Board WRMA DEC	DEC Water Board WRMA	
Curb charcoal burning and transportation	Reduced cases of charcoal burning	No. of cases reported	Quarterly	KFS DEC KWS Police Provincial Administration	KFS KWS	
Identify and inventorise the existing Wetlands	No. of wetlands identified	No. of inventories(entry)	Quarterly	D.E.C Water Board WRMA Ministry of land and settlement		
Reclamation and rehabilitation of wetlands	No. of wetlands reclaimed & rehabilitated No of wetlands covered with trees	No. of wetlands identified and surveyed (functional) No of seedlings planted	Quarterly	Forest Dept	Forest Dept D.E.C County council Water boards	
Gazettement of wetlands	No. of wetlands	No. of gazette	Quarterly	D.E.C	D.E.C	

	gazetted	notices		Water Board WRMA Ministry of land and settlement		
Inventory of wetlands	No of inventories	Reports	Quarterly	D.E.C	N.E.M.A	
Hilltops survey	No of hills surveyed	Survey Reports	Quarterly	N.E.M.A County Council	N.E.M.A	
Hilltops rehabilitation	No. of Hectares planted	No. of hills planted with seedlings	Quarterly	KFS N.E.M.A Bureti County Council	N.E.M.A	
Re allocation of people from landslide prone areas	Landslide prone areas identified and persons living there notified	No of people reallocated	Quarterly	County Council Ministry of lands and settlement D.D.C	Ministry of lands and settlement D.D.C	
Gazettement of important catchments and hill tops	No. of hills and catchment areas gazetted	No. of gazette notices	Quarterly	D.E.C Water Board KFS Bureti County Council Ministry of land and settlement	D.E.C	
Afforestation and re-afforestation of catchments areas		No. of hectares re-afforested	Quarterly	WRMA NEMA KWS KFS	KFS Water Board WRMA	
Protection of spring, streams, riverbanks and the riparian reserves		No. of streams and springs protected No. of riparian reserves protected	Quarterly	Water Board WRMA NEMA KWS KFS Community	KFS Water Board WRMA DEC	
Survey and rehabilitation of catchment areas and riparian reserves.		No. of catchment areas surveyed No. of riparian reserves rehabilitated	Quarterly	Water Board WRMA NEMA KWS KFS Min of Lands & Settlement	KFS Water Board WRMA	

				Community Water Users association		
Inspection of river water abstractions and water flow volumes	Reduced illegal Abstraction	Increased volume of water in the Rivers	Quarterly	Water Board C.B.O	NEMA, WRMA, Water Board	
Curb water diversions		Increased volume of water in the Rivers	Quarterly	WRMA Water Board C.B.O	DEC, Water Board	
Establish the cyclic nature of drought in the area	Established and verified cycle	Study reports Precautionary measures taken	Annual	DEC Provincial Administration	Provincial Administration	
Identify areas that suffer most from the effects of drought	Areas identified and defined	No. of areas identified Extent defined	Quarterly	DEC Provincial Administration	DEC Provincial administration Min. of Agriculture	
Identify landslide prone areas	Areas identified and defined	No. of areas identified Extent defined	Quarterly	DEC Provincial Administration		
Re-allocate people from landslide prone areas	Precautionary measures taken to avert landslides disaster	No. of families re-located	Annual	DDC Provincial Administration	DDC Local Authorities Provincial administration	
Making of conservation Structures (e.g. gabions)	Reduced soil erosion	No. of conservation structures constructed	Quarterly	Min of Agriculture Public Works	Min of Agriculture	
Refilling of abandoned and exhausted quarries	Rehabilitated Quarries	No. of Queries Refilled	Quarterly	C.B.O NEMA Litein Municipal Council Bureti County Council	N.E.M.A	
Introduction of dustbins in towns	Reduced solid waste load garbage in towns	No of dustbins installed Collection trucks available	Quarterly	Litein Municipal council	Litein Municipal Council D.E.C	
Construct standard septic tanks in residential and commercial estates	Reduced over flow of sewerage into the open	No. of standard septic tanks and soak pits constructed	Annual	Litein Municipal council	Litein Municipal council D.E.C	

Regularly inspect waste disposal techniques	Improved efficiency in solid waste collection	No. of inspection visits	Quarterly	Litein Municipal council	Litein Municipal council D.E.C	
Plan for implementation of standard sewerage systems	Proper liquid waste and effluent disposal	Progress report on the level of planning and implementation	Annual	Litein Town council	Litein Town council D.E.C	The high cost of constructing a sewerage and drainage system is a limiting factor.
Slaughter houses & other effluent source points surveillance	Reduced and well disposed effluent	No. of surveillance and inspection visits	Quarterly	Litein Town council Public Health	Litein Town council D.E.C	
Construction of sanitary landfills	No. of landfills constructed Properly disposed solid waste	No. of landfills properly used	Annual	Litein Town council	Litein Town council D.E.C	
Intensify collection of garbage	Reduced garbage accumulation in the town centres	No. of times solid waste is collected per week	Monthly	Litein Town council	Litein Town council D.E.C	
Identify alternative dumping site for Litein Town	Site identification and survey	Site identified	Annual	Litein Town council Min. of Lands & Settlement	Litein Town council D.E.C	

Table 48: Monitoring and Evaluation Matrix

REFERENCES

- GOK (2004) -Economic Recovery Strategy for Wealth and Employment Creation
- GOK (2001) -Poverty Reduction Strategy Paper (PRSP) 2001 - 2004
- GOK (2002) -District Development Plans 2002-2008
- NEMA 2004 & 2005 -NEMA State of Environment Reports for the years 2003 and 2004.
- GOK (2002) -Economic survey
- GOK (2000) -Statistical Abstract
- GOK (2004 & 2005) Departments Annual Plans – Buret District
- GOK (1999) Population and Housing Census