

SUB-CATCHMENT MANAGEMENT PLAN (SCMP)

Final Document

**NAME OF WRUA: LANAWRUA
REGION: RIFT VALLEY**

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DATE: NOVEMBER 2009
(First submitted March 2009)

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1 INTRODUCTION

1.1 Overview of SCMP Development

The Lake Naivasha Water Resource Users Association (LANAWRUA) Sub Catchment Management Plan (SCMP) was developed in December 2008. This was developed by use of participatory focused group discussions with the help of WRMA staff, WRUA members, WWF, and other relevant stakeholders in the WRUA sub catchment.

2 OVERVIEW OF SUB-CATCHMENT

General description of Sub-Catchment

Lake Naivasha (0. 45°S, 36. 26°E), altitude 1890, lies on the floor of Africa's Eastern Rift Valley and covers approximately 140 km². It is the second-largest freshwater lake in Kenya. It is one of a series of twenty three major lakes in the East Rift Valley – eight in central Ethiopia, further eight in Kenya and seven in Tanzania – spanning latitudes from approximately 7° N to 5° S. The overall climate of the Eastern Rift Valley is semi-arid.

Geology and soils

In this section only a few properties will be discussed with direct relevance to the management of the Lake. The volcanic formations in the Rift Valley have in general high sodium (Na) content. The soils around the Lake are developed on volcanic ashes mainly composed of fine pumice grains. Pumice layers are abundant. The interaction between volcanic deposits and water (lakes) cause the genesis of zeolite minerals. The soils around the Lake are, due to the high pumice content, very permeable and have a very low water holding capacity. The result of this is that irrigation water seeps quickly to below the rooting zone. Very frequent (some farmers claim 10 times daily) irrigation frequencies are necessary and all excess irrigation will seep down to the groundwater. The soil properties are also important for the path agrochemicals are likely to follow. Due to the high permeability and the gentle slopes, run off occurs not often and most agrochemicals will be transported towards the groundwater.

Groundwater plays a very important role in the working of the Naivasha system. The leakage out of the Lake is part of the groundwater system. Exact identification of this mechanism could provide for a better exploitation of groundwater resources. Although groundwater is potentially a recipient of agrochemicals used around the Lake, the sub surface flow is in general away from the Lake and the risk that agrochemicals end up in the Lake is low. The aquifers around the Lake are very high yielding, and North of the Lake irrigation is predominantly groundwater based.

The alkaline nature of the volcanic rock soils results in the groundwater having high sodium content. This causes a problem for both growing high quality crops and the structure of the soils. In general groundwater in the area South of Lake Naivasha is not

very suitable for irrigation. Mixing groundwater with surface water may be a viable option.

The abundant presence of pumice is an important factor in hydroponic irrigation systems used extensively around the Lake. The pumice is a perfect substrate for hydroponic culture.

The presence of Zeolites play an important role in organic farming and modern land management. Zeolites have very high soil water retention capacities, extremely high Cation Exchange Capacities (CEC) and they are able to capture ammonia (NH_4). For these reasons it is highly recommended to undertake research to fully understand the potential of Zeolites in the floricultural industry around the Lake.

Hydrology

The Lake is fed by two perennial rivers, the Malewa and the Gilgil, contributing eighty percent and twenty percent to the total inflow respectively. The Karati which drains the area east of the Lake is ephemeral and flows between 2 and 4 months in a year. The area South of Lake Naivasha does not produce significant runoff to the Lake. To the west the drainage from the Mau Hills and Eburu infiltrates before it reaches the Lake.

Both the Malewa and the Gilgil yield water of excellent quality. The Electric Conductivity (EC) can vary very rapidly over a few hours but the mean EC for both rivers is around $100 \mu\text{S}/\text{cm}$. Like all natural water in the area the sodium content is relatively high.

The Lake fills a shallow depression with gentle slopes. Therefore the surface area and the evaporation increases with rising Lake Levels. The Lake exhibits a very dynamic behavior that is demonstrated in the historical record of levels presented below. The range of the Lake levels over the last 100 years has been some 12 meters.

The water levels of the Lake follow the traditional cycles of wetter and dryer periods of the year.

Lake Naivasha comprises three separate lakes. Crescent Lake which is the deepest part of the Lake (18m depth) can during times of higher water levels be connected to the main Lake. Oloiden is a smaller lake at the south end of the Lake which may also be connected to the main Lake at times of high water levels. Crater Lake or Sonachi is located on the southwestern part of the Lake and is independent from the main lake.

The main Lake is shallow (<8 meters) and has no surface outlet but despite this it has good water quality with an EC of approximately $300 \mu\text{S}/\text{cm}$. It has long been presumed that this can be attributed to underground outflow. The groundwater levels and the isotopic composition of groundwater indicate that this flow is both to the North and to the South. A small part of the groundwater evaporates and will escape in the form of fumaroles in the geothermal areas; the remainder of the water flows into Lake Magadi

and Lake Elementeita. It takes 1000's of years for the groundwater flow to reach these lakes.

The Lake itself can be considered as an outcrop of a very good shallow aquifer that is draining into a deeper aquifer system, carrying water towards the terminal lakes (Magadi and Elementeita). The groundwater system around the Lake is complex and has important management implications that are discussed later. In general the water flows away from the Lake with the exception of the West where an inflow from the Ndabibi Plains occurs.

