



Habarow-Saka Adapted Sub-Catchment Management Plan, Garissa County



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Habarow-Saka Adapted Sub-Catchment Management Plan, Garissa County

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Acronyms

ASALs	Arid and Semi-Arid Lands
CDF	Constituency Development Fund
FaIDA	Fafi Integrated Development Association
IUCN	International Union for Conservation of Nature
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forest Research Institute
KFS	Kenya Forest Service
KTB	Kenya Tourism Board
KWS	Kenya Wildlife Service
LATF	Local Authority Transfer Fund
MoA	Ministry of Agriculture
MoLD	Ministry of Livestock Development
MoL	Ministry of Lands
MoE&MR	Ministry of Environment and Mineral Resources
MoE	Ministry of Education
MoPHS	Ministry of Public Health and Sanitation
MoPV	Ministry of Planning and Vision 2030
MoPW	Ministry of Public Works
MoR	Ministry of Roads
MoWI	Ministry of Water and Irrigation
WRMA	Water Resource Management Authority
WRUA	Water Resource Users Association
NDMA	National Drought Management Authority
NEMA	National Environment Management Authority
NWSB	Northern Water Services Board
NRT	Northern Rangelands Trust
SCMP	Sub-catchment Management Plan
WDC	WRUA Development Cycle

Chapter 1: Introduction

1.1 Overview of Adapted SCMP Development

The Adapted Sub-Catchment Management Plan for pastoral communities in the Arid and Semi-arid Lands (ASALs) of Kenya is a working document developed through a participatory process by engaging relevant stakeholders, including Water Resource Users Association (WRUA), other resource users associations, government officials and Non-Governmental Organizations (NGOs) to effectively manage and conserve natural resources through integrated resource management. ASCMPs consider both water and land resource management components to enhance equitable and sustainable resource management for improved livelihoods of communities in sub-catchments.

The ASCMP preparation followed the WRUA Development Cycle (WDC) guide with some additions to address the particular issues associated with arid areas. ASALs face different challenges compared to more humid environments and as such require different kinds of attention. The uncharacteristic nature of ASALs is manifested in the following amongst other things:

- Unique, heterogeneous and fragile ecosystems that are prone to degradation
- Most of the land is communally owned and migration is the back bone for survival
- Poverty levels are high and communities rely heavily on natural resources for their livelihood
- There are increasing constraints to mobility as dry season fodder/forage reserves are converted to arable agriculture. Mobility is further constrained by haphazard and mushrooming settlements in pasture areas
- The spread of invasive weeds such as *Prosopis juliflora* are adversely affecting natural pastures
- Adverse impacts of climate change in recent decades that contribute to higher rainfall variability and low reliability than in the past
- Weak governance due to dysfunctional traditional /customary laws and institutions and poorly or non-functioning modern laws and institutions, leading to the proliferation of unsustainable management practices
- Poor understanding of dryland systems leading to inappropriate approaches to development.

The Habarow – Saka Sub-catchment referred to in this report as Saka Sub-catchment for which this adapted SCMP was developed, is an arid land comprising over 90% range, mainly pastoral land. Consequently, the need to integrate rangeland planning and management component into this SCMP is of paramount importance in order to ensure holistic management of resources.

The adapted SCMP is a plan that aims to ensure sustainable management of both land and water resources in the sub-catchment area in order to enhance the livelihoods of communities. The plan entails a participatory approach in both the planning and management of resources. It is designed to ensure equitable sharing of benefits associated with the exploitation of resources, supported by effective governance mechanisms that also mainstream gender.

In order to help realise development of the adapted SCMP, experts from IUCN (from both the Water Wetlands and Drylands Programmes) and WRMA conducted a ‘Training of Trainers (ToT)’ workshop on rangeland and water management planning process for ASALs in Garissa between 22nd and 24th August 2012. The training equipped community members and relevant stakeholders on ways of integrating rangeland management planning and conventional sub-catchment management planning process aimed at allowing them to produce an all-inclusive and integrated adapted SCMP which caters for special need of dryland environment.

The adapted SCMP is a plan for five years with provision of adjustments based on prevailing conditions.

The adapted SCMP was developed through a participatory process involving all the relevant stakeholders through meetings held at Saka Al-Hamdu Hall, Saka Centre from 4th to 11th September 2012. The participants included community representatives from entire Saka sub-catchment, Saka WRUA Committee and key stakeholders including Departments of Agriculture, Livestock, Water and National Drought Management Authority, Kenya Wildlife Service (KWS), Fafi Integrated Development Association (FaIDA) and International Union for Conservation of Nature (IUCN).

Prior to starting work on chapters of the adapted SCMP, WRUA members and other stakeholders involved in SCMP preparation were sensitised and enlightened on the steps required in the development of the adapted SCMP in order to enable them understand and follow the recommended procedure. The adapted SCMP has a total of 14 chapters and various methods were used during SCMP development including:

Group work (stakeholder input): community members and other participants participated as individuals in the development of SCMP chapters by contributing ideas, providing information and acting as facilitators in some sessions

Discussion: after the content of each chapter was prepared there was a discussion session where participants gave their comments and made additions or adjustments

Transect walk/drives: based on the problems identified by community members, participants were divided into groups to visit specific sites related to each problem. Related information to location names, GPS coordinates, problem/issue, planned/possible activities to solve the problem etc. were also collected

Literature review and data collection from different departments: various literatures were reviewed to obtain relevant information to use in compilation of some sections of the SCMP. Data was also obtained from different government departments including from WRMA, the Ministry of Livestock Development, the Kenya Forest Service etc.

1.2 Objectives of the Adapted SCMP

- To improve the quantity and quality of water and land resources to enhance livelihoods
- To improve the ability of the rangeland and riparian areas within the sub-catchment to provide ecosystem services
- To improve the governance of land and water resources by promoting stakeholders participation in natural resource management (NRM)
- To enhance compliance to water, land and environmental regulations
- To develop well-governed and self-reliant WRUA and other land users.

Chapter 2: Overview of Sub-Catchment

The chapter summarizes the resources within the catchment, threats affecting them and the effects, affected and solution options.

The Saka Sub-catchment (Figure 1) lies in the Saka Division, Balamabala District, Garissa County. The sub-catchment covers Saka Division with two locations, that is, Daley and Saka. The catchment covers an area of 748.1 km² and is settled by Kenya Somali pastoralists and agro-pastoralists whose survival is heavily dependent on natural resources both within and outside the sub-catchment boundary. Neighbouring communities also have access to the resources in the Saka area, such as pasture and water resources.

Saka is endowed with riparian forests and woodlands, a permanent river (Tana River) and many seasonal rivers locally known as “Laghas”, seasonal shallow wells, farmlands, livestock, wildlife, fodder and pasture and minerals (sand, stones, gravels). Natural resources are the life line of the Saka community as well as some of the neighbouring populace and there is thus a need to effectively and sustainably manage these resources for the wellbeing of the population. Livestock is the backbone of the economy with limited sources of income also from crop production and small scale business.

The Saka community is actively involved in management of natural resource in various ways. The sub-catchment has a WRUA in place whose mandate is to sustainably manage water and other natural resources. The WRUA’s membership is voluntary and currently consists of people from varied backgrounds including pastoralists, agro-pastoralists, traders and women. The WRUA works closely with various line ministries and government agencies, in particular WRMA and Ministry of Water. IUCN, in partnership with WRMA and FaIDA, also works with the WRUA; this work is focussed mainly in enhancing their capacity on natural resource management and resource governance through strengthening of traditional institutions and laws on resource use and management, as well as initiating activities that build community resilience to drought and curtail environmental degradation

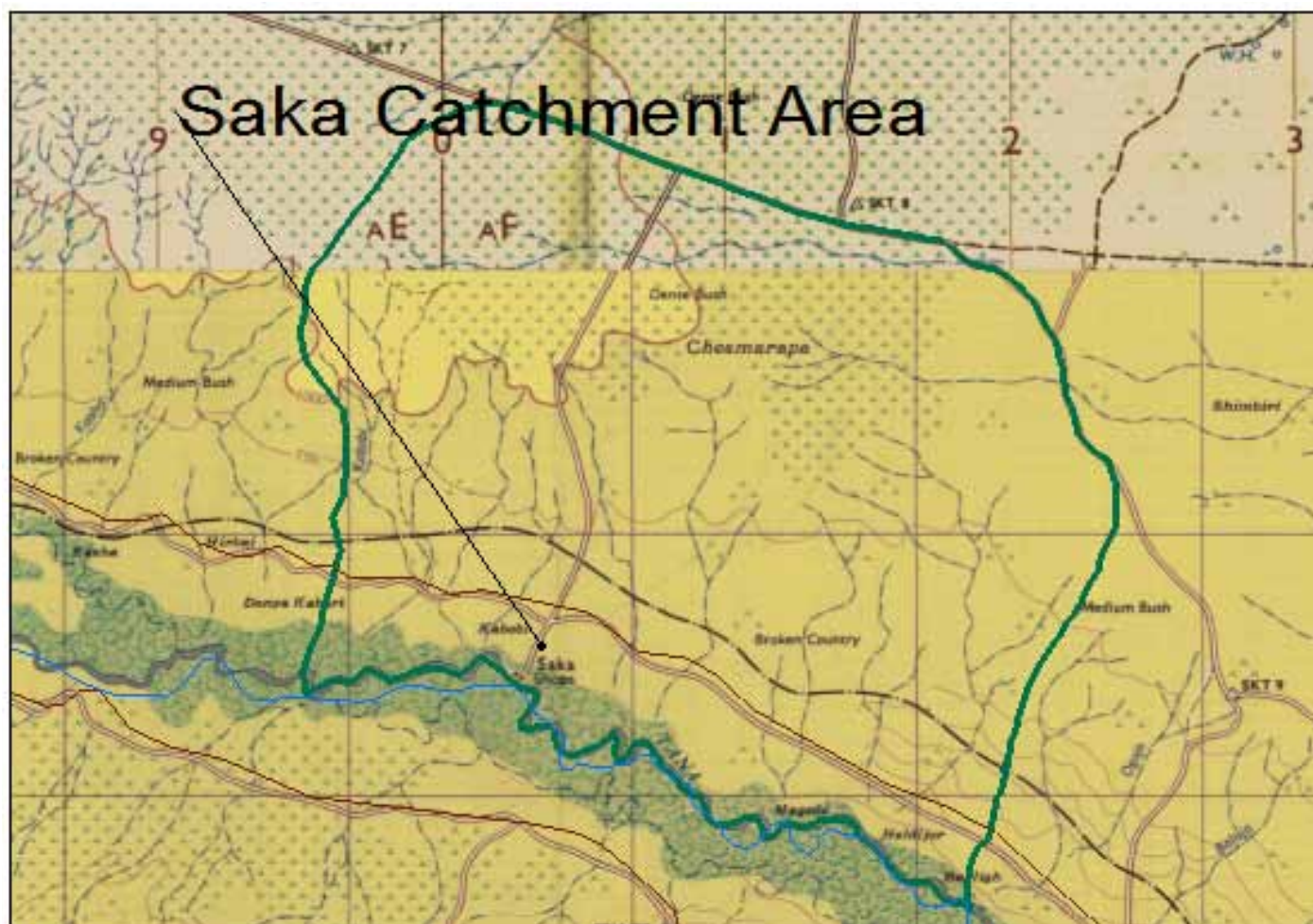


Figure 1. Hydrological map of Saka Sub-catchment (Source WRMA Garissa Office, 2012)

An integrated land and water resources management approach provides a suitable platform for a sustainable management approach, including allocation and monitoring of resources to meet the communities' social, economic and environmental needs. SCMP preparation is pinned on the principles of integrated land and water management approaches in order to achieve the results desired by all the stakeholders involved. Although the area has vast natural resources there are a myriad of socio-economic and environmental challenges facing communities of the sub-catchment and their environment adversely affecting their wellbeing. These problems affect the wellbeing of communities in the Saka sub-catchment. The forests and woodlands are threatened by deforestation, wildfire, drought, overgrazing, charcoal burning, soil erosion and conversion to croplands and mushrooming and haphazard settlements. The effects, affected and solution options are Annex 1.