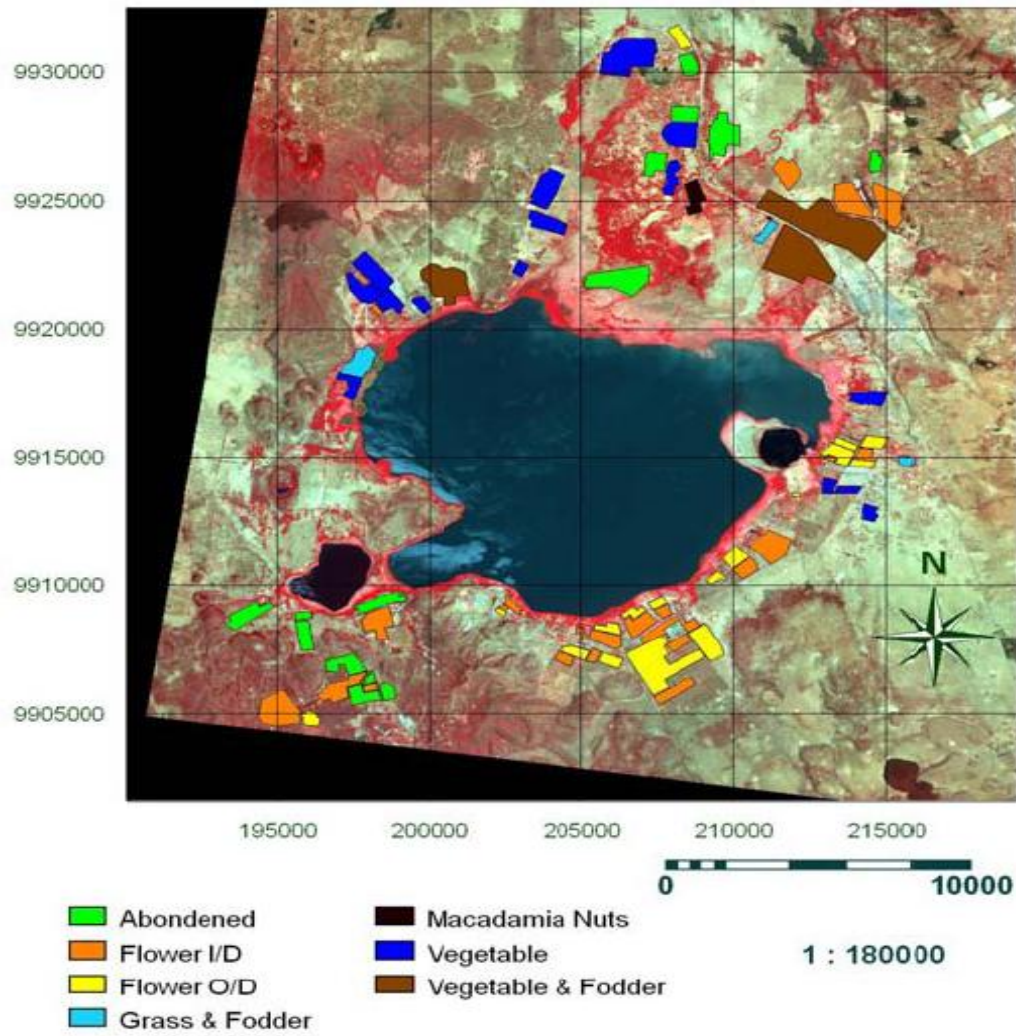
Land Use

Lake Naivasha supports unique habitats particularly the fringing papyrus swamp and associated freshwater biodiversity. The ecosystem comprises three chemically distinct water bodies, the main freshwater lake itself, and a more alkaline and sometimes connected Oloidien, and a crater lake, Sonachi. .

The changing land use patterns, especially north of the Lake are dynamic. The differentiation between vegetables and fodder production is not always possible. A number of trends have been observed:

- In the flower industry, a move from outdoor to indoor production
- Fodder production has been replaced by vegetable production
- Generally irrigated land has been abandoned
- The total area under irrigation has been relatively constant over the past 10 years

Irrigated Crop Around the Lake



Population

Based on the 1999 census, Central Bureau of Statistics reports the population of Naivasha Urban Core as 32,000 and Naivasha Municipality as 115,000 persons. Below are the population estimates for 2007.

No.	SUBLOCATION	AREA Km ²	DENSITY	POPULATION
1	Kongoni	76.08	34.62	3,213
2	Tarambete	72.56	80.94	7,165
3	Karati	141.53	198.89	34,341
4	Moindabi	34.22	91.94	3,838
5	Lake View	18.15	430.60	9,535
6	Sokoni	59.37	493.74	35,762
	Total			93,854

Source: WAP Draft Document (June 2007) by Rural Focus Ltd.

Economic activities

Power generation

In 1982 the KenGen Ol Karia geothermal power plant, situated 7km south of the Lake, became operational; producing some 45MW of power and in 2002 an independent power producer started production in an adjacent area and now produces 36 MW. In 2003 a second KenGen generation station was commissioned and is now producing 70KW of power. Other IPP's have also now started generation.

Tourism

Between 1985 and 1992, the number of visitors to Hell's Gate National Park increased by more than 600 percent. In 1994, a total of 41,000 visitors entered the two national parks in Naivasha area - Hells' Gate and Mt. Longonot. By 1997 there were 47,311 visitors to Hell's Gate alone. By 2003 the statistics reflected 75,000 visitors for both parks.

The following features of tourism and recreation are of concern:

- growth of the tourist industry must be supported by the provision of infrastructural facilities, such as sewage disposal;
- tourists may cause disturbance to breeding places and fragile ecosystems;
- routes for tourists to gain access to the Lake may become inadequate and overcrowded.

Agriculture-Horticulture and Floriculture

In the early 1980s the first flower farm started and in a period of twenty years the floricultural area has increased from close to zero to some 4,000 ha. Growers now produce at least 25 varieties of flowers (roses, spray carnations, gypsophila,

alstroemeria, eustoma, etc) and vegetables (peas, baby corn, beans) for the export market. All of which are either irrigated from Lake, incoming rivers or from groundwater.

The horticultural industry employs more than 50,000 people directly and many others indirectly, both as dependents and service providers. The industry is the principal source of foreign exchange for Kenya.

Livestock

Pastoralists have been present in the area from the 18th century grazing their animals in the Lake catchment. Land use and ownership has changed over the years with increasing population, the introduction of intensive horticultural production and ranching. Pastoral activities compete with commercial horticulture, land subdivisions, deforestation and the growth of Naivasha Municipality. These all challenge the sustainability of ecosystem but at the same time create employment, wealth and income for the Government. However, unplanned and uncontrolled development, such as conversion of agricultural land to haphazard and unserviced settlements, cannot be sustained.

Forestry and Wildlife

The littoral zone is inhabited by macrophytes that provide suitable habitats for fish feeding and breeding, and mulch for invertebrates.

The papyrus is considered one of the most important plants in Lake Naivasha. It occurs in the shallow water of the Lake edge and on land where sub-surface soil is saturated. It almost completely surrounds the Lake, forms floating islands on the Lake and can be found up to five kilometers up the Malewa River. It acts as an efficient silt and nutrient filter and is capable of recycling excess nutrients. It forms an important habitat for fish (where submerged or floating) and wildlife such as birds, hippo and buffalo which use it as safe refuge and feeding area. The amount of papyrus in the Lake has varied tremendously as a consequence of fluctuating water levels, fires, human encroachment and destruction by animals. The Naivasha thorn or Yellow Fever Tree (*Acacia xanthophloea*) is the dominant terrestrial tree species and forms the woodland around the Lake. It is an important habitat for birds and other wildlife, and the undergrowth provides an important buffer to prevent erosion and silt and nutrients getting to the Lake. Many animals are to be found on the shores of the Lake, in the Acacia woodland and the neighboring national parks and sanctuaries, including hippopotamus (a population of over 600), waterbuck, buffalo, giraffe, eland, zebra, Thomson's and Grant's gazelles, bushbuck, duikers, mongooses, otters, various snakes and rodents as well as the occasional leopard. The River Malewa delta comprises Acacia woodland before giving way to papyrus swamp.

Fishery

The Lake has historically supported an important commercial fishery. However over exploitation has occurred by an increasing number of fishermen using small mesh nets

and other unsustainable practices and these activities have led to damage of the papyrus swamps and submerged plants (fish breeding areas), stirring up settled nutrients, and removal of juvenile fish before they have had a chance to breed thereby reducing the fish stocks. The illegally caught fish do not go through the official fish landing beaches for data collection thus denying the Fisheries Department and researcher's vital research and management information.

Infrastructure and Industry

Lake Naivasha has important natural resources - in some cases unique within a wide area including:

- Fresh water
- Geothermal power
- Diverse habitats
- Wide variety of mammals and birds
- Productive fishery
- Natural beauty and mild climate

Due to the availability of the above resources, proliferation of various informal settlements, industries and other support infrastructures e.g. roads, airstrips, urban centers have developed in the area.

Threats from the wider catchment

Increasing population growth and intense land utilization in the Catchment are likely to:

- accelerate the rate of soil erosion and consequently cause increased siltation and nutrient enrichment in the Lake;
- impoverish the soil, hence increase the need for agro-chemicals as farm inputs;
- increase deforestation opening steep slopes to erosion;
- encourage unplanned growth of human settlements in Naivasha town and other satellite areas;
- increase demand for food thus promoting intensive farming practices that may cause high water use from, and runoff pollution into, the rivers;
- Increase demand for water abstraction from the rivers for domestic and agricultural use.

Conflict between Socio-economic Development and Biodiversity Conservation

The Lake sub catchment presents an ideal situation where community-based management of the natural resources can be implemented. Lake Naivasha freshwater resources are already used for water supply, irrigation, industry, fishery, and tourism. The horticultural industry employs more than 50,000 people directly and many others indirectly and also earns billions of Shillings in foreign exchange and taxes. Nearly 15% of Kenya's total electrical energy demand is supplied from Ol Karia geothermal power plants. Such rapid population and economic growth and consequent intensified demand on the already stretched resources can only be sustained within an integrated planning and management process.

Whilst the resources of Lake Naivasha and its surrounding area should be put to multipurpose use, care must be taken by applying the wise use principle and compliance to ensure that the resource base is not damaged. Conflicting goals of various users need to be harmonised within an integrated Management Plan so that socio-economic development does not exceed the sustainable capacity and resilience of the natural resources. Such a Management Plan will be implemented through a representative body comprising stakeholders from the local communities, the private sector, non-governmental organizations and government agencies.

3 WATER RESOURCE PROBLEMS

What are the main water resource problems?

PROBLEMS (ISSUES)

The problems identified were clustered into the following major issues.

1. Declining water quantities
2. Declining water quality
3. Catchment degradation
4. Access to water resources
5. Encroachment of riparian lands
6. Non-compliance to natural resources management laws
7. Weak law enforcement mechanisms

3.1 Problem, Causes and Effects,

PROBLEMS	CAUSES	EFFECTS
LAKE NAIVASHA		
1. Decline in lake level	<ul style="list-style-type: none"> -Declining water inflows -Climate change Out of basin transfers -Siltng -Deforestation -Over abstraction 	<ul style="list-style-type: none"> -Decline in water quality -Water use conflicts (competing water users) -Loss of habitats -Reduced investment -Loss of employment opportunities -Risk to existing investors.
2. Declining water quality	<ul style="list-style-type: none"> -Poor land use practices -Destruction of riparian zone -Pollution from point – sources -Inadequate law enforcement 	<ul style="list-style-type: none"> -Increased health risks -Decline in Amenity value -Reduced fisheries -Increased water treatment costs
3. Decline in air quality	<ul style="list-style-type: none"> -Poor land use -Over grazing -Road construction -Deforestation -Geothermal activity emissions -Wind erosion 	<ul style="list-style-type: none"> -Increased health risks -Loss of top soil/reduced soil fertility -Loss of productivity/reduced light levels
4. Declining biodiversity loss of habitats	<ul style="list-style-type: none"> -Fluctuating lake levels/lake surface -Poor water quality/pollution -Over exploitation of the resources(e.g. fish and trees) -Encroachment of the riparian zone -Introduction of invasive species 	<ul style="list-style-type: none"> -Some effects as in issue 3 above except water treatment -Human/wildlife conflicts -Loss of livelihoods of heavy industries
5. Invasive species	<ul style="list-style-type: none"> -Planned and unplanned introduction -Fluctuating water quality 	<ul style="list-style-type: none"> -Decline in water quality -Loss of biodiversity(endemic) -Reduced livelihoods

	<ul style="list-style-type: none"> -Migratory birds and animals and human activities (gardens, boats etc) -Inadequate law enforcement 	<ul style="list-style-type: none"> -Ecological imbalance -Health risks (increase) -Loss/change of vital habitats
RIVERS AND STREAMS		
1. Decline in normal river flows & flow periods	<ul style="list-style-type: none"> -Illegal abstraction / farming activities in river riparian land -Deforestation of the water catchment areas -Over abstraction / out of basin transfer -Climate change -Planting of eucalyptus along the river banks 	<ul style="list-style-type: none"> -Change in water quality -Decline in riverine flora and fauna -Water use conflict -Decline in river levels -Change in biodiversity -Loss of livelihood
2. Erratic water flows	As in 1 above	<ul style="list-style-type: none"> -Loss of life, crops, property, damage of infrastructure
3. River bank encroachment	<ul style="list-style-type: none"> -Land pressure -Lack of law enforcement -Conflicting departmental laws -Poverty -Decline of productive agricultural areas 	<ul style="list-style-type: none"> -Decline in water quality and levels -Decrease in periods of flows -Soil erosion -Change of river course -Loss of biodiversity
4. Decline in water quality (This also applies to water quantity)	<ul style="list-style-type: none"> -Poor farming practices e.g. overgrazing (wildlife, livestock), removal of vegetation cover, inappropriate application of fertilizer/pesticides -Lack of knowledge/skills -Inadequate agricultural extension services -Lack of resources and technology 	<ul style="list-style-type: none"> -Siltation -Reduced water volumes -Refer to WQ Lake Naivasha
5. Over abstraction /river diversion and obstructions	<ul style="list-style-type: none"> - Inadequate law enforcement -Lack of storage and water 	<ul style="list-style-type: none"> -Water conflicts -Loss of livelihoods -Loss of revenue

	<ul style="list-style-type: none"> harvesting facilities -Lack of compliance -Increase in water demand -Improper resource planning -Lack of data/information on the resource. 	-Refer to effects on the lake and river above
6. Quarrying along river banks	<ul style="list-style-type: none"> -Poverty -Rapid infrastructural development -Poor law enforcement -Lack of policy guideline of quarrying and sand harvesting 	<ul style="list-style-type: none"> -Decline in water quality -Increased erosion -Loss of riparian land and habitat -Alteration of the natural river course -Change inflow rate regimes -Loss of life
7. Planting of alien species	<ul style="list-style-type: none"> -Inadequate knowledge -Conflicting departmental priorities -Short term gains 	<ul style="list-style-type: none"> -Reduction in rivers/streams flows -Change in riverine ecology
GROUND WATER RESOURCE		
1. Decline in ground water levels and yields	<ul style="list-style-type: none"> -Over abstraction /allocations -Lack of compliance -Inadequate data -Reduced vegetation cover -Volcanic activities /tectonics -Lack of recharge -Climatic change 	<ul style="list-style-type: none"> -Increased pumping costs -Decreasing aquifer storage -Reduced ground water recharge -Increased costs on water treatments due to decline in water quality -Reduced productivity -Pollution ie. infiltration from pit latrines
FOREST COVER		
1. Declining vegetative cover and destruction of water towers	<ul style="list-style-type: none"> -Deforestation (logging charcoal burning) -Change of land use -Illegal/inappropriate land allocation -Changes in ground water table -Fire -Over utilization/ grazing of certain plants 	<ul style="list-style-type: none"> -Soil erosion and siltation -Reduction of water and air quality -Loss of livelihood -Reduced infiltration -Reduced rainfall, increased wind erosion -Loss of aesthetic value (affecting tourism) -Loss of medicinal herbs

	-Climate change -Lack of compliance and law enforcement	-Increase in human wildlife conflicts Loss of biodiversity, Lowered food production
5. WILDLIFE		
1. Access routes to water	- Change of land use /tenure -Abandonment of previous water points -Inappropriate land acquisition	-Human/wildlife conflicts -Increased degradation of habitat around remaining water points
2. Shrinking home range	-Change of land use -Development -Change/declining vegetative cover	-Overgrazing/over population/disease -Human wildlife conflicts -Shrinking of gene pools
3. Poaching	-Hunger/poverty -Relaxation of international laws -Non compliance/non law enforcement	-Reduced population of targeted species -human conflicts -Loss of tourism income /revenue -Health risks
4. Over population	-Lack of predators -Shrinking of home range -Proper wildlife management	-Increase of disease risk -Over grazing -Change in vegetative structures -Land degradation -Human wildlife conflicts
GEOHERMAL POWER GENERATION		
1. Non compliance with water management rules	-Conflicting policies -Inadequate water use data/data base	-Reduced revenue base -Inaccurate water allocation data
2. Air pollution	-Drilling of wells create gas emissions -Lack of law/compliance enforcement (EIA)	-Increased health risks -Retarded plant/vegetation growth -Reduced land-cover

3.2 Bi-ranking of problems

The problems were ranked in order of priority

Key

DWQ Declining water quantities

DQ Declining water quality

CD Catchment degradation

AWR Access to water resources

ERL Encroachment of riparian lands

NC Non-compliance to NR management laws

EM Enforcement mechanisms

	DWO	DQ	CD	AWR	ERL	NC	EM	SCORE	RANK
DWQ		DWQ	CD	CWQ	DWQ	DWQ	DWQ	5	4
DQ			CD	AWR	ERL	NC	EM	0	7
CD				CD	CD	NC	EM	4	3
AWR					ERL	NC	EM	1	6
ERL						NC	EM	2	5
NC							EM	4	2
EM								6	1

1. Enforcement mechanisms
2. Non-compliance to NR management laws
3. Catchment degradation
4. Declining water quantities
5. Encroachment of riparian lands
6. Access to water resources
7. Declining water quality

What is the strategy to solve these problems?