The rivers are vulnerable to river diversions, change of river course, floods and river bank erosion. Other pressures in the use the resource include destruction of farmlands, crocodile menace, mosquito infestation and spread of *Prosopis juliflora* (Mathenge) invasive weed. The effects, affected and solution options are Annex 2.

Farmlands are exposed to human-wildlife conflicts, inadequate irrigation infrastructure, flush floods, destruction of crops and other properties, lack of fence and protection, pest and diseases, inadequate capacity on crop production, frequent breakdown of water pumps, pastoralist-farmers conflicts, poor roads and poor market for farm produce. The effects, affected and solution options are Annex 3.

Livestock challenges constitute pests and diseases, predators (e.g. hyenas, crocodile, baboons and lions), drought, poor markets, inadequate extension services (e.g. veterinary services), wildfire caused by charcoal burning (leading to destruction of fodder, pasture and injuries to animals), inadequate pasture, influx from neighboring villages, obstruction of watering corridors, conversion of pasture land into farmlands and inadequate water for livestock use. Detailed are in Annex 4.

Wildlife resource is abundant within the sub-catchment but is constrained by inadequate water, pests and diseases, loss of habitat to crop farming and settlements, increased human-wildlife conflicts and no direct income from wildlife. Wildlife such hyenas and crocodiles feed on livestock, elephants and hippos destructs crops and fruits and is causing human death and disabilities. Detailed are in Annex 5.

Fodder and pasture is seasonal in nature and the constraints and threats related to it include frequent drought, wildfire, overgrazing, de-vegetation, clearance for mushrooming settlement and inland water sources, invasive weeds e.g. *P. juliflora*, inadequate water to access far away pastures, livestock influx especially those for Garissa market and wildlife-livestock conflict especially during the dry spell. The effects, affected and solution options for fodder and pastures are Annex 6.

Minerals (sand, cement like material, stones, hardcore and gravels) within the sub-catchment are faced by water erosion (especially sand), poor management and markets and inadequate skills to exploit. Detailed are in Annex 7.

The threats related to shallow well resources are collapsing of walls causing deaths and injuries, water from the source are polluted and contaminated, wildlife – human - livestock conflict and human to human conflicts for the use of the resource, spread and transmission of pest and diseases, “lagha” sedimentation filling shallow wells with eroded materials and the digging of the resource is labor intensive. The effects, affected and solution options are Annex 8.

In the course of the SCMP preparation, communities and other stakeholders identified various potential interventions, the individuals or institutions to involve and the resources required to overcome the challenges. The details are covered in Chapter 4 and subsequent chapters.

Chapter 3: Catchment Characteristics

Baseline on current status and management of water and land resources

The chapter provides baseline details on current status and management of water and land resources including community mapping, the identified management units and the current status of the available natural resources within the catchment and how they are used and managed. The chapter ends with problem ranking within Saka and matrix to overcome the challenges in obtaining data for planning of sustainable natural resource management (NRM).

3.1 Community resource mapping

In order to get an accurate picture of baseline conditions, especially the nature and location of natural (including water) resources, community members drew resource maps of the sub-catchment. Such 'community resource maps' were used as an important data gathering tool as they help show the status of resources, as well as the issues/challenges that negatively affect them. They also provide information on how best to manage them, and give understanding on the common resources that require protection from all community members. Finally, such maps also allow others to know what resources their sub-catchment is endowed with.

The maps reflect community resource boundaries as opposed to administrative ones. They also show agreed management units, mobility (pattern of the livestock movement during dry and wet seasons) to access pasture and water, water sources; wet and dry season pastures; minerals resources; crop farming; influx patterns; roads; settlements; threats and the nature and location of existing management practices. Community maps are also an important tool to aid in understanding landscape level planning and management in pastoral set ups.

Locally available materials (grass, leaves, stones, soil, disposed containers, vegetables, ash, animal dung etc.) were used to prepare the maps on the ground by three groups (women, elders and youth) (Plates 1) before transferring them on to paper (Plate 2) for plenary discussion and verification with the community. Further, transect drives and walks by technical staff and community resource experts were used to confirm the status map.

3.2 Water and land management units

Saka Sub-catchment falls within the management unit 4GB and consists of three resource management units: pastoral zone, which is estimated to cover 80% of land, agro-pastoral zone 18% and settlement zone 2% (Plate 3). The resource management units were defined and agreed with the community.

The pastoral unit consists of communal grazing areas away from the River Tana and is mostly used during the rainy seasons. The zone is freely used by all members of the community plus those from neighboring communities. Additionally, wildlife simultaneously uses the zone with livestock. Consequently, it's prone to overgrazing, de-vegetation, wild fire, human-wildlife conflict and general environmental degradation. As dry season approaches water becomes a constraint and livestock herds plus wild animals migrate to the agro-pastoral zone while other members of the community search for casual jobs in the settlement zone.

Agro-pastoral unit consists of flood plains and cover 2-3 km stretch from the banks of the River Tana towards the hinterland. The zone locally known as "Bada or Goosh" is covered by luxuriant *Acacia tortilis* forest with intermittent individually or group owned crop lands. The natural vegetation is managed by elders based on unwritten but agreed by-laws and supported by the government chiefs. Despite these efforts, the land unit is threatened by deforestation, charcoal burning, overgrazing and human-wildlife conflict.

Settlement zone consists of 11 mushrooming and haphazard settled centres formed by pastoral dropouts and business persons and they are the main market outlets for pastoral and agro-pastoral products. The major constraints include lack of physical planning, polythene menace, insufficient quality water for domestic use, inadequate capacity to handle and process products and conflict over land ownership (plots).



Plate 1(a) Map by elders

Plate 1(a) Map by women

Plate 1: Community resource maps of Saka Sub-catchment on the ground by elders and women

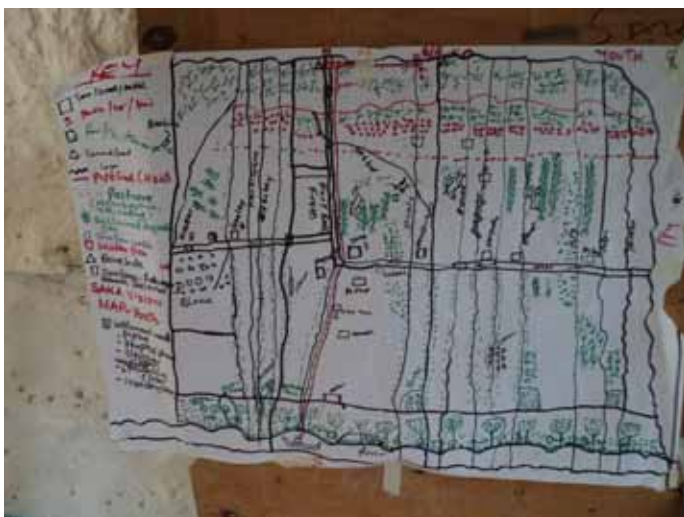


Plate 2a Map by Youth

Plate 2b Map by Women



Plate 2c Map by Elders

Plate 2: Community resource maps of Saka Sub-catchment on paper

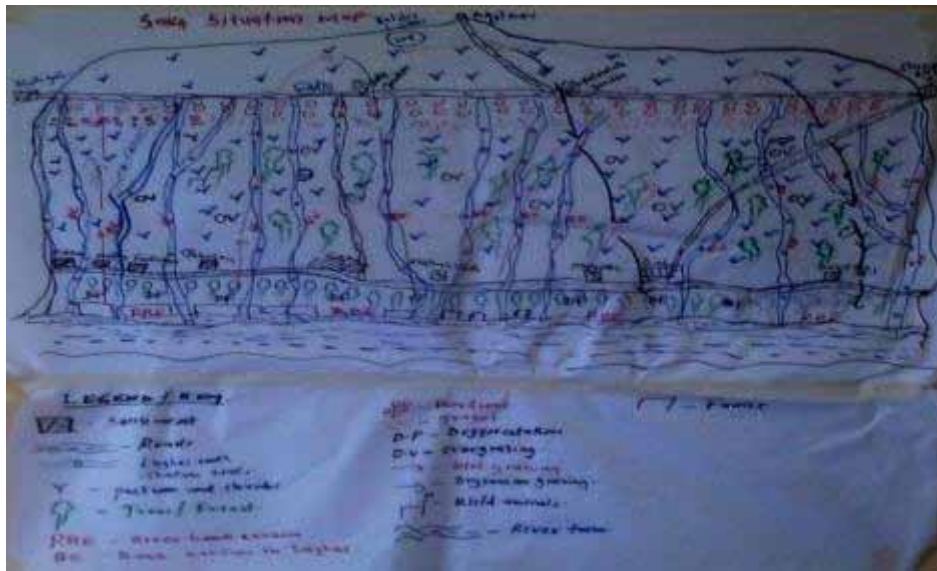


Plate 3: Current status/situation map and resource management units as defined by Saka Community

3.3 Current status of resources

Climate and weather conditions

Saka is situated in an arid area. For the past decades rainfall in Saka has been irregular and erratic leading to recurrent droughts and flush floods. Mean annual rainfall is estimated at 300mm. The long rains occur April and May and the short rains between November and December. Mean annual temperature is approximately 30oC while annual evaporation is estimated at over 2,000 mm. January and February are the hottest months and June - July the coldest.

Hydrology

The sub-catchment is blessed to have the River Tana that forms Saka’s southern border (Figure 1) and has over 10 seasonal rivers (laghas) with the major ones being Habarow and Fadiwayne. Many shallow wells are located along the laghas mainly used for watering small stocks and occasionally for human consumption. There are four water pans located along northern border and are mainly used in rainy seasons though some have rarely impound water because of poor site location and inlets. Water tankering is another source of water for populations in North Saka especially in drought periods. Slopes are generally flat with gentle increase towards the north.

There is water scarcity in the sub-catchment and this often results in human-wildlife conflict over water resources due to competition mainly around open water sources. Defecation and urination by wildlife and livestock also causes water pollution to open water sources. Currently, the Saka sub-catchment has no water allocation plan in place.

Geology and soils

The dominant soil type in the sub-catchment is sandy (reddish or whitish) derived from sedimentary rocks with slight variation in areas along the rivers that have alluvial soils (a mixture of loam, sand and clay) as a result of periodic floods.

Land use

Community mainly practices nomadic pastoralism where their livestock depends on free access to pasture and fodder. Currently there is no planned wet and dry season grazing system in place although wet season grazing is concentrated away from the river and vice versa in dry seasons to avoid tsetse fly infestation and to minimize adverse impacts of floods within the river flood plains. The pasture and fodder resources are utilized by Saka Community and other migrant pastoralists from neighboring villages and divisions. There are few incidences of conflict reported on resource use but there are concerns that livestock for Garissa Livestock Market is causing overgrazing.

Crop and agroforestry irrigation farming is practiced partly along the River Tana. Pastoralist-farmer conflicts and human-wildlife are not uncommon especially in dry seasons.

There are over 10 haphazard and mushrooming settlements within the sub-catchment mostly along the River Tana. These settlements are recent and are as a result of recurrent droughts that wiped out livestock forcing many pastoral dropouts to settle in order to attract food aid, try petty business and crop farming as the last alternative. The settlements also houses vulnerable members of pastoralists as able bodied members herd the few remaining livestock.

3.4 Existing management practices

Saka Community is actively involved in the management of natural resources through traditional norms and elders although weakened over time. Community elders are involved in giving advice on resource use and heavily on conflict resolution.

The Sub-catchment has a WRUA since 2011 whose mandate is to sustainably manage water and other natural resources. The WRUA is a registered association with Ministry of Gender, Children Social Development on 16th February 20011 with certificate number 139174 and with Office of the Attorney General with receipt number SOC/61255 of 8th July 2011. There are over 90 members mostly representing different community institutions and more are registering with time. The WRUA's membership is voluntary and currently consists of people from varied backgrounds including pastoralists, traders and women. The WRUA work closely with various government agencies in particular with WRMA, Ministries of Water and Irrigation (MoWI), Livestock Development and Agriculture and CARE. IUCN, in partnership with WRMA and FaIDA, also works with the WRUA; this work is focussed mainly in enhancing their capacity in natural resource management and resource governance through strengthening of traditional institutions and laws on resource use and management, as well as initiating activities that build community resilience to drought and curtail environmental degradation.