3.3 SOLUTIONS

Out of the problems and causes identified, possible solutions or interventions were discussed as listed below

ISSUES	POSSIBLE SOLUTIONS
1. Declining water quantity	<ul style="list-style-type: none"> • Practice rain water harvesting • Improve efficiency in water use • Improve farming practices • Improve land use in the catchment areas • Reforestation • Assessment and development of the WAP for water resources • Awareness creation • Negotiation on inter-basin transfer • Increase/restore the flow of rivers flowing into the lake e.g. Karate River • Include LANAWRUA/WRMA in management of water transfer • Increase (flood) water storage within the catchment areas • Enforcement of water management laws
2. Declining water quality	<ul style="list-style-type: none"> • Carry out a survey to determine the sources of pollution • Protect and rehabilitate the riparian land and wet lands • Eradicate farming on the riparian land and riparian zones • Enforce compliance of law • Reforestation of catchment area • Relocation of latrines, dumping sites, car washes , etc away from water resources • Expand the sewerage system by NAIVAWAS • Improve sustainability/ efficiency (use the sewerage to produce biogas and power) • Promotion of cleaner production and disposal systems (industries, agriculture) • Enforce EMCA and other statutory instruments • Promote initiatives that support sustainable environmental services. • Sensitization and awareness creation within communities

3. Catchment degradation	<ul style="list-style-type: none"> • Improve proper land usage practices • Enforce the laws • Protection of forests, wetlands & water catchment areas • Initiate catchment restoration programmes • Introduce incentives to community for the conservation of forests catchment areas, (PES) and other agencies • Awareness creation • Identify water conservation areas for gazettement • Data collection and monitoring on catchment area trends • Identify and apply other methods of monitoring catchment change
4. Access to water sources	<ul style="list-style-type: none"> • Identify the access routes (corridors) • Evaluate grazing capacity of areas and strictly enforce limits e.g. stock units/ha • Acquire the relevant maps and documents • Reclaim the identified corridors (cattle, wildlife, livestock) • Identify the existing water points/sources (inventory) • Develop /rehabilitate water supply projects • Enforce water rules /laws to ensure equitable access by all
5. Encroachment of riparian land	<ul style="list-style-type: none"> • Demarcation/identify the riparian boundaries and the current status • Sensitization and awareness creation • Reclaim the encroached riparian land and wetlands. • Restore all degraded riparian areas • Enforcement of all the relevant laws • Gazettement of the identified riparian lands as fragile ecosystem areas.
6. Non-compliance to NRM laws	<ul style="list-style-type: none"> • Awareness creation on the existing laws. • Proper/simplified packaging information dissemination • Enforcement of laws on companies, government bodies, parastatals and individuals • Identify conflicting departmental laws and lobby for harmonization. • Promote/instill a sense of awareness of the NRM's

	among the community and WRUA's
7. Weak law enforcement mechanisms	<ul style="list-style-type: none"> • Enhance/build capacity of the enforcement agencies • Lobby for establishment of environmental courts • Sensitization of the judiciary and law enforcers • Initiate serious collective monitoring system on compliance • Publicize the offenders/defaulters

4 MANAGEMENT APPROACH

Key Themes:

- Management Unit from RCMS
- Classification from RCMS
- Status of the WRUA
 - **When was WRUA formed**
 - LANAWRUA was formed in the year 2007 in accordance with the Water Act 2002.
 - **By whom?**
 - It was and is formed by major water users within the 2000masl contour line in collaboration with WRMA, Provincial Administration, WWF, and other stakeholders, the categories as listed below:-
 - Individuals
 - Pastoralists
 - Water service providers
 - Irrigators
 - Commercial users
 - Tour operators
 - **Why?**
 - The WRUA was formed as a forum for conflict resolution and cooperative management of water and other natural resources within the area.

- **What is the WRUA registration status?**
- It was registered under the Societies Act (Laws of Kenya) on 6th of June 2007 and the first AGM was in October 2007 at which the 12 members of the Executive committee were elected.

- **What is the boundary of the WRUA area?**
- The WRUA's sub catchment boundary is the area encompassed by the 2000masl contour line with an exception of the parts covered by the Lower Malewa, Lower Gilgil and the Mariba WRUAs.

Resource map and the WRUA boundary map for the sub catchment
(Refer to Appendix A)

5 WATER BALANCE

Key Themes:

- Assessment of water resource potential
- Assessment of reserve
- Assessment of water demand
- Assessment of water balance

5.1 Current Status

Abstraction survey of all the abstractors in the sub catchment has been undertaken which gives us reasonable status of the water demand but more needs to be done.

5.2 Targets

To assess and promote exploitation of the water resources potential, water demand, balance and maintain the reserve.

5.3 Proposed Outputs

- Water resources potential
- Demand
- Balance
- Reserve

5.4 Proposed Activities

- Collection of flow data/characteristics on the Malewa ,Gilgil and Karati rivers and other seasonal streams to produce stage-discharge curves for continuing data collection
- Computation of the potential, demand, balance and the reserve

Water Balance			
Target	To assess the water resources potential, reserve and balance		
Output	Water resources potential		
Activity	Sub-Activity	Timeframe	Budget
Data collection Malewa ,Gilgil and Karati rivers other seasonal streams	Identification of gauging points along Malewa ,Gilgil and Karati rivers other seasonal streams	4 days	Fuel: 20ltrs/d*90*4 = 7,200 Contractor 1*4*9000, 1*4*6000 = 60000 Subsistence: WRUA 4*2*300 = 2,400 Total: KShs69,600
	Production of stage- discharge curves at the identified points	2day*12M onths	Fuel: 70ltrs/*90*2*12= 151,200 Subsistence: WRUA 1*2*12*300 = 7,200 Contractor 1*6000*2*12 = 144000 Total: KShs302,400
Lake Naivasha	Bathymetry surveys-(ADCP)	2 weeks per year	Sourcing of ADCP(Tana/LVEMP)=KShs200,000 Subsistence: WRUA 4*14 *3 *300=50400 Contractor 3*6000*14 1*9000*14 = 378000 Stationery & reporting= KShs10,000 Total=KShs638,400
	Acquiring ADCP, dinghy, current meters, sediment sampler	Year 2	ADCP & accessories=KShs1,000,000 Dinghy=KShs500,000 Current meters=KShs800,000 Sediment sampler=KShs500,000 Waders=KShs50,000 Total KShs2,900,000

Computation of demand, reserve and balance	Computation of demand, reserve and balance	3 months in year	Stationery 40,000 Contractor 1*66*6000 = 396000 Total =KShs436,000
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Total for Water Balance Activities = Shs4,346,400

6 WATER ALLOCATION

Key Themes:

- Current abstraction
- Compliance with permits
- Development of water allocation plan
- Improvements to water use efficiency

6.1 Current Status

An abstraction survey of all water users in the sub catchment has been undertaken but there are numerous sources of inaccuracy and lack of regular reporting/reading of water meters, etc.

The majority of the abstractions have valid permits but there are still a significant number without.

No water allocation plan is in place, but this will shortly be submitted for approval. Water use efficiency is being monitored as permits are submitted for renewal.

6.2 Targets

- To finalize the water allocation plan

6.3 Proposed Outputs

- Water allocation plan

6.4 Proposed Activities

- Verification/determination of the actual abstraction
- Enforcement of compliance to permit conditions
- Development of a water allocation plan
- Capacity building of community on water use efficiency

Target	To develop a water allocation plan		
Output	Water allocation plan		
Activity	Sub-Activity	Timeframe	Budget (KShs)
Verification/ determination of the actual abstraction	Measurement of actual water abstracted e.g. volumetric, flow meter	9 months	Fuel: 60ltrs/d*90*22*9 = 1,069,200 Subsistence: WRUA 2*22*9*300= 118800 Contractor 2*6000*22*9 = 2376000 Total: KShs3,564,000
Enforcement of compliance to permit conditions	Issue of WRMA orders to install measuring devices and record the readings monthly, disconnections, reconnections after compliance, prosecutions	Quarterly	286000 per qtr *4*3yrs KShs3,432,000
Finalisation of a water allocation plan	WAP review	14 days	Consultant 4*9000*14 = 504000 Venue, stationery =30000 Kshs534,000
	WAP publication and distribution	30 days	Contractor 3*6000*30 = 540000 Printing, binding, distribution 500,000 KShs1,040,000 (150 copies)
Capacity building of community/water users on water use efficiency	Stakeholder meetings (6)	6 days	Transport= 200,000 Subsistence 200*200/p= 40,000 Venue 6000*6 = KShs36 000 Consultant 1*20000*6 = 120000 Total Kshs396,000

Monitoring and Evaluation of the WAP	Interviews and workshops	Quarterly	Fuel: 70ltrs/d*90*6*4*3= 453600 venue hire= 432000 Contractor 1*9000*6*4*3 =648000 KShs1,533,600
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Total for Water Allocation Activities KShs10,499,600

7 RESOURCE PROTECTION

Key Themes:

- Protection of reserve - quantity
- Protection of reserve - quality
- Pollution surveys
- Environmental impact assessments
- Pollution and effluent control
- Catchment and groundwater protection areas

7.1 Current Status

- **Protection of reserve - quantity & quality**

Tree planting initiatives in the catchment and along the riparian land are being undertaken towards protection of the quantity and quality of the reserve. The WRUA's has been sensitizing members on maintenance of natural vegetation around the lake and along river banks and water courses and by restricting papyrus harvesting.

- **Pollution surveys**

Pollution surveys are yet to be comprehensively done, however some water sampling has been done for the lake zone.

- **Environmental impact assessment**

All major horticultural and agricultural operations, and tourist lodges have had EIAs done and generally adhere to the NEMA requirements. New projects are required to submit an EIA report to NEMA before implementation. Though approval must be obtained before the project implementation commences this is not always adhered to.

- **Pollution & effluent control**

None of the expanding urban centers have sewerage collection systems and treatment works. The effluent from these centers is disposed directly into the rivers and the lake. Naivasha Municipality's sewage works is not functioning effectively and is a major source of pollution in the lake.

• **Catchment and groundwater protection areas**

Hells Gate and Longonot National Parks are gazetted as protected areas.

The community needs to be educated on good land use practices. Restoration programs on the degraded areas need to be implemented.

There is a proposal for establishment of ground water conservation areas (GCA) but these areas have not yet been demarcated.

7.2 Targets

- Protection of the quantity and quality of the reserve in the lakes, rivers and other streams.

7.3 Proposed Outputs

- Protected quantity and quality of the reserve
- Pollution survey reports and effluent control plans
- Gazetted catchments and ground water conservation areas

7.4 Proposed Activities

- Protect reserve quantity

Resource protection			
Target	Protection of the reserve quantity and quality in the lakes, rivers and other streams.		
Output	• Protected reserve quantity and quality		
	• Pollution survey reports and effluent control plans		
	• Gazetted catchments and ground water conservation areas		
Activity	Sub-Activity	Timeframe	Budget
Protect reserve - quantity	River flow gauging for analysis of Q95 at the identified points	1day*12Months	Covered in chapter 5 (water balance)

	Evaluation of existing data (Lake Naivasha 2GD6 and Malewa 2GB1, Gilgil 2GA1, Karati 2GD2 and rainfall stations)	1 month	Subsistence: WRUA $4 \times 300 \times 30 = 36000$ Contractor $4 \times 6000 \times 30 = 720000$ KShs756,000
	Computation of existing data	1 week	Stationery: 1000 Contractor $1 \times 6000 \times 7 = 42000$ KShs43,000
	Preparation of flow duration curves	1 week	Subsistence WRUA $3 \times 300 \times 5 = 4500$ Contractor $1 \times 6000 \times 7 = 42000$ =KShs46,500
	Installation of information system-gauges/signboards along the rivers and at a significant public place(traffic light system)	2 weeks	7 gauges= $7 \times 100,000 = 700,000$ 4 Signboards * $100,000 = 400,000$ WRUA $2 \times 300 \times 5 = 3,000$ (Nakuru & Kenyatta Ave exit, South lake road junction, CBD) Contractor $1 \times 6000 \times 14, 4 \times 300 \times 14 = 100800$ Launching of information system $= 100,000$ Total =KShs1,303,800
Protect reserve quantity/quality	Enforce maintenance of the reserve quantity/quality	Quarterly for 3 years (1 week/qtr)	Fuel: $70 \text{ltrs/d} \times 90 \times 5 \times 4 \times 3 = 378000$ Subsistence: WRUA $3 \times 300 \times 5 \times 4 \times 3 = 54,000$ Contractor $1 \times 6000 \times 5 \times 4 \times 3 = 360000$ Total =KShs792,000
Establish the current WQ status	<ul style="list-style-type: none"> Identify points and the hotspots in the sub catchment (Conduct pollution survey) 	1 week per quarter	Fuel: $30 \text{ltrs/d} \times 90 \times 5 \times 4 \times 3 = 162,000$ Contractor $3 \times 6000 \times 5 \times 4 \times 3 = 1080000$

			Subsistence: WRUA $3*300*5*4*3=54,000$ Total= KShs1,296,000
	<ul style="list-style-type: none"> • Sampling, and analysis 	2 months	Fuel: $70\text{ltrs}/\text{d}*60*90= 378,000$ Subsistence: WRUA $3*300*60=54,000$ Laboratory costs $=240*5,000*2*3$ $=\text{KShs}7,200,000$ Total =KShs8,712,000
	<ul style="list-style-type: none"> • Map the point & non point sources of pollution 	1 month	Map coverage preparation Contractor $2*6000*30 = 360000$ $=50,000$ Stationery and printing= $100,000$ Total =KShs510,000
Sensitisation on EIA	Capacity building (6 barazas)	6 days	Transport= $200,000$ Refreshments $200\text{pax}*200/\text{p}= 40,000$ Venue $6,000*6 = 36 000$ Consultant $1*20000, 2*6000 = 32000$ Total = KShs308,000
Gazetted catchments and ground water conservation areas	Demarcation and gazetting of the areas	1 year	Contractor $1*6000*22*12 = 1584000 =\text{Kshs}1,584,000$

Total for Resource Protection Activities KShs15,351,300

8 CATCHMENT PROTECTION

Key Themes:

- Surveys & conservation of riparian areas
- Erosion/sediment surveys
- Soil and water conservation plans
- Catchment rehabilitation

8.1 Current Status

- Surveys & conservation of riparian areas

The riparian land boundaries around the lake are subject to interpretation but no authoritative opinion/decision has been made. Once this is done pegging needs to be done to delineate the boundary. A number of farms and community members (Kihoto area) have farming activities which are understood to encroach on the riparian land. A substantial amount of papyrus and acacia woodland has been destroyed.

- Erosion/sediment surveys

No initiative has been taken to date on erosion/sediment surveys.

Overgrazing is responsible for wind and soil erosion. The land carrying capacity is less than number of animals it currently has to sustain.

- Soil and water conservation plans

The preparation of land use plans has not been undertaken though individual farms do have their plans which now need to be harmonised.