Currently the WRUA is tasked with water management and conservation plus environmental protection in general. However, the WRUA will upscale their mandate to include pasture and fodder management, wildlife and other natural resources. Community members using the WRUA as a platform will engage with government departments and other partners on issues around management, protection, efficient use of resources, reporting and apprehending of criminals/those who break agreement and norms on resource use.

Communities practice a pastoralism life style where their livestock and those of neighbouring communities depend on free access to pasture and fodder. There have been minor incidences of conflict over use of resources between pastoralists and agro-pastoralists. In 2005, the community with the support of the area chiefs set up committee of elders and unwritten by-laws to support resource conservation especially in the "Bada or Goosh" (riparian Acacia forests). Some of the rules include no cutting of leaving trees and no more farms and new settlements within in the "Bada" and south the Garissa – Balamabala Road. When the WRUA was formed in 2011, the above mentioned elders joined the new structure to continue with the conservation efforts.

Forest and woodlands resources

Saka sub-catchment is covered with luxuriant riparian Acacia forest along the Tana River and *Acacia - Commiphora* woodlands on the plains. The resource is protected using by-laws set by the community and it's estimated to be about 40% of the land cover. The major vegetation are *Acacia tortilis* and *A. elatior* along the Tana River and *A. tortilis*, *A. mellifera*, *A. senegal*, *A. reficiens*, *Delonix elata*, *Terminalia orbicularis*, *Boscia* spp, *Boswelvia neglecta*, *Commiphora erythrea* and *C. africana* on the plains. Non-wood products such as gums, resins, honey, pods and thatch are also among the products derived from the forest/woodlands. The community similarly uses the forest to obtain poles for construction and fuel-wood. The biggest threats to the forest and woodlands are deforestation; charcoal burning and invasive weeds especially *Prosopis juliflora*.

Wildlife resources

Wildlife resources are plenty and available in the sub-catchment grazing/browsing freely with livestock. The flourishing status of wildlife is attributed to protection from the community. The community sees wildlife ungulates as an assurance against livestock predators such as hyena, cheetah, lion and wild dogs. They also appreciate the role of marabou stock in disposing carcasses. Others also value the role of wildlife in tourism that generates salaries for teachers, health staff and others government staff. They also associate birds in pollination and dispersal of indigenous plant species. Other community members also find wildlife to be encouraging the sprouting of natural vegetation and in providing manure for vegetation. However, threats such as settlement, habitat loss, drought and conflicts with humans exist. Saka sub-catchment has endangered and threatened species e.g. Wild Dogs (*Lycaon pictus*), African Elephant (*Loxodonta africana*), African Lions (*Panthera leo*) and Grevy's Zebra (*Equus grevyi*). Common wildlife species found in the sub-catchment include: Somali Ostrich (*Struthio camelus molybdophanes*), Reticulated Giraffe (*Giraffa camelopardalis reticulata*), hippopotamus (*Hippopotamus amphibious*), Lesser Kudu (*Tragelaphus imberbis*), Plain Zebra (*Equus quagga*), Aardvark (*Orycteropus*

afér), Genet Cat (*Genetta* sp.), African Civet Cat (*Civettictis civetta*), White Tailed Mongoose (*Ichneumia albicauda*), Spotted Hyena (*Crocuta crocuta*), leopard (*Panthera pardus*), cheetah (*Acinonyx jubatus*), Black-backed Jackal (*Canis mesomelas*), African Wildcat (*Felis sylvestrus lybica*), Honey Badger (*Mellivora capensis*), Velvet Monkey (*Chlorocebus pygerythrus*), Olive baboons (*Papio anubis*), African Hedgehog (*Atelerix albiventris*), bats, Ground Squirrel (many species), Lesser Bush Baby (*Galago senegalensis*), spring hare (*Pedetes capensis*), crocodile (*Crocodylus niloticus*), gerenuk (*Litocranius walleri*), dik-dik (*Madoqua kirkii*), warthog (*Phacochoerus africanus*), tortoise (*Geochelone sulcata*), porcupine (*Hystrix cristata*), as well as many different kinds of snakes and numerous bat and bird species.

Livestock resources

Livestock is the main asset of communities living in Saka. Communities rear different kinds of livestock with the main ones being camels, cattle, goats, sheep, donkeys and poultry (Table 1). Almost every household depends on livestock for subsistence and as a source of income. It is estimated that livestock contributes to 95% of food production and income in the sub-catchment. In recent years the livestock resource has been affected by severe and recurrent droughts weakening herd and eventually causing death in some instances thereby, leading to loss of livelihoods.

Water resources

The water resources in the sub-catchment include permanent and seasonal rivers (Laghas), shallow wells, water pans and natural ponds. There is one permanent river (River Tana), 15 Laghas and about 75 seasonal shallow wells situated at interval of about half kilometer along the major Laghas. In rainy season, it is estimated that a single shallow well can sustain thousand herds a day for a period of two months. The water resource is threatened by pollution, contamination, conflicts, fencing and recurrent drought. The major uses of water in the sub-catchment are domestic use, livestock use and crop farming.

A part from livestock, other major water uses are for domestic (communities, schools, health facilities and mosques) and crop irrigation in farms.

Farmlands

Some community members practice crop and agroforestry farming along the River Tana with most being small scale farms. They are 25 registered group farms. Watering of farms is usually done manually though pump sets are used in some of the farms. The crops and fruits grown include maize, tomatoes, watermelon, mangoes, onions, bananas, pawpaw, kales (Sukuma wiki), and capsicum (Pilipili hoho) (Table 2).

Pasture and fodder resources

Pasture and fodder resources are vital component for the pastoral community. The pasture zone cover about 90% of the sub-catchment and dominated by grasses (*Aristida* spp, *Eragrostis* spp, *Tetrapogon* spp) legumes and shrubs (*Indigofera* spp, *Tephrosia* spp, *Seracocomopsis pallida*, *Ipomea donaldsonii*, *Cordia* spp, *Anistosis tannensis*, *Acacia* spp, *Duospermum* spp) while the riparian forest mainly of *A. tortilis* are vital for fodder accessibility and nutrition especially in dry seasons. It's estimated that a single *Acacia tortilis* tree can produce 10 kg of pods per season or 20 kg per year. Unfortunately, some perennial palatable species such as *Chrysopogon aucheri*, *Chloris roxburghiana*, *Sporobolus helvolus*, *Dactyloctenium aegyptium*, *Entropogon macrostachyus*, *Litepes senegalensis* and *Bleriperisperum* spp have disappeared/over exploited due to overgrazing/over browsing. Farms along the River Tana also provide crop stovers, fodder from agroforestry tree leaves and some grow grasses (mainly Sudan Grass) through irrigation for livestock. Pasture and fodder are important to the livestock enterprise, however this resource is threatened by overgrazing, overstocking and climate change.

Regrettably, traditional grazing plans have been abandoned. There are also no distinctive rules and regulations on wet and dry season grazing and regulations that separate the use of resources by local community and outsider groups.

Table 1 Estimated livestock population in Saka Sub-catchment

Livestock	Population
Camel	71,450
Cattle	94,040
Goats	260,800
Sheep	107,000
Donkeys	16,000
Hives –Langstroths	88
Hives-KTBH	372
Hives-local	560
Poultry	3,200

Source: District Livestock Production Office, Balambala (2012)

Table 2 Estimated yields of crops/fruits grown in Saka Sub-catchment

Crop/vegetable/fruits	Estimate production (tons/year)
Tomato	130
Watermelon	4.5
Mangoes	20
Onion	120
Banana	120
Pawpaw	3
Sukuma wiki	0.5
Pilipilihoho	0.5
Maize	560

Source: District Agricultural Office, Balambala (2012)

Minerals

The minerals found in the sub-catchment include sand, cement like stones most probably “mudstone”, stones/hardcore and gravel. There could be other precious minerals but no exploration has been conducted to ascertain the type of minerals, their quantity and quality. The level of exploitation is very low due to inadequate skills and lack of investment. However, sand and soil are harvested for shelter but the degradation resulting from such exploitation is minimal therefore, not alarming. However, stringent measures need to be put in place to avoid widespread land degradation in future.

Table 3 Estimated population of Saka Sub-catchment

Location	Population			Household no.	Area (km ²)	Density (persons/km ²)
	Female	Male	Total			
Saka	2,673	2,338	5,011	913	531.9	9
Daley	1,036	868	1,904	342	216.2	9
Total	3,709	3,206	6,915	1,255	748.1	

Source: Kenya National Bureau of Statistics (2009)

3.5 Population and settlement

The sub-catchment is estimated to be inhabited by approximately 7,000 people with density of nine persons per km (Table 3)

3.6 Problem identification and ranking

Problem identification and pairwise ranking was conducted with the community. The ranking was based on the severity and extent of the problems as perceived by the community (Table 4). Deforestation was perceived to be the most severe and polythene bag menace the least.

Table 4: Ranking Natural resource related problems in Saka Sub catchment

Problem	DF	WFR	OV	DR	SE	PB	Score	Rank
Deforestation (DF)	5	1	1	1	1	1	5	1
Wildfire/charcoal burning (WFR)	0	4	1	1	1	1	4	2
Overgrazing (OV)	0	0	3	1	1	1	3	3
Drought (DR)	0	0	0	4	1	1	2	4
Soil erosion (SE)	0	0	0	0	5	1	1	5
Polythene bags (PB)	0	0	0	0	0	6	0	6

Additionally, problem identification and ranking was done for each existing resource in the sub-catchment and are listed below:

Problem identification and ranking for river related issues

1. Change of river course
2. Floods and related problems e.g. mosquito infestation, pollution and turbidity
3. River bank erosion
4. Crocodile menace
5. River diversion
6. Spread of *Prosopis juliflora*

Problem identification and ranking for farmland

1. Destruction /lack of irrigation infrastructure
2. Flash floods
3. Human-wildlife conflicts arising from no/lack fence and protection to control entry of wildlife as well as livestock
4. Poor market
5. Poor roads
6. Inadequate capacity on crop production
7. Frequent breakdown of pumps
8. Pastoralist encroachment to farms
9. Pests and diseases

Problem identification for pasture/fodder and forests/woodlands

1. Fire
2. Frequent droughts
3. Mushrooming of settlement and water sources
4. De-vegetation/deforestation
5. Overgrazing
6. Livestock influx especially those for Garissa Market
7. Inadequate water to access pasture
8. Invasive weeds e.g. Prosopis
9. Wildlife and livestock conflicts especially during the dry spell

Problem identification for wildlife

1. No direct benefit from wildlife
2. Human-wildlife conflicts including destruction of farm products, human deaths and livestock
3. Inadequate water
4. Conversion of pasture to farms
5. Pests and diseases

Problem identification for livestock

1. Drought
2. Pests and diseases
3. Inadequate extension services
4. Poor market
5. Inadequate pasture due to overgrazing, deforestation and charcoal burning
6. Predators
7. Conversion of pasture into farmlands
8. Closure of watering corridors

Generally there is little baseline information on natural resource status and related activities that influence conditions of resources. To gain more information on the current status of the natural resources that will enhance sound management, community members and other stakeholders involved in SCMP preparation identified certain areas that need gathering of baseline information (Table 5). The budget for the various proceeding chapters (in Kenya Shillings – Kshs) consists of lump sum estimates including transport, inputs, per diems, stationery and expertise costs.