- Catchment rehabilitation

Individual farms have areas set aside for tree planting. Some farmers e.g. Korongo farm have planted eucalyptus within the riparian land. Tree nurseries have been established to supply communities in upper catchment. Now that the Aberdare National Park has been secured by fencing this activity has the opportunity to create a positive impact on the ecosystem. A number of projects are being investigated, such as the rehabilitation of the Gilgil swamp and the Karati River, to control erosion and protect the flow regime as a means to boost aquifer recharge.

8.2 Targets

- To protect and conserve the catchment

8.3 Proposed Outputs

- Controlled soil erosion
- Increased water flow in quality and quantity
- Increased riparian vegetation cover
- Increased biodiversity
- Protected riparian land

8.4 Proposed Activities

- Catchment rehabilitation
- Pegging and protection of riparian land (150km)
- Soil and water conservation
- Wetland restoration

Catchment Protection			
Target	To protect and conserve the catchment		
Output	Controlled soil erosion Increased water flow in quality and quantity Increased riparian vegetation cover Increased biodiversity Protected riparian land		
Activity	Sub-Activity	Timeframe	Budget (KShs.)
Catchment Rehabilitation (Forestation)	Site identification	2 months	Fuel: 40ltrs/d*90*60= 216,000 Subsistence: WRUA 3*500*60 = 90,000 Lunch: Forester/ Agric: 2*500*60 = 60,000 Contractor 3*6000*60 = 1080000 Total:= KShs1,446,000
	Assessment of the required plant material(papyrus ,trees etc)	2 days	Subsistence: WRUA 3*300*2 = 1,800 Subsistence: Forester/ Agric: 1*500*2 = 1,000 Contractor 3*6000*2 =36000 Total =KShs38,800
	Tree nursery establishment (Six sites proposed)	In three phases	Contractor 200000*3 Total =KShs600,000
	Training community on forest management	Quarterly for 3 years	12 training sessions*20,000*3 = KShs720,000
Pegging and protection of riparian land: Approx.370Km	Identify areas which are degraded/encroached	2 weeks	See catchment rehabilitation (identify areas)
	Pegging Lakes zone:160 km Malewa river:100km Gilgil:60km Karati:50km Total:370km	3 months	Consultancy Re-surveying costs=500,000 Mapping and re-installation of the beacons=400,000 Supervision costs=100,000 Total= KShs1,000,000
	Planting of indigenous flora along the riparian lands	3 years	Rivers:1million trees*10 =KShs10,000,000

			Lakes:2.5M trees*10 =25,000,000 Contractor , collect & transport to site 0.15*3.5M = 525000 Total= KShs35,525,000
	Follow-up	3 years	Fuel 70ltrs/d*90*2*12*3= 453,600 Contractor 1*6000*2*12*3 =432000 = KShs885,600
Soil Erosion control	Identify degraded sites	2 weeks	Covered under pegging and rehabilitation of riparian lands
	Educate farmers on soil Erosion prevention issues	Annual	70lit/day*90*15*3= 283,500 Contractor 2*6000*15*3 = 540000 Three sites = KShs823,500
	Demonstration on soil conservation methods	Annual	Demonstrate the use of old tyres to rehabilitate gullies or eroded water courses Included above
	Follow up to ensure the practice is adopted by the community	3 years	70lit/day*90*7*3*3=396,900= Contractor 2*6000*7*3 =252000 KShs648,900

Total for Catchment Protection Activities KShs41,687,800

9 INSTITUTIONAL DEVELOPMENT

Key Themes:

- WRUA Capacity Building
 - Mobilization
 - Membership sensitization
 - Communication
 - Human resource development
 - Facilities
- Stakeholder Coordination Activities

- Roles and responsibilities

9.1 Current Status

- WRUA Capacity building

Mobilization of members is being achieved through the distribution of application forms to members to formalize their status.

Communication between members presently only exists through private connections e.g. mobile phones and internet and informal meetings.

The WRUA presently has no assets. It has no office, communication facilities, a vehicle or stationery. There is an urgent need to acquire these and other relevant infrastructure. The WRUA is planning to establish a secretariat in the future to oversee its daily activities.

STAKEHOLDER COORDINATION ACTIVITIES

The WRUA is currently working in collaboration with partners such as WRMA, WWF, LNNG, LNRA and the Provincial Administration. The WRUA conducts regular bi-monthly meetings for water permit vetting and executive committee meetings.

See Stakeholders analysis in Appendix C.

9.2 Targets

- Strengthen the WRUA through training and workshops
- To understand and promote stakeholders' interests
- To educate stakeholders on their roles and responsibilities

9.3 Proposed Outputs

- Strong and effective WRUA

9.4 Proposed Activities

- Conduct training needs assessment
- Conduct training

Institutional Development			
Target	Strengthen the WRUA through capacity building to understand and promote stakeholders interests and to educate stakeholders on their roles and responsibilities		
Output	Strong and effective WRUA, Coordinated management of the sub catchment		
Activity	Sub-Activity	Time frame	Budget (KShs.)
Conduct TNA(training needs assessment) for WRUA and stakeholders	Develop a training tool	1 week	Consultant 5 days 100,000 Office stationery=2,000 Total=KShs102,000
Conduct training for WRUA members and stakeholders	Carry out six training to different categories of members and stakeholders Prepare reports	6 days	Hall hire: 6dys@6,000=36,000 Fuel: 70ltrs/d*90*6 = 37,8000 Subsistence: 70*1,000*6=420,000 Consultant 6 days 120,000 WRUA transport 140*500=70,250 Stationery and report preparation: =20,000 Total=KShs704,050

Total for Institutional Development Activities KShs806,050

10 INFRASTRUCTURE DEVELOPMENT

Key Themes:

- Water storage facilities at different levels (household, settlements, farms, sub-catchment)

- Groundwater recharge
- Flood water control

10.1 Current Status

There are a several rainwater harvesting and constructed wetland facilities in private farms. There are some public dams in need of rehabilitation. No ground water recharge projects currently exist. The sub catchment is liable to flooding during periods of intense rain fall.

10.2 Targets

- To increase water storage in the sub catchment
- To provide potable water and sanitation services to disadvantaged settlements.

10.3 Proposed Outputs

- Improved infrastructure leading to increased water availability
- Controlled and regulated water use

10.4 Proposed Activities

- Construction of rain water harvesting facilities
- Construction of dams and pans Construction of wetlands
- Construction of weirs for aquifer recharge (Karate)
- Construction of water supply and sanitation services to the local communities

Infrastructure Development			
Target	To increase water storage facilities To provide potable water and sanitation services to disadvantaged settlements		
Output	Increased water storage Controlled/regulated water availability and use.		
Activity	Sub-Activity	Timeframe	Budget (KShs.)
Construct rain water harvesting facilities	Identify and construct storage facilities from green house runoff.	3years	Construction @30/-/m ² for 20ha farm=6,000,000 Catchment area=1,200ha Total= KShs360,000,000
	Sensitise and educate communities on advantages of rain water harvesting	Continuous	3,000 lit storage tank=25,000. Budget will depend on number of communities and residents therein Consultant 1*6000*10*3 =180000 Fuel 30lit/d*90*1*52*3= 421,200 Total= KShs 601,200
Construction /rehabilitation of dams/pans	Feasibility study	2 days	Fuel: 70Lts@90*2=12,600 Subsistence WRUA: 3@500*2= 3,000 Total= KShs15,600
	Survey of the area	10 days	10 days@3500*3= 105,000 Subsistence: 10@500*5=25,000 (Community/WRUA)Contractor 1*6000*10 =60000 Total= KShs190,000

	Carry out design	2 month	Contractor 1*9000*60 =540000 Stationary150,000 Total= KShs690,000
	Conduct EIA	1 month	EIA report= KShs300,000
	Tendering	7 days	Contractor 1*6000*7 42000 Postage: 5 contractors@500= KShs2,500 Total= KShs44,500
	Construction of dams/pans	3 years	4 dams @ 10,000,000 = KShs40,000,000
Construction of wetlands	Feasibility study	2 days	Fuel: 40Lts@90*2=7,200 Subsistence WRUA: 3@500*2= 3,000 Contractor 3*6000*2 =36000 Total= KShs46,200
	Survey of the area	10 days	10 days@3500*3 = 105,000 Subsistence:10@500*5 = 25,000 (Community/WRUA) Contractor 1*6000*10=60000 Total= KShs190,000
	Carry out design	2 month	Contractor 1*9000*60=540000 Stationary= KShs150,000 Total= KShs690,000
	Conduct EIA	1 month	Consultant EIA= KShs300,000
	Tendering	7 days	Postage:5 contractors@500= KShs2,500
	Construction of wetland	3years	3 wetlands@3,000,000 = KShs9,000,000
	Rehabilitation of the Gilgil wetland	ongoing	Funded privately
Construction of Weirs for aquifer recharge(Karati)	Feasibility study		Contractor 1*9000*30=270,000 = KShs270,000
	Survey of the area		Contractor 2*6000*30= 360,000 = KShs360,000

	Carry out design	10 days	Consultant 1*20000*10 =200,000 =KShs200,000
	Conduct EIA	1month	Lump sum for EIA= KShs100,000
	Tendering		No cost
	Construction of weirs	6months	Contract budget =KShs27,200,000
Construction of water supply & sanitation services to the communities	Feasibility study	3months	Fuel: 70Lts@90*60= 378,000 Lunch WRUA: 3@500*60=90,000 Consultant 1*9000*90*=810000 Contractor 2*6000*90 = 1080000 Total= KShs2,358,000
	Survey of the area	3months	66dys*3500*3 = 693,000 66dys*500*5= 165,000 (community/WRUA) Total=KShs858,000
	Carry out design	2 month	Consultant 1*9000*60 = 540000 Contractor 1*6000*60 =360000 Stationary= KShs150,000 Total=KShs1,050,000
	Conduct EIA	1month	EIA= KShs300,000
	Identify donors		8*50,000= KShs400,000

Total for Infrastructure Development Activities KShs445,166,000

11 RIGHTS BASED APPROACH / POVERTY REDUCTION

Key Themes:

- Threats to water rights

- Conflict issues
- Gender issues
- Environmental issues
- Sustainable livelihoods

11.1 Current Status

Everybody has a right of access to water. Conflicts related to access to water are prevalent in this area. Few women, the disabled and the disadvantaged are included in decision making in water and environmental matters. The youth are unaware of the issues at stake and need to be encouraged to become more involved.

There are several clearly identifiable sources of pollution that affect the water quality in both the lake and sub catchment. The sub catchment's water resource is threatened as abstraction is believed to be more than the reserve. However this has yet to be verified. More reliable data is now being compiled and this will assist in improving the accuracy of estimation.

As the lake is designated as a RAMSAR site, it is imperative that the management of the resource is sustainable and its status maintained.

Tourism and horticulture are major sources of regular employment that alleviate poverty and have resulted in the migration of labor into the area. Behavioral changes have resulted in the demand for HIV and Aids awareness and family planning services.

Targets

- Improved access to quality water to enhance sustainable livelihoods
- Improved social economic status of the communities in the sub catchment

11.2 Proposed Outputs

- Improved access to water
- Improved livelihoods

11.3 Proposed Activities

- Awareness creation on water conservation and sanitation
- Encourage good farming and land use practices
- Enforce measures on effluent discharge from point and non point sources

Rights based approach /poverty reduction			
Target	Improved access to quality water to enhance sustainable livelihoods Improved social economic status of the communities in the sub catchment		
Output	Improved access to water and improved livelihoods		
Activity	Sub-Activity	Time frame	Budget (KShs.)
Awareness creation on water conservation and sanitation	6 barazas	6 days	Fuel=50ltrs/d*90*6 = 27,000 Subsistence WRUA:5@500*6dys = 15,000 PA=1*6*450=2,700 Contractor 2*6000*6=72000 Stationery and reporting =20,000 Total=KShs136,700
Encourage good farming and land use practices	Initiate PES and similar programmes and Training of communities on good practices(6 workshops)	6 days	Fuel=50ltrs/d*90*6 = 27,000 PA=1*6*450=2,700 Subsistence community: 90*6*300 =162,000 Contractor 2*6000*6 =72000 Stationery and reporting = 20,000 Expert facilitation on PES= 6*10,000=60,000 Exchange visits with other WRUA's =500,000 (allowance for transport, subsistence) Total=KShs843,700

Enforce measures on effluent discharge from point and non point sources	Sensitization of the community	6 days	Covered above (awareness creation)
	Identifying defaulters and issue orders to non compliant offenders	5 days	Fuel=70ltrs/d*90*5 = 31,500 Subsistence WRUA; 5@300*2days= 3,000 PA=1*2*450=900 Public health=2* 500=1,000 Contractor 1*6000*5=30000 Total KShs66,400
	Take offenders to Court		Legal fees and costs= KShs150,000

Total for Rights Based Approach Poverty Reduction Activities KShs1,196,800

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12 MONITORING AND INFORMATION

Key Themes:

- Water resource monitoring
- Water quality monitoring
- Water use monitoring
- Pollution monitoring
- Information collection and sharing arrangements

12.1 Current Status

There are four gauging stations in the sub catchment which are being monitored and have data. However they are not representative of the whole sub-catchment. There are three rainfall stations being monitored by WRMA, though the majority of flower farms collect rainfall data regularly. The annual average rainfall of the area is approximately 600mm. There is no ground water monitoring station within the catchment or sub-catchment. A private farm has a ground water monitoring system.

Water quality/pollution monitoring has been initiated and samples collected from appropriate locations. WRUA and WRMA share information on water sector issues and policy matters through meetings held on a monthly basis. Inter WRUA meetings in Lake Naivasha basin have been undertaken on two occasions in the past year. Water

resource monitoring is currently being undertaken by WRMA and LNGG members. The LANAWRUA makes recommendations on water use permit applications.

12.2 Targets

- Regular and accurate water resource monitoring by the WRUA/WRMA
- A comprehensive water data system established

12.3 Proposed Outputs

- Enforceable monitoring and regulating system
- Increased availability of quality water

12.4 Proposed Activities

- Monitoring of quantity, quality and water use

Monitoring and Information			
Target	Regular and accurate water resource monitoring by the WRUA/WRMA A comprehensive water data system established		
Output	Enforceable monitoring and regulating system Increased availability of quality water		
Activity	Sub-Activity	Timeframe	Budget (KShs.)
Monitoring of quantity, quality and water use	Set up data base and share with WRMA to determine quantity, quality, usage, abuse, non compliance, revenue base	Continuous	Fuel 70lit/d*90*5*12*3= 1,134,000 Contractor 1*6000*5*12*3= 1080000 Total= KShs2,214,000
	Sharing and dissemination of information	Monthly	Contractor 1*6000*1=60000 for 3 years =180000 (stationery, venue,) = 252,000 Subsistence = 108,000 Total KShs540,000

Total for Monitoring and Information Activities KShs2,754,000

13 FINANCING AND IMPLEMENTATION

Key Themes:

- WRUA operational budget
- Mechanisms to meet WRUA operational budget
- SCMP investment budget
- Mechanisms to raise SCMP investment budget

13.1 Current Status

WRUA operational budget

The WRUA has a current account with CFC STANBIC Bank (Naivasha). Potential sources of income for the WRUA are:

- Membership fee
- Annual subscription fee (based on permit category)
- Percentage of WRMA revenue collection (sub agency)

Every water permit holder is automatically a member of the WRUA.