Table 5: Planned matrix for catchment characteristics

Target: Obtain adequate natural resource data

Overall output: Reliable current natural resource data

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
Deforestation/ De-vegetation	Baseline survey to establish the extent of deforestation	Community sensitisation (Transport, Expertise, Stationery, Lunches)	<ul style="list-style-type: none"> WRUA WRMA IUCN FalDA KFS NDMA Administration Community 	Sensitization report	Report successfully completed and accepted	Oct 2012	In all resource management units	100,000
		Design of field methodology and data collection	<ul style="list-style-type: none"> KFS WRMA IUCN FalDA WRUA NDMA 	Deforestation assessment report	Successfully completed and accepted report. Detailed data on species cut, amount of biomass deforested and for what purpose	Nov 2012– March 2013	In all resource management units	300,000
		Share deforestation report with WRUA and community (Transport, Expertise, Stationery, Lunches)	<ul style="list-style-type: none"> KFS WRUA IUCN FalDA NDMA NEMA WRMA Administration Community 	Workshop report	Report successfully completed and accepted	May 2013	Saka Centre	100,000
Sub-total								500,000
Charcoal burning	Charcoal survey	Community sensitisation	<ul style="list-style-type: none"> KFS WRUA WRMA IUCN FalDA NDMA Administration County Council Community 	Sensitization report	Report successfully completed and accepted	Oct 2012	In all resource management units	100,000
		Design and conduct charcoal survey	<ul style="list-style-type: none"> WRUA KFS IUCN FalDA NDMA NEMA WRMA 	Charcoal assessment report	<ul style="list-style-type: none"> Successfully completed and accepted report Detailed data on preferred species, volume harvested 	December 2012 – January 2013	All resource management units	300,000
		Share charcoal survey report with WRUA and community	<ul style="list-style-type: none"> WRUA KFS IUCN FalDA NDMA NEMA WRMA Administration Community 	Workshop report	Report successfully completed and accepted	March 2013	Saka Centre	100,000
Sub-total								500,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
Mining	Conduct geological survey	Community sensitisation	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA Mines & Geology Administration County Council Community 	Sensitization report	Report successfully completed and accepted	Oct 2012	All resource management units	100,000
		Design and conduct geological survey including mapping	<ul style="list-style-type: none"> Consultant Mines & Geology WRMA IUCN FaIDA WRUA Mines & Geology WRUA Consultant Mines & Geology 	Geological/ mining survey report	Detailed data on the minerals found in the sub-catchment and economy of exploitation/ use	November 2012– March 2013	In all resource management units	8,000,000
	Share geological survey report with WRUA and community	<ul style="list-style-type: none"> KFS IUCN FaIDA NDMA NEMA WRMA Administration Community 	Workshop report	Report successfully completed and accepted	May 2013	Saka Centre	100,000	
	Sub-total							
Overgrazing	Conduct pasture survey	Community sensitisation on pasture status & livestock influx	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA NDMA MoLD Administration County Council Community 	Sensitization report	Report successfully completed and accepted	February 2013	Pastoral and agro-pastoral units	100,000
		Design and conduct pasture survey including mapping & status	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA NDMA MoLD 	Pasture status report	<ul style="list-style-type: none"> Survey successfully completed and reports accepted Detailed data on the pasture status in the sub-catchment and causes of degradation 	March - May 2013		300,000
		Design and conduct impact assessment of influx of livestock for Garissa Market on resources within the sub-catchment	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA MoLD 	Impact report on influx of livestock for Garissa market	<ul style="list-style-type: none"> Surveys successfully completed and reports accepted Detailed data on the pasture status in the sub-catchment and causes of degradation 	June – August 2013		300,000
		Share with community pasture status and impact of livestock for Garissa Market reports	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Oct 2013	Saka Centre	100,000
Sub-total								800,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
Lack of data on water resources	Baseline survey on water resources (ground and surface water)	Community sensitisation	<ul style="list-style-type: none"> WRUA WRMA MoW&I NDMA IUCN FaIDA Administration Community 	Sensitization report	Report successfully completed and accepted	March 2013	All resource management units	100,000
		Water resources (ground and surface water) survey for both quantity and quality	<ul style="list-style-type: none"> Consultant WRUA WRMA MoW&I IUCN FaIDA 	Water resources assessment report	<ul style="list-style-type: none"> Successfully completed and accepted report Detailed data on location, volume, seasonality etc of surface and ground water 	April-June 2013		500,000
		Share with community water sources status report	<ul style="list-style-type: none"> WRUA Consultant IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	August 2013	Saka Centre	100,000
Sub-total								700,000
Change of river course	Study on causes of river course change	Community sensitisation	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA MoLD MoA MoW&I Administration Community 	Sensitization report	Report successfully completed and accepted	February 2013	Pastoral and agro-pastoral units	100,000
		Design and conduct river course change	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA MoLD MoA MoW&I 	Change of river course report	<ul style="list-style-type: none"> Surveys successfully completed and reports accepted Detailed data on causes of river course change 	March – May 2013		300,000
		Share with community river course change report	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	July 2013	Saka Centre	100,000
Sub-total								500,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
River bank erosion	Study causes of banks erosion	Community sensitisation	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA KENGEN Land and Reclamation MOLD MoA MoW&I Administration Community 	Sensitization report	Report successfully completed and accepted	April 2013	Pastoral and agro-pastoral units	100,000
		Design and conduct causes of river erosion	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA 	Causes of river change report	<ul style="list-style-type: none"> Surveys successfully completed and reports accepted Detailed data on causes of river bank erosion 	May – July 2013		300,000
Sub-total								400,000
Floods	Flood assessment and causes	Community sensitisation	<ul style="list-style-type: none"> WRUA KENGEN WRMA IUCN FaIDA Land Reclamation Department MoW&I MoA MoPHS NDMA Community Administration 	Sensitization report	Report successfully completed and accepted	March 2013	Agro-pastoral unit	100,000
		Design and conduct assessment, impacts and causes of floods	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA MoPHS NDMA 	Flood assessment report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on impacts of floods and their causes 	May – July 2013		300,000
		Share with community river bank erosion and flood reports	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Community Administration 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								500,000
Pollution	Analysis of the quality of water from all sources	Community sensitisation	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA MoPHS National Water Board Services (NWBS) Government Laboratory Administration Community 	Sensitization report	Report successfully completed and accepted	April 2013	All resource management units	100,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
		Design and conduct quality assessment and implications	<ul style="list-style-type: none"> • Consultant • WRMA • WRUA • IUCN • FaIDA • MoPHS • NWBS • Government Lab 	Water quality report	<ul style="list-style-type: none"> • Quality analysis successfully completed and report accepted • Detailed data on quality of water from all sources within the sub-catchment and their implications 	May – July 2013	All resource management units	500,000
		Share with community pollution report	<ul style="list-style-type: none"> • WRUA • Consultant • IUCN • FaIDA • NDMA • NEMA • WRMA • KFS • Administration • Community 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								700,000
Crocodile menace	Effects of crocodile on people and livestock	Community sensitisation	<ul style="list-style-type: none"> • WRUA • MoLD • MoA • Administration • KWS • IUCN • FaIDA • WRMA • Community 	Sensitization report	Report successfully completed and accepted	June 2013	Agro-pastoral unit	100,000
		Design and conduct survey to assess impacts of crocodile on people and livestock	<ul style="list-style-type: none"> • MoLD • MoA • WRUA • KWS • IUCN • FaIDA • WRMA 	Survey report	<ul style="list-style-type: none"> • Survey successfully completed and report accepted • Detailed data on effects of crocodile on humans and livestock and their implications documented 	June-July 2013		300,000
		Share with community crocodile menace report	<ul style="list-style-type: none"> • WRUA • IUCN • FaIDA • NDMA • NEMA • WRMA • KFS • Administration • Community 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								500,000
Wildfire	Assessment of causes and control of wildfires	Community sensitisation	<ul style="list-style-type: none"> • WRUA • MoLD • Administration • KFS • Pastoralists • IUCN • FaIDA • NDMA • Community 	Sensitization report	Report successfully completed and accepted	Oct 2013	Pastoral and agro-pastoral units	100,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
		Design and conduct assessment on causes and control of wildfires	<ul style="list-style-type: none"> MoLD WRUA KFS IUCN FaIDA NDMA 	Wildfire assessment report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on causes of wildfires and controls documented 	Nov 2013 –Jan 2014	Pastoral and agro-pastoral units	300,000
		Share with community wildfire report	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Community Administration 	Workshop report	Report successfully completed and accepted	March 2014	Saka Centre	100,000
Sub-total								500,000
Settlement	Assessment of settlement patterns	Community sensitisation	<ul style="list-style-type: none"> WRUA MoLD County Gov't/ County Council Administration IUCN NDMA Community 	Sensitization report	Report successfully completed and accepted	April 2013	Settlement, pastoral and agro-pastoral units	100,000
		Design and conduct assessment on causes and control of haphazard settlements	<ul style="list-style-type: none"> MoLD IUCN WRUA NDMA WRUA IUCN FaIDA NDMA 	Settlement pattern assessment report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on data on settlement pattern documented 	May –July 2013		300,000
		Share with community settlement report	<ul style="list-style-type: none"> NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								500,000
Invasive weed – <i>Prosopis juliflora</i> (Mithenge)	Assessment of Prosopis coverage, threat and control/management	Community sensitisation	<ul style="list-style-type: none"> MoLD KFS KEFRI NEMA WRUA FaIDA IUCN NDMA Administration MoA County Gov't/ County Council Community 	Sensitization report	Report successfully completed and accepted	March 2013	Pastoral and agro-pastoral units	100,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
Invasive weed – <i>Prosopis juliflora</i> (Mathenge)	Assessment of <i>Prosopis</i> coverage, threat and control/management	Design and conduct assessment of coverage, threat and control/management	<ul style="list-style-type: none"> MoLD KEFRI KFS NDMA IUCN WRUA MoA 	Mathenge assessment report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on data on coverage of invasive weeds, threats and management in place 	April-June 2013	Pastoral and agro-pastoral units	300,000
		Share with community <i>Prosopis</i> report	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								500,000
Inadequate irrigation infrastructure	Conduct infrastructure status and needs assessment survey	Community sensitisation	<ul style="list-style-type: none"> WRUA MoA MoWI NDMA Administration Farmers 	Sensitization report	Report successfully completed and accepted	September 2013	Agro-pastoral unit	100,000
		Design and conduct infrastructure status and needs assessment	<ul style="list-style-type: none"> MoWI MoA WRUA NDMA 	Infrastructure status and needs assessment report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on data on status of infrastructure in place 	Oct-Dec 2013		300,000
		Share with community irrigation infrastructure report	<ul style="list-style-type: none"> WRUA MoA MoWI NDMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014		100,000
Sub-total								500,000
Human-wildlife conflict	Conduct assessment survey	Community sensitisation	<ul style="list-style-type: none"> WRUA KWS MoA Chiefs Administration MoLD Community 	Sensitization report	Report successfully completed and accepted	October 2013	Agro-pastoral unit	100,000
		Design and conduct human-wildlife conflict survey	<ul style="list-style-type: none"> KWS MoA WRUA MoLD 	Human – wildlife conflict survey report	<ul style="list-style-type: none"> Assessment successfully completed and report accepted Detailed data on human – wildlife conflict in place 	Jan-March 2014		300,000
		Share with community wildfire report	<ul style="list-style-type: none"> WRUA IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	April 2014	Saka Centre	100,000
Sub-total								500,000

Problem	Activities	Sub-activity	Responsibility	Outputs	Indicators	Time frame	Where	Budget (kshs)
Poor market and roads	Market chain survey and value chain analysis	Community sensitisation	<ul style="list-style-type: none"> WRUA MoA MoLD Administration IUCN FalDA Community 	Sensitization report	Report successfully completed and accepted	Jan 2014	Garissa County and national level	100,000
		Design and conduct market value chain analysis	<ul style="list-style-type: none"> Consultant MoA MoLD WRUA IUCN FalDA NDMA 	Market survey and value chain reports	<ul style="list-style-type: none"> Survey and analysis successfully completed and report accepted Detailed data on market survey and value chain analysis in place 	Jan – March 2014		500,000
		Share with community market chain analysis report	<ul style="list-style-type: none"> WRUA Consultant IUCN FalDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	May 2014	Saka Centre	100,000
Sub-total								700,000
Total cost (kshs)								16,500,000

Chapter 4: Management approach

The chapter provides details on the management approaches that are considered appropriate for the progressive improvement of water and land management in the sub-catchment. It also explores ways of sustainably maximizing the benefits accruing from the resources that are available in sub-catchment. The management will adopt an approach where appropriate technologies and participatory processes are the main focus in the implementation of the adapted SCMP to ensure sustainability and resilience to drought. One of the key management themes of the adapted SCMP is to decentralize management activities with a view to making the WRUA and the stakeholders more responsive to the needs of their sub-catchment. This will be achieved through the following:

- Vision mapping of the management units
- Capacity build the WRUA to provide the services required to manage water and land resources.
- Sustainable NRM within a management unit to overcome the current challenges.