Mechanisms to meet WRUA operational budget

As above

SCMP investment budget

The SCMP investment budget has been prepared as per Appendix B below

Mechanisms to raise SCMP investment budget

This is expected to be achieved through project proposal to WSTF, GOK, CDF, international donor agencies, NGO's, development partners, well wishers and community contribution both in kind and material.

13.2 Targets

- To implement the projects as proposed in the SCMP document.

13.3 Proposed Outputs

- To successfully implement and complete the project proposals as per the SCMP document
- To generate further projects to achieve sustainable sub catchment management.

13.4 Proposed Activities

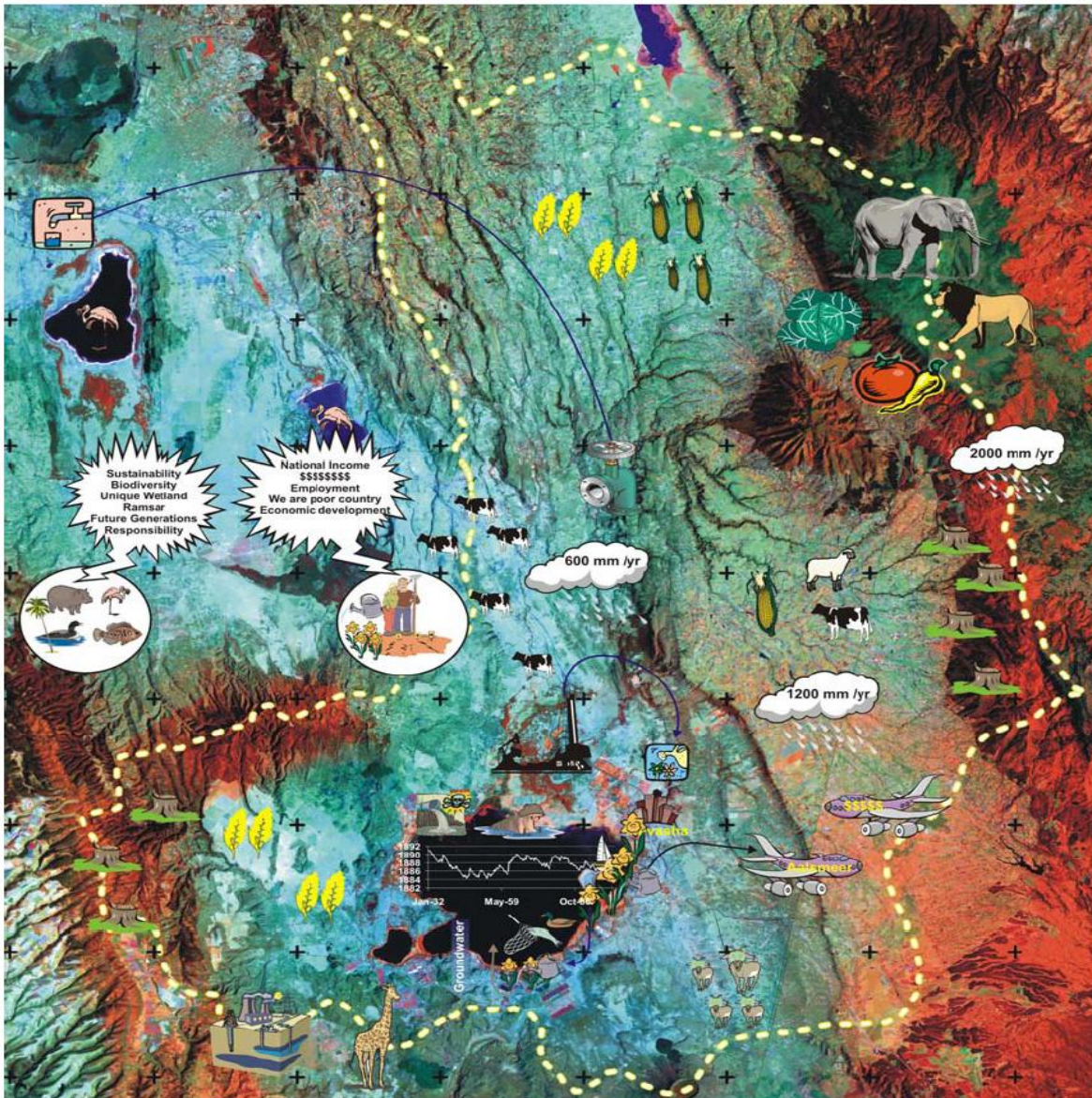
- Ensure all dues are paid

- Sign MOA with WRMA on revenue collection
- Financial management
- Resource mobilization
- Project management

Financing and Implementation			
Target	To ensure the WRUA is financially sustainable		
Output	Financially sustainable WRUA		
Activity	Sub-Activity	Timeframe	Budget (KShs.)
Sign MOA with WRMA on revenue collection	Conduct negotiations with WRMA Prepare documents for review and signature	3 months	Five trips to NBO=150lts of fuel x 90=13,500 Contractor 5*9000=45000 Stationery=10,000 Refreshments=5,000 Total=KShs73,500
Resource mobilization	Proposal writing and soliciting of funds from donors, financial institutions and organisations	Continuous (3 years)	Consultant 12*20000*3=720000 Stationery= 50,000 pa Total=KShs780,000
Project management	Identify and prioritize projects. Oversee projects and ensure compliance with project requirements and budgetary allocations	Continuous (3 years)	Project Manager 1*250000*36 Total=KShs9,000,000
Financial management	Ensure all dues are paid, disbursement of expenses, keeping WRUA accounts	Continuous (3 years)	Financial Controller 1*60000*36 = KShs2,160,000
	Implement projects that have been accepted and funded		Funding as part of the project proposal

Total for Financing and Implementation Activities KShs12,013,500

APPENDIX A MAPS



**APPENDIX B
WORKPLAN AND BUDGET**

LANAWRUA STAKEHOLDERS

1. Ministry of Fisheries
2. Ministry Lands Department of physical planning
3. Ministry of Environment and NEMA
4. Ministry of Local Government (Municipal Council ,County council)
5. Ministry of Water and Irrigation
6. Ministry of Agriculture
7. Water Service Board
8. Tour Operators (hoteliers),
9. Institutions (schools, hospitals NYS, Prisons,)
10. Forestry (KFS and CFA), Eburru Community Forest Association
11. KWS
12. Pastoralists
13. WRMA
14. Commercial users (KenGen, ranching, Dairy farmers)
15. Industry (KCC, Keroche IND. Fai AMARIOS Winery, e.t.c)
16. Small scale farmers (People in villagers
17. Commercial irrigators (Flowers growers, Vegetable growers)
18. NGOs (Local and international CSOs, CARE, WWF, LNRA, Elsa mere, World vision, Reconcile, Care international, WSUP, Green Belt, Reconcile, NAWACOP, SIAN, KEPAWU, Central Landing, Tarambete Landing, South Lake landing CEPAD, etc.
19. Provincial administration
20. Public health
21. Ministry of planning (Economic)
22. Sports and leisure
23. KARI
24. Business people (shops and supermarkets etc.
25. Ministry of public works (contractors' roads, housing etc.)
26. Nakuru wildlife forum (conservancy)
27. Kenya National Fisher folks Association
28. Drilling Companies
29. CDF/LATF
30. Research institutions - ITC the Netherlands, UoN, Egerton, U of Leicester
31. Ndorobo community -Eburru forest
32. Kenya Pipeline Co. Ltd
33. Ministry of Environment and NAT Resources
34. Slaughter houses
35. Politicians
36. Other WRUA's (Upper Catchment)
37. RAMSAR
38. Kenya Flower Council, FPEAK,

- 39. Ministry of Finance,
- 40. Ministry of Trade
- 41. NAIVAWAS
- 42. W.S.T.F

Stakeholder analysis using the Penn diagram