Saka sub-catchment is mainly suitable for livestock production. Nevertheless, irrigation farming is also practiced along the River Tana and rainfed crop farming in flush flood plains along some of the major laghas such as Qabobey and Fadiweyne. During the ASCMP development community members and other stakeholders proposed various interventions and management practices to overcome problems faced by the community. Most of the proposed activities will be spearheaded by community members with technical and financial support from government and other donor agencies. Saka WRUA is expected to mobilize community members to actively participate in implementing the proposed activities.

Objectives

- To ensure a well conserved catchment that is sufficient both in quantity and quality of water and other land resources to meet human and environmental requirement
- To ensure the local community is involved in the management, conservation and protection of the water and land resources
- To promote community resilience to drought through sustainable, equitable and efficient land and water resource management.

4.1 Participatory conservation of catchment for drought resilience

A combined community resource map was used to draw the vision map (Plate 4). The map contains proposed activities per management unit to overcome the challenges faced within the sub-catchment in the next five years. The catchment is classified as ALARM due to water scarcity, environmental degradation such as charcoal production and frequent droughts. Other challenges for each management unit are indicated below:



Plate 4: Community vision map for Saka Sub-catchment

Management units

Saka Sub-catchment falls within 4GC and consists of three resource management units: pastoral, agro-pastoral and settlement.

Pastoral unit

The pastoral unit is the largest of the three management units and it is mainly used as grazing zone for livestock and wildlife especially in wet season and normal dry spell. The major challenges were highlighted in Chapter Three.

The following are the proposed activities to combat the above challenges:

- Regulate and guide dry and wet grazing seasons to avoid overgrazing
- Enlighten on stocking rates
- Reseeding and reforestation with local species from the sub-catchment
- Improve the availability of water for livestock, domestic and wildlife
- Management of pests and diseases – including information on early warning/surveillance
- Reduce human-wildlife conflict through sensitization and awareness creation, strengthen partnership with KWS, formation of game scouts, increased corporate responsibility to communities and ecotourism promotion
- Formation/strengthen of by-laws on pasture, water, livestock and environmental management
- Infrastructure development – roads, communication network to enhance the above suggested solutions.

Agro-pastoral unit

This unit is the second largest management unit within the sub-catchment and it is mainly used as dry season grazing zone for livestock and wildlife. The zone also covers croplands dotted within the area. The major constraints were highlighted in Chapter Three.

The following are the proposed activities to reduce the severity of the above challenges:

- Formation/strengthen of by-laws on pasture, fodder and crop management
- Conservation of *Acacia tortilis* riparian forests for fodder through community forest scouts, strengthen partnership with KFS and KEFRI, afforestation and reforestation
- Protection of existing Malkas (water corridors) and advocacy for more
- River bank protection/stabilization
- Promotion fodder farming and agroforestry
- Promotion of wildlife farming and sanctuaries
- Reduce farmer-pastoralist-wildlife conflicts through electric fencing, strengthen partnership with KWS, formation of game scouts, increased corporate responsibility to communities and ecotourism promotion
- Sensitization and awareness creation
- Management and mainstreaming of conservation activities in irrigation schemes.

Settlement unit

This unit is the smallest management unit within the sub-catchment and it is mainly used as town centres and market outlets for livestock and crop products. The settlement zone consists of mushrooming and haphazard town centres formed by pastoral dropouts and businessmen. The major constraints were highlighted in Chapter Three.

The following are the proposed activities to reduce the impacts of the above challenges:

- Physical planning of major settlements
- Formation/strengthen of by-laws on environmental conservation
- Establishment of markets for livestock and crops
- Recycling of polythene bags and planned disposal of solid waste
- Promotion of natural resource based cottage industries
- Provision of clean and adequate water
- Promotion of natural resource management education.

Based on the above threats and activities the community developed work plan and budget matrix for management interventions to build resilience and enhance sustainable land and water uses (Table 6).

Table 6: Planned matrix for management approach in Saka Sub-catchment

Target: To build community resilience and enhance sustainable resource management in the sub-catchment to be spearheaded by WRUA members and other stakeholders
Overall output: The community within the sub-catchment understand the ecological, commercial and livelihood zones and appropriate mechanism to solve the existing resources challenges

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Water scarcity	Capacity building of WRUA and community members on natural resource management to solve water scarcity	Workshop on management of existing water sources (3days)	<ul style="list-style-type: none"> WRUA MoWI WRMA IUCN FaIDA Other NGOs 	Workshop report	<ul style="list-style-type: none"> Successfully documented and accepted workshop report Improved water management 	Jan 2013	Settlement zone (Saka Centre)	500,000
		Awareness raising on resource use and management under devolved system of governances (11 sensitization meetings - Barazas)	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA KFS KWS MoA MoLD NDMA MoW&I 	Awareness creation report	Successfully documented and accepted awareness report	Jan 2013	Settlement zone (in 11 centres)	600,000
Sub-total								1,100,000
Poor land use	Mapping the sub-catchment into management unit	Hold 11 Community sensitization sessions	<ul style="list-style-type: none"> WRUA WRMA IUCN FaIDA NDMA 	Awareness creation report	Successfully documented and accepted sensitization report	Feb – March 2013	Settlement zone (in 11 centres)	100,000
		Digitisation of community map (Geo-referencing, image classification, ground truthing and validation, printing and sharing with partners and community)	<ul style="list-style-type: none"> Consultant WRMA IUCN FaIDA NDMA WRUA 	Digitized map of Saka Sub-catchment management units with detailed report	Successfully documented and accepted digitized map	April 2013	All management units within the sub-catchment	1,000,000
		Share with community GIS maps	<ul style="list-style-type: none"> Consultant WRUA IUCN FaIDA NDMA NEMA WRMA KFS Administration Community 	Workshop report	Report successfully completed and accepted	June 2013	Saka Centre	100,000
Sub-total								1,200,000
Charcoal burning	Sustainable charcoal production	Awareness creation on sustainable charcoal production and management	<ul style="list-style-type: none"> KFS WRUA Community County Gov't/ County Council NEMA WRMA IUCN FaIDA NDMA 	Awareness creation report	<ul style="list-style-type: none"> Successfully documented and accepted awareness report Improved tree cover within the sub-catchment 	April 2013	All management units within the sub-catchment	100,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Charcoal burning	Sustainable charcoal production	Formation of charcoal a producers association that practice sustainable charcoal production	<ul style="list-style-type: none"> • KFS • WRUA • NEMA • NDMA • FaDA 	Registered charcoal producers associations	Successfully registered and recognized charcoal producers associations	May-June 2013	All management units within the sub-catchment	300,000
		Development of woodland/ forest management plan	<ul style="list-style-type: none"> • KFS • WRUA • Community • NEMA • WRMA • IUCN • FaDA • NDMA 	Detailed woodland/ forest management plan	Woodland management plan successfully documented and accepted	August-Sept 2013	Pastoral and agro-pastoral units	1,000,000
		Share with community woodland/forest management plan	<ul style="list-style-type: none"> • WRUA • IUCN • FaDA • NDMA • NEMA • WRMA • KFS • Administration • Community 	Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000
Sub-total								1,500,000
Overgrazing	Regulate and guide dry and wet season grazing	Community consultation meetings	<ul style="list-style-type: none"> • WRUA • MoLD • Administration • Elders • Community • KWS • IUCN • FaDA • WRMA • NDMA 	Grazing management committee (GMC) formed/strengthened to regulate dry and wet season grazing	Minutes of meetings	October every year and March every year (for 5 years)	Pastoral and agro-pastoral units	1,000,000
		Development of dry and wet grazing pattern		Seasonal grazing calendar planned and implemented by GMC	Progress reports	October every year and March every year (for 5 years)	Pastoral and agro-pastoral units	1,000,000
		Sharing dry and wet grazing pattern with community		Workshop report	Report successfully completed and accepted	Sept 2013	Saka Centre	100,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Overgrazing	Regulate and guide dry and wet season grazing	Implementation of dry and wet grazing pattern	<ul style="list-style-type: none"> WRUA MoLD KWS IUCN FalDA WRMA NDMA Elders Community Administration County Council/ County Gov't 	Planned seasonal grazing calendar implemented by GMC	Progress reports	2013 - 2017	Pastoral and agro-pastoral units	2,500,000
	Enlighten communities on the need to destock	Sensitization and awareness creation workshops	<ul style="list-style-type: none"> WRUA Administration Elders KWS MoLD IUCN FalDA WRMA NDMA 	Communities sensitized on destocking	No. of sensitization meetings	April 2013 June 2014	Pastoral and agro-pastoral units	300,000
Sub-total								4,900,000
Weak early warning system	Management of natural disasters (pests and diseases, drought)	Document the existing and traditional early warning systems	<ul style="list-style-type: none"> NDMA Met Dept MoLD MoA KWS WRUA WRMA IUCN FalDA NDMA 	Existing and traditional reports	Traditional early warnings successfully documented and report accepted	Nov 2013	Pastoral and agro-pastoral units	300,000
		Integrate traditional and modern early warning systems		Integrated traditional and modern early warning reports	Integrated traditional and modern early warning reports successfully documented and report accepted	Nov 2013		300,000
		Develop and strengthen early warning systems and surveillance		Reduced incidence of pests and diseases infestation	No. of livestock vaccinated/ treated	Continuous from October 2012- June 2017		1,000,000
		Community consultation to sensitize and agree on the number and the cost of off-take per livestock		Sensitization reports	Agreed no. of livestock for off- take	Drought years	Pastoral and agro-pastoral units	500,000
		Execution of off-take		Livestock off -take plan	Agreed no. of livestock for off- take	Drought years	Pastoral and agro-pastoral units	10,000,000
Sub-total								12,100,000
Conflict over natural resources	Strengthen existing peace committees to reduce conflict over drought periods	Training committees on conflict resolution (1 session per year)	<ul style="list-style-type: none"> Peace committee WRUA MoLD MoA KWS NDMA Administration DSG 	Training reports	Successfully documented and accepted training reports	July per year for 5 years	All management units in the sub-catchment	3,000,000
		Exposure visit for peace committees to areas with active peace initiatives		Exposure reports	Successfully documented and accepted exposure reports	One exposure after every two years		2,500,000
		Surveillance by peace committees and conflict resolution meetings		Surveillance and meeting reports	Successfully documented and accepted surveillance and meeting reports	Two surveillance and meetings per year		1,000,000
Sub-total								6,500,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Human – wildlife conflict	Reduce human-wildlife conflict	Human-wildlife conflict resolution meetings	<ul style="list-style-type: none"> WRUA WRMA KWS NDMA KFS MoLD MoA IUCN FaDA 	Reduced incidence of human-wildlife conflicts	<ul style="list-style-type: none"> No. conflicts avoided No. of meetings executed to resolve conflict 	June – October per year February – March per year (2013-2017)	Pastoral and agro-pastoral units	1,000,000
		Sensitization on peaceful co-existence with wildlife on-farms	<ul style="list-style-type: none"> KWS IUCN FaDA WRUA WRMA Peace committee MoA 	Communities sensitized on peaceful co-existence (themselves and with nature)	No. of sensitization meetings	October 2012 – June 2017	Agro-pastoral unit	500,000
Sub-total								1,500,000
Weak customary institutions & laws for NRM	Formation/strengthen of institutions and by-laws on the management and use/resource sharing of natural resources (pasture, fodder, livestock, water and crop management and environmental conservation) by residents and outsiders	Meetings with communities and partners to formulate, develop and enforce by-laws	<ul style="list-style-type: none"> IUCN FaDA MoLD KWS KFS MoWI Administration Elders WRUA WRMA MoA Environmental committee Other NGOs 	Improved governance on pasture, livestock and environment through legalized customary institutions and by-laws	No. of by-laws developed and enforced	October 2012 – June 2017	Pastoral, agro-pastoral and settlement units	5,000,000
Weak biodiversity conservation along River Tana	Promote biodiversity conservation	Awareness creation and sensitization meetings on conservation of Acacia tortilis riparian forests "Bada" for fodder	<ul style="list-style-type: none"> KFS KWS WRUA WRMA IUCN FaDA Community Elders Administration 	Communities sensitized and forests conserved	<ul style="list-style-type: none"> Acreage of "Bada" forest conserved No. of meetings organized for "Bada" forest 	November 2012 – June 2017	Agro-pastoral unit	1,000,000
		Trainings on fodder farming and agroforestry on-farms	<ul style="list-style-type: none"> WRUA MoA WRMA IUCN FaDA NEMA KFS CDF LATF 	Fodder and agroforestry promoted on farms	<ul style="list-style-type: none"> No. of trainings on fodder and agroforestry Acreage under fodder/agroforestry 	October 2012 – June 2017	Agro-pastoral unit	1,000,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Weak biodiversity conservation along River Tana	Promote biodiversity conservation	Promotion of indigenous species biodiversity conservation on-farms	<ul style="list-style-type: none"> • MW&I • MoA • WRUA • Kenya Red Cross • Adeso • IUCN • FaIDA • Farmers • WRMA • NDMA • CDF • LATF 	Biodiversity conservation promoted within group irrigation schemes	No. of schemes that promote biodiversity conservation	October 2012- June 2017	Agro-pastoral unit	1,000,000
		Recycling of poly bags and waste management	<ul style="list-style-type: none"> • WRUA • WRMA • NEMA • IUCN • FaIDA • Line ministries (HoDs) 	Waste managed and polythene bags recycled in major centres within the sub-catchment	Kgs of polythene and waste managed and recycled	July 2013 – December 2014	Settlement unit	1,000,000
Sub-total								4,000,000
Total								37,800,000

Chapter 5: Resource availability and demand

This chapter provides a description of the resource balance status within the sub-catchment with respect to availability of the resources and demand. The chapter shows that the resource balance has to consider the reserve, the future demands, and needs for conservation. The information will be used to develop resource allocation plans to identify deficit and surplus areas for improvement and to mitigate resource deficits and uses. Water and land resources are the backbone for community survival within the sub-catchment. An important concept of resource management is to match or balance the demand for resources with its availability, through suitable resource allocation arrangements. Establishing demand for resources within the sub-catchment and ascertaining the resource availability will help in planning effectively to enable community use the resources equitably and sustainably.

At the sub-catchment level, there is a large number of often competing resource needs by residents and outsiders. The main source of water for communities and their livestock are R. Tana, ponds, pans and shallow wells. Except for the R. Tana the rest of the sources are seasonal. Water and pasture use are highest in wet seasons when the sources are in plenty than in dry seasons. The current resource use especially pastures and water (in sites far from the R. Tana) may not sustain the resources in the sub-catchment (Tables 7, 8, 9, 10 and 11) and therefore freely access in neighboring villages outside the sub-catchment. Similarly, outsiders freely access pasture and water from the sub-catchment. Unfortunately, there is limited resource assessment data in order to ensure sustainable use so as to strengthen capacity to manage natural resources and source markets for natural resource products and therefore this has to be the priority (Table 12).

Demand for fuel-wood and poles for construction

The estimated 1,170 households in Saka depend on the surrounding vegetation to meet their fuel and shelter needs. Each household on average collects firewood after every two days. Distance within 2 Km radius is estimated to meet firewood demands but for poles people travel up to 5-10 km into the woodlands.

Table 7. Demand for water (Human) in Saka Sub-catchment

Location	Population in m ³			Water Demand (45l/day) in m ³ /d	Total Water Demand
	Female	Male	Total		
Saka	2673	2338	5011	0.045	225.50
Daley	1036	868	1904	0.045	85.68
Total	3709	3206	6915	0.045	311.18

Sources: KNBS (2009), WRMA (2011)

Table 8. Demand for water (livestock)

Type	Population per day	Requirement per animal (L/day) (L/day)	Total requirement
Camel	71,450	20	1,429,000
Cattle	94,040	15	1,410,600
Goats	260,800	5	1,304,000
Sheep	107,000	5	535,000
Donkeys	16,000	15	240,000
Total	552,490		4,918,600

Sources: District Livestock Production Office (2012), Mohamed et al (2009)

Table 9. Demand for water (farms)

No of farm	Approximate size in acre	Water requirement in a day (L/day)	Total water requirement (L/day)
25	25	42,870	1,071,750

Sources: DAO Balamabala (2012)

Table 10. Pasture requirement by livestock

Type	Population	Average body weight(kg)	Percentage calculation for pasture	Average Requirement per animal per day (kg/day)	Total requirement (kg/day)
Camel	71,450	400	8% body weight	32	2,286,400
Cattle	94,040	250	8% body weight	20	1,880,800
Goats	260,800	45	10% body weight	5	1,304,600
Sheep	107,000	45	10% body weight	5	535,000
Donkey	16,000	250	8% body weight	20	320,000
Total					63,26,800

Source: District Livestock Production office (2012)

Table 11. Estimated pasture and forage production in Saka Sub catchment

Pasture/forage	Average Production (Kg)	Total area less settlement (km ²) avail- able for forage and fodder	Total average production (kgs)/year
Pasture	2.5kgs per m ² per season	733.1	36,655,000
Fodder trees (excluding pods)	25 – 30 kgs per season	No data	
Acacia pods	10Kgs per tree per season	No data	
Total			36,655,000

Source: District Livestock Production office (2012)

Table 12. Resource availability and demand in Habarow - Saka Sub-catchment

Target: Establish natural resource demand and supply for Saka Sub-catchment

Overall output: Adequate data on natural resource demand and supply established

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Improve water availability for domestic, irrigation and environment	Assessment of water potential, reserve and balance for domestic, irrigation and livestock	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> • WRUA • MoWI • Chief • Elders • KWS • Community • MoLD • MoA • KFS • IUCN • FalDA • WRMA • NDMA 	Sensitization reports	Report documented and accepted	October 2012	In all management units within the sub-catchment	300,000
						January – March 2013		
						June 2013		
Sub-total				Water status report	Survey assessment successfully completed and report accepted	January – March 2013	In all management units within the sub-catchment	1,000,000
						June 2013		
Improve Pasture/ fodder availability	Assessment of pasture/fodder potential, reserve and balance for livestock and wild herbivores	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> • WRUA • Consultant • Community • IUCN • FalDA • NDMA • WRMA • Administration • Community 	Workshop report	Report successfully completed and accepted	June 2013	In all management units within the sub-catchment	300,000
						October 2012		
Sub-total				Sensitization reports	Report documented and accepted	October 2012	In all management units within the sub-catchment	300,000
						April – May 2013 and Dec 2013-January 2014		
Improve Pasture/ fodder availability	Assess quantity and quality of pasture and fodder status	Pasture/fodder status report	<ul style="list-style-type: none"> • Consultant • WRUA • KWS • IUCN • FalDA • WRMA • NDMA • KARI • KEFRI 	Pasture/fodder status report	Report documented and accepted	April – May 2013 and Dec 2013-January 2014	Pastoral and agro-pastoral units	500,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
		Share with community pasture availability, demand and reserve report	<ul style="list-style-type: none"> WRUA Consultant Community IUCN FalDA NDMA WRMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	In all management units within the sub-catchment	300,000
Sub-total								1,100,000
Land use planning	Assessment of land use/cover	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Elders KWS KFS MoLD MoL MWI IUCN FalDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2013	In all management units within the sub-catchment	300,000
		Assess current land uses/cover	<ul style="list-style-type: none"> Consultant WRUA WRMA IUCN FalDA NDMA MoL 	Digitized current and future land use/cover map	Survey successfully completed and maps accepted	October 2012 – December 2013	In all management units within the sub-catchment	500,000
		Share with community current status of land use/cover	<ul style="list-style-type: none"> WRUA Consultant Community IUCN FalDA NDMA WRMA MoL Administration 	Workshop report	Report successfully completed and accepted	Feb 2014	In all management units within the sub-catchment	300,000
Sub-total								1,100,000
	Assessment of crop and agroforestry production potential	Community sensitization meetings (three meetings) Assessment of crop and agroforestry production potential	<ul style="list-style-type: none"> WRUA Chiefs Elders KFS MoLD MoL MWI IUCN FalDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	In all management units within the sub-catchment	300,000
		potential including soil nutrient	<ul style="list-style-type: none"> Consultant WRUA IUCN FalDA WRMA NDMA KEFRI KARI 	Crop and agroforestry potential report	Report successfully documented and accepted	January – Dec 2013	Agro-pastoral and pastoral units	500,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
		Share with community crop and agroforestry potential report	<ul style="list-style-type: none"> WRUA Consultant Community IUCN FaIDA NDMA WRMA MoLD MoA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	In all management units within the sub-catchment	300,000
Sub-total								1,100,000
	Assessment of forest/woodlands status	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Environmental committee KFS IUCN FaIDA WRMA NDMA KEPRI 	Sensitization report	Report documented and accepted	October 2012	In all management units within the sub-catchment	300,000
		Assess forest/woodlands/pasture availability, demand and reserve	<ul style="list-style-type: none"> Consultant WRUA IUCN FaIDA WRMA NDMA KFS KEPRI 	Forest/woodland assessment report	Assessment successfully completed and report accepted	December 2013 – January 2014	In all management units within the sub-catchment	800,000
		Share with community forest/woodland availability, demand and reserve report	<ul style="list-style-type: none"> WRUA Consultant IUCN FaIDA NDMA WRMA MoLD MoA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	In all management units within the sub-catchment	300,000
Sub-total								1,400,000
	Climatic change impact assessment	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Elders KWS MoLD MoWI IUCN FaIDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	In all management units within the sub-catchment	300,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
		Assess impacts of climate change on communities and natural resources	<ul style="list-style-type: none"> Consultant WRUA IUCN FaIDA WRMA NDMA Met Dept 	Impact of climate change assessment report	Assessment successfully completed and report accepted	October 2012 – December 2013	In all management units within the sub-catchment	500,000
		Share with community impacts of climate change report	<ul style="list-style-type: none"> WRUA Consultant IUCN FaIDA NDMA WRMA MoLD MoA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
Sub-total								1,100,000
Minerals	Exploration and assessment of minerals in the sub-catchment	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> Mines and Geology NEMA WRUA Chiefs Elders KWS MoLD MoWI IUCN FaIDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	In all management units within the sub-catchment	300,000
		Survey and map mineral resources	<ul style="list-style-type: none"> Consultant WRUA Mines and Geology NEMA IUCN FaIDA WRMA NDMA 	Maps showing where minerals are found	Maps documented and accepted	October 2012 – December 2013	Pastoral and agro-pastoral units	500,000
		Share with community mineral resources report	<ul style="list-style-type: none"> WRUA Consultant IUCN FaIDA NDMA WRMA MoLD MoA KFS Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
Sub-total								1,100,000
Total								8,500,000

Chapter 6: Natural resources allocation for sustainable, equitable and efficient use by communities

Livelihoods in the sub-catchment are dependent on natural resources. The major natural resources used include water, pasture/fodder, wood and non-wood products (poles, withies, charcoal, firewood, thatch, wild fruits, gums and resins), minerals (sand, stones, gravel and soil) and land. Traditionally, all community members within Saka have equal access to use river and pans/ponds water but shallow wells are privately owned by persons who dug them. Water for farm irrigation is dependent upon the economic power of individual/group farmers. Similarly, piped water in settlements like Saka is accessed by all who can afford connection and monthly charges. Moreover, pastoralists including those from neighboring villages freely access Tana River water via corridors locally known as “Hilas or Malkas”. The same “Malkas” are used by wildlife to freely access river water. Potentially, the sub-catchment with an area of 748.1 km² (748,100 m²) and with estimated annual rainfall of 300mm generates estimated 224,430,000 m³ of water but almost all of it is lost through runoff without harnessing.

Customarily, Saka community members also have the right to access pasture and fodder resources. Outsiders too access the resource with the permission from Saka Community elders. Similarly, Saka community access pastures and fodder in the neighboring villages in case it does not rain within the sub-catchment. Furthermore, in rainy seasons when pasture is in plenty Saka community migrate to pastures in neighboring locations and divisions e.g. Dujis, Shimbirey, Dadaab and Lagdera. In drought years the community shifts to beyond Balamabala into Ukambani (Mwingi, Tseikuru), Meru, Isiolo and Tana River areas. However, in normal years they stay within the Saka Sub-catchment.

Conventionally, the community members freely access dry woods for firewood and charcoal production. They can also freely access poles, withies and other shelter materials for construction.

Unfortunately, the traditional institutions and rules on resource allocations have become ineffective over the years due to lack of support from the formal system. The consequence has been ineffective controls in the use and management of natural resources leading to increased incidences of deforestation, overgrazing and misuse catalyzed by poverty and ever increasing demands from urban centres.

There are also no allocation plans for natural resources within the sub-catchment and therefore there is need to develop such plans. To achieve the above there is a need to generate necessary data and information and capacity build the community to develop participatory plans. Improved and sustainable resource use is critical in the allocation and management of resources therefore, cornerstones of this chapter. The principles governing the development of allocation plans are to ensure equity and efficient resource use.

The current allocation of resources according to the community is unsustainable, inequitable and inefficient especially along the River Tana. Additionally, there is need for charcoal production and use of other non-wood products to have license. The community recognises the need for capacity building on management of natural resources and empowerment on market intelligence for natural resource products. The main instruments to guide allocation of resources are based on principles of integrated natural resource management. The instruments include plans for water allocation, grazing management, physical planning & land use, conflict resolution and resource contingency (Table 13).

Table 13. Natural resource allocation plan for sustainable, equitable and efficient use in Saka sub-catchment

Target: To develop natural resource allocation plans

Overall output: Natural resource allocation plans in place

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Water allocation	Development of Water allocation plans (WAP) for compliance to water abstraction and use based on the Water Act	Community sensitization meetings on allocation plan, abstraction, water use permits and water user charges (three meetings)	<ul style="list-style-type: none"> WRUA MoWI Chiefs Elders KWS MoLD MoA KFS IUCN FalDA WRMA NDMA 	Sensitization reports	Report documented and accepted	October 2012 – January 2013	In all management units within the sub-catchment	300,000
		Abstraction survey to assess quantity and quality	<ul style="list-style-type: none"> Consultant WRUA MoWI KWS MoLD MoA KFS IUCN FalDA WRMA NDMA 	Abstraction report	Survey assessment successfully completed and report accepted	January – December 2013		1,000,000
		Preparation of allocation plan including environmental flows (Consultancy)	<ul style="list-style-type: none"> MoLD MoA KFS IUCN FalDA WRMA NDMA 	Water allocation plan	Plan successfully completed and accepted			500,000
Sub-total		Share with community water allocation plan (three meetings)	<ul style="list-style-type: none"> WRUA Consultant MoWI KWS MoLD MoA KFS IUCN FalDA WRMA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
		Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Elders KWS MoLD MoWI IUCN FalDA WRMA NDMA KARI KEFRI 	Sensitization reports	Report documented and accepted	October 2012	In all management units within the sub-catchment	300,000
Improve Pasture/ fodder availability	Development of pasture/fodder plan for livestock and wild herbivores							2,100,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Improve Pasture/ fodder availability	Development of pasture/fodder plan for livestock and wild herbivores	Development of grazing management plans for livestock and wild herbivores in arid communal lands to advise on dry and wet season grazing	<ul style="list-style-type: none"> Consultant WRUA KWS MoLD MoWI IUCN FaIDA WRMA NDMA KARI KEFRI 	<ul style="list-style-type: none"> Range capacity holding plan for communal lands Sub-catchment grazing management plan for dry and wet seasons 	<ul style="list-style-type: none"> Range capacity holding plan and grazing management plan successfully completed and report accepted 	Nov – Dec 2013	Pastoral and agro-pastoral units	1,000,000
		Share with grazing management plans	<ul style="list-style-type: none"> WRUA Consultant MoWI KWS MoLD MoA KFS IUCN FaIDA WRMA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
Sub-total								
Land use planning	Development of land use/cover plan	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Elders KWS KFS MoLD MoL MoWI IUCN FaIDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	In all management units within the sub-catchment	300,000
		Map out land use/cover plan for future	<ul style="list-style-type: none"> Consultant WRUA WRMA IUCN FaIDA KWS KFS MoLD MoL MoWI 	Digitized land use/ cover future plan with map and detailed report	Plan successfully completed and maps accepted	October 2012 – December 2013	In all management units within the sub-catchment	500,000
Sub-total								
1,600,000								

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Land use planning	Development of land use/cover plan	Share with community land use/cover plan	<ul style="list-style-type: none"> WRUA Consultant MoWI KWS MoLD MoA KFS IUCN FaIDA WRMA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
Sub-total								1,100,000
	Forest/woodlands management plan	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> WRUA Chiefs Environmental committee KFS IUCN FaIDA WRMA NDMA KEFRI 	Sensitization report	Report documented and accepted	October 2012 – January 2013	Agro-pastoral and pastoral units	300,000
		Development of forest/woodlands management plan	<ul style="list-style-type: none"> WRUA KFS IUCN FaIDA WRMA NDMA KEFRI 	Forest/woodland management plan	Plan successfully completed and report accepted	October 2012 – December 2013	Pastoral and Agro-pastoral units	1,000,000
		Share with community forest/woodlands management plan	<ul style="list-style-type: none"> WRUA Consultant KFS MoWI KWS MoLD MoA IUCN FaIDA WRMA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	Feb 2014	All management units within the sub-catchment	300,000
Sub-total								1,600,000
Physical plans for major centres	Development of physical plans	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> Min of Lands WRUA MWI Chiefs Elders KWS MoLD MoA IUCN FaIDA WRMA NDMA County Council 	Sensitization report	Report documented and accepted	October 2012 – January 2013	Agro-pastoral and pastoral units	300,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Physical plans for major centres	Development of physical plans	Preparation of physical plan for major centres	<ul style="list-style-type: none"> Consultant Min of Lands WRUA WRMA County Council 	Physical plans for major settlements (four centres) within the sub-catchment	No. of plans developed and approved by county government	January - April 2014	Settlement unit	1,000,000
		Share with community physical plan	<ul style="list-style-type: none"> WRUA Consultant Min of Lands WRMA MoWI KWS MoLD MoA IUCN FalDA WRMA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	June 2014	Settlement unit	300,000
Sub-total								1,600,000
Minerals	Development of plan for exploration and exploitation of minerals within the sub-catchment	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> Mines &Geology WRUA NEMA Chiefs Elders KWS MoLD MoWI IUCN FalDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	Agro-pastoral and pastoral units	300,000
		Exploration and sustainable exploitation plan (quantity and quality)	<ul style="list-style-type: none"> Consultant Mines and Geology NEMA WRUA KWS IUCN FalDA WRMA NDMA 	Exploration and sustainable exploitation plan	Plan successfully completed and report accepted	October 2012 – December 2013	Pastoral and agro-pastoral units	1,500,000
		Share with community exploration and sustainable minerals exploitation plan	<ul style="list-style-type: none"> WRUA Consultant Mines &Geology WRMA NEMA KWS KFS MoLD MoA IUCN FalDA NDMA Administration Community 	Workshop report	Report successfully completed and accepted	June 2014	All management units within the sub-catchment	300,000
Sub-total								2,100,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Resource & conflict resolution planning	Resource sharing and conflict resolution planning	Community sensitization meetings on resource allocation, contingency & conflict resolution plans (three meetings)	<ul style="list-style-type: none"> • WRUA • Chiefs • Elders • KWS • KFS • MoA • MoLD • MoWI • IUCN • FaIDA • WRMA • NDMA 	Sensitization report	Report documented and accepted	October 2012 – January 2013	All management units within the sub-catchment	300,000
		Develop participatory equitable resource use plan		Resource sharing and allocation plan	Resource allocation plan developed and approved by county government	Nov 2012	500,000	
	Develop participatory resource contingency plans	Develop natural resource conflict resolution plans	<ul style="list-style-type: none"> • WRUA • Peace committee • MoWI • Admin • Elders • KWS • KFS • MoLD • MoA • IUCN • FaIDA • WRMA • NDMA • Community 	Resource contingency plans	No. of resource contingency plans developed and accepted	Nov 2012	500,000	
				Share with community resource allocation, contingency & resource conflict plans	Conflict resolution plans	No. of conflict resolution plans developed and accepted	Dec 2012	500,000
				Workshop report	Report successfully completed and accepted	Jan 2013		300,000
Sub-total								2,100,000
Total								12,200,000

Chapter 7: Resource protection

This chapter describes the approach and options adopted in order to protect the natural resources using integrated approach. The WRUA is keen to ensure that the sources are retained in their natural state as much as possible. There is need to establish management agreement and enforce the same. Similarly, it is important to support activities that arrest and reverse declining resources and catchment productivity and those that will capacity build communities on the same (Table 14).

Water sources

Currently, there is minimal protection of water sources. Analysis of the quality of water from all water sources has not been fully undertaken and there are only two dispensaries at Daley and Saka Centres within the sub catchment to treat water borne/related diseases such as diarrhea, malaria and typhoid. Water quality is estimated to be grossly contaminated and polluted. The prime threats to the quantity and quality of water sources are erosion (river bank and soil erosion within the sub-catchment and neighboring villages) due to overgrazing, deforestation, opening of land for cultivation and settlement plus sand harvesting.

Another major challenge is pollution due to open defecation of the increasing population, floods, poor governance such as poor management of open water sources (lack of fence, direct access by people and livestock, siltation due to embankment erosion, overgrazing in the catchment), animal waste, application of pesticides on farms, poor solid waste disposal mechanisms and lack of drainage and sewage systems in settlements. As a result diarrhea is the most prevalent waterborne disease in the sub-catchment affecting 30% of the population. The invasion of exotic species/weed such as *Prosopis juliflora* is adversely affecting water quality and biodiversity conservation along the rivers and in pastures. Other threats include conflict over the use of the resource, change of river course and river diversion for irrigation that also contributes to the breeding of mosquitoes.

Pasture, fodder, forest and woodland resources

There exist unwritten community by-laws that protect the “Bada or Goshe” (riparian Acacia forests) as mentioned in Chapter 3. The major threats to the quantity and quality of pasture and fodder are recurrent droughts, wildfire, overgrazing, deforestation, mushrooming settlements and establishment of inland water sources, invasive weeds such as *P. juliflora*, livestock influx especially those for Garissa and conflict over the use of the resource.

Wild animals

Customarily, like all other Kenyan Somalis the Saka Community don't hunt wild animals but threats to the existence of wildlife diversity include inadequate access to water especially in dry seasons, pests and diseases, habitat loss to crop farming and settlements, human – wildlife conflict and no direct income from the resource to the community.

Mineral resources

There are no protection measures on the use of minerals in the sub-catchment. Threats to mineral resources comprise of over exploitation of the resource by individuals without the full consent of the community and no direct income from the resource to the community.

Comprehensive protection measures for all resources as suggested by the community and stakeholders are summarised in Table 14.

Table 14. Planned activities for implementation of resource protection in Saka Sub-catchment

Target: Protection of the existing natural resources in order to achieve desired services
Overall output: Catchment maintain ability to provide required services

Resource(s)	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Water	River bank erosion	River bank protection	Sensitization on none cultivation of 60m from river bank by protecting natural vegetation along the River Tana	<ul style="list-style-type: none"> WRUA MoA KFS IUCN FaIDA WRMA Farmers CDF LATF NEMA 	Sensitization report	Report documented and accepted	October 2012 - June 2017	Agro-pastoral unit	500,000
	Inappropriate management of water sources	Improve governance on management of water sources	Form/strengthen (train) WUAs on governance	<ul style="list-style-type: none"> WRUA IUCN KFS FaIDA WRMA MoWI Community CDF LATF NEMA 	WUAs formed/ strengthened	No. of WUAs formed/ strengthened	February 2013 to June 2017	Saka Sub-catchment	1,000,000
Pollution		Pollution survey	Community sensitization meetings (three meetings)	<ul style="list-style-type: none"> MoW&I MoPHS WRUA NEMA Admin Community IUCN FaIDA WRMA NDMA 	Sensitization report	Report documented and accepted	October 2012	Agro-pastoral and pastoral units	300,000
			Execute pollution survey		Pollution status report	Report documented and accepted	December 2012 – January 2013	Agro-pastoral and pastoral units	500,000
			Share with community pollution report		Workshop report	Report successfully completed and accepted	May 2013	All management units within the sub-catchment	300,000
			Sensitization on eco-sanitation		Sensitization report	Report documented and accepted	June 2013 October 2013 January 2014	Settlement unit	300,000
		Capacity building on use of pesticides	Train farmers on appropriate use of pesticides (two sessions)	<ul style="list-style-type: none"> WRUA WRMA MoA IUCN FaIDA Farmers KRCS 	Training reports	Reports documented and accepted	March 2013	Saka Centre	500,000
Sub-total									1,900,000

Resource(s)	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Water	Collapsing of shallow wells	Reduce risks to collapse of shallow wells	Sensitization and awareness on use of shallow wells (three sessions)	<ul style="list-style-type: none"> WRUA NEMA WRUA NEMA MoWI 	Sensitization report	Report documented and accepted	April 2014 April 2015 April 2016	Saka Sub-catchment	300,000
			Support the conservation of pasture and forest resources	Promote gene bank for high value plant species	<ul style="list-style-type: none"> KFS WRUA MoLD MoA WRMA IUCN FaIDA KEFRI KARI 	Community empowered on development of biodiversity gene banks	No. gene banks created, and species collected and conserved	May 2013 – December 2014	Saka Centre
Pasture and forest resources	Inappropriate management of pasture and forest resources due to drought, wildfire, overgrazing, deforestation	Reduce the risk of fire to pastures and forests/woodlands	Create firebreaks and EIA/audit within planned pastures	<ul style="list-style-type: none"> MoLD MoA WRMA IUCN FaIDA KFS KEFRI KARI 	Firebreaks developed and EIA/audit incorporated into grazing management plan	No. of firebreaks and EIA/audit incorporated into grazing plan	May 2013 December 2013	Pastoral and agro-pastoral units	1,000,000
			Protect vegetation through by-laws & awareness creation	<ul style="list-style-type: none"> Admin. KFS WRUA WRMA IUCN FaIDA MoLD 	90 acres of standing hay conserved	Area conserved (acres)	December 2012 – June 2017	Agro-pastoral and pastoral units	500,000
			Diversify community assets to reduce overgrazing	<ul style="list-style-type: none"> MoLD MoA WRMA IUCN FaIDA KFS KEFRI KARI 	Promotion of small scale business	No. of small scale business developed and successfully implemented	May 2013 - June 2017	Saka sub-catchment	500,000
			Formation of Community Forest Associations (CFAs) with forest scouts for implementation	<ul style="list-style-type: none"> KFS WRMA IUCN FaIDA WRUA Environmental Committee NEMA Community 	Two CFAs with scouts formed	No. of CFAs and scouts in place and supported by KFS	July – August 2013	Daley Location Saka Location	600,000
			Posting of forest personnel	<ul style="list-style-type: none"> KFS County Gov't 	Forest personnel posted to Saka Sub-catchment	No. of officers posted and sustained	Immediate	Saka sub-catchment	N/A
		Strengthen forest management within the sub-catchment	Awareness raising on the dangers of unsustainable charcoal burning	<ul style="list-style-type: none"> KFS WRUA KWS IUCN Admin. FaIDA 	Communities sensitized on dangers of charcoal burning	No. of community members sensitized	December 2012	Saka sub-catchment	500,000
Sub-total									4,100,000

Resource(s)	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Environment	Mushrooming settlements and establishment of haphazard water sources contributing to environmental degradation	Control mushrooming settlements and establishment of inland water sources	Sensitize communities on by-laws concerning mushrooming settlement and establishment of haphazard water sources	<ul style="list-style-type: none"> MoL MoP Admin. WRUA MoLD Community IUCN KWS 	Communities sensitized on stoppage of mushrooming settlements and establishment of haphazard water sources	No. of meetings	October 2012 - June 2017	All management units in the sub-catchment	500,000
		Establishment of drainage and sewerage systems, and solid waste management including EIA/audit		<ul style="list-style-type: none"> County govt LATF CDF MoL WRMA WRUA MoWI FaIDA NWSB MoPH 	Major centres in the sub-catchment with drainage and sewerage systems + garbage collection and dumping sites	No. of drainage, sewage, garbage collection and dumping sites developed and implemented	January 2013 – December 2014	Settlement unit	10,000,000
Sub-total									10,500,000
Wild animals	No direct income	Strengthen wildlife management within the sub-catchment	Sensitization workshops on importance of wildlife	<ul style="list-style-type: none"> WRUA Community Admin. KWS KTB IUCN FaIDA NDMA NRT 	Sensitization report	Report documented and accepted	October 2012 – December 2015	Saka sub-catchment	500,000
		Promotion of ecotourism		<ul style="list-style-type: none"> WRUA KWS Admin 	Ecotourism potential promoted within the sub- catchment	No. of promotion campaigns undertaken			500,000
		Formation of Community Wildlife Associations (CWAs) with wildlife scouts for implementation		<ul style="list-style-type: none"> WRUA KWS Admin 	Two CWAs with scouts formed	No. of CWAs and scouts in place and supported by KWS	July – August 2013	Daley Location Saka Location	600,000
		Wildlife personnel to be posted		<ul style="list-style-type: none"> KWS County Gov't 	KWS personnel posted to Saka Sub-catchment	No. of officers posted and sustained	Immediate	Saka sub-catchment	N/A
		Reduce human/livestock – wildlife conflict on farms and pastures through sensitization meetings to reduce human – wildlife conflicts		<ul style="list-style-type: none"> KWS WRUA Admin MoLD MoA WRMA NDMA IUCN FaIDA 	Sensitization report	Report documented and accepted	Feb 2013 – Feb 2017	Saka sub-catchment	500,000
		Establish historical wildlife corridors and map wildlife attack hotspots attack sites		<ul style="list-style-type: none"> WRUA KWS Admin MoLD MoA Community 	Corridor maps and reports	Corridor maps and reports accepted for implementation	Immediate	Pastoral and agro-pastoral units	600,000
		Improve reporting of wildlife incidence to KWS for action (e.g. relocation)		<ul style="list-style-type: none"> MoA Community 	Wildlife incidence reports	Successful incidence reports accepted implemented by KWS	Immediate	Pastoral and agro-pastoral units	500,000
Sub-total									3,200,000

Resource(s)	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Mineral resources	<ul style="list-style-type: none"> No direct income to community Exploiting without the full consent of the community 	Promote participatory mineral use	Sensitization of community on use and conservation of the minerals –WRUA as entry points for mineral use	<ul style="list-style-type: none"> MoE&MR IUCN WRUA WRMA MoL FaIDA Community County Govt Admin. 	Sensitization reports	Report documented and accepted	March 2013 – June 2017	Saka Sub-catchment	500,000
Total									22,000,000

Chapter 8: Catchment protection

This chapter provides details regarding implementation of strategies for catchment conservation. It looks at the different types of land uses and addresses each separately. The strategies are based on the zoning of the catchment area as identified earlier. The implementation of catchment conservation activities is aimed at increasing the productivity and sustainability of the sub-catchment based on the principles of integrated natural resource management. Currently there are conservation efforts emanating from the community though minimal and requires to be strengthened. Conservation in the sub-catchment is greatly attached and related to the community customary norms, culture and faith and therefore, should be considered when making conservation plans.

A part from the River Tana, the sub-catchment is dissected by at least 11 major laghas that drain flush floods into the river and flood plains that support dryland farming in rainy seasons. The over 7,000 population of Saka are mainly pastoralists and agro-pastoralists with livestock as the backbone of economy. Crop farming through group farms is concentrated along the R. Tana and supported by limited institutions such as Food For Asset Project of NDMA/Kenya Red Cross Society/UN World Food Programme/Ministry of Agriculture. The objective of conservation in the sub-catchment is to boost resource use without affecting ability of ecosystem to provide resources and services therefore, reducing detrimental impacts. Charcoal burning, deforestation, river bank erosion and overgrazing are issues of concern to be addressed to ease conservation.

Obstacles to conservation in the sub-catchment are linked directly or indirectly to human activities not ruling out natural factors e.g. climate change. Nonetheless, the community has expressed strong will for conservation. This is well demonstrated by community recognition of natural resource dynamics and relationships e.g. appreciation of the role of wild herbivores as a buffer to predators against livestock. The community's will is limited by inadequate knowledge and information on conservation coupled with factors such as poverty and drought that exacerbate environmental degradation (deforestation, charcoal burning, river bank erosion and overgrazing). Proposed conservation activities have been summarized in Table 15.

Table 15. Implementation of catchment conservation activities within the management units

Target: To reduce catchment degradation through integration of protection and conservation approach
Overall output: Rehabilitated catchment that has ability to offer a balanced ecosystem services

Resource	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Water	Erosion	River bank stabilization	Community tree nurseries	<ul style="list-style-type: none"> WRUA MoA MoLD KFS IUCN FaIDA WRMA Farmers CDF LATF 	Tree nurseries promoted and established	No. seedlings raised in nurseries/ planted and survived	October 2012 to June 2017	On farms and in institutions	1,000,000
			Model farms with agroforestry trees	<ul style="list-style-type: none"> WRUA MoA KFS IUCN FaIDA WRMA Farmers CDF LATF 	Model farms planted with agroforestry trees	No. of model farms targeted		Farms along River Tana	2,000,000
			Construction of gabions along major flooding sites within farms	<ul style="list-style-type: none"> WRUA MoA KFS IUCN FaIDA WRMA Farmers CDF LATF 	Gabion constructed on farms	No. of gabion constructed	October 2012 – October 2014	On farms within the flood plains - Agro-pastoral unit	5,000,000
Sub-total									8,000,000
Pasture and forest resources	Drought and overgrazing	Promote pasture conservation on communal lands and farms	Diversion of laghas to range land to promote pasture growth	<ul style="list-style-type: none"> Mo WI MoLD CDF WRUA LATF County govt NDMA Pastoralists 	Laghas diverted to irrigate natural pastures	No. of laghas diverted for production within rangelands	December 2014 – Dec 2015	Sub-total Pastoral unit (Takoy Hirbai Durdurane Abdi gab)	3,000,000
			Reduce impact due to Influx of pastoralists	<ul style="list-style-type: none"> WRUA MoLD County government NDMA IUCN FaIDA 	<ul style="list-style-type: none"> Strengthening of by-laws on seasonal grazing Setting up of designated livestock routes 	<ul style="list-style-type: none"> No. of by-laws developed and enforced No. of designated livestock routes 		Pastoral and agro-pastoral units	500,000
			Promote the planting of drought tolerant forage and fodder species	<ul style="list-style-type: none"> MoLD MoA WRMA IUCN FaIDA KFS KEFRI KARI 	Appropriate species identified and promoted (10 species)	No. of species identified and successfully promoted	October 2012 – June 2017	Saka Sub-catchment	1,000,000
Sub-total									5,000,000

Resource	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
	Deforestation	Reclamation of degraded sites	Reforestation, afforestation and reseeded with priority to local species	<ul style="list-style-type: none"> WRUA IUCN KFS MoA Community Chiefs WRMA NEMA CDF LATF 	Degraded sites planted with trees (10,000 trees) and reseeded (30 acres)	<ul style="list-style-type: none"> No. of trees planted and survived Acres successfully reforested and reseeded 	May 2013 - June 2017	Pastoral unit Agro-pastoral unit Settlement unit	3,000,000
Sub-total									3,000,000
	Invasive weeds	Control and management of invasive weeds	Control and management of <i>P. juliflora</i>	<ul style="list-style-type: none"> KFS WRMA NDMA IUCN FaIDA MoLD MoA WRUA Community Admin 	Coverage of Prosopis in the sub catchment reduced (by 50%)	No. of acreage where <i>P. juliflora</i> has been controlled and managed	October 2012 – June 2017	Saka sub-catchment	3,000,000
Sub-total									11,000,000
Wild animals	No direct income	Promote legalized game farming & community managed sanctuaries	<p>Fish and game farming including crocodile, birds farming (guinea fowl, ostrich) promoted</p> <p>Publicity and marketing of wildlife in Saka and establishment of a sanctuary in Mathahlibaah</p>	<ul style="list-style-type: none"> MoLD Fisheries KWS IUCN WRUA KWS WRUA Wildlife committee IUCN FaIDA WRMA KTb MoE PTA BoG WRUA Wildlife committee 	<p>Game farms (fish, crocodile and beehives) established</p> <p>Establish, register & market a sanctuary</p>	<ul style="list-style-type: none"> No. of game farms successfully established Established and operational sanctuary Amount of income generated from the sanctuary 	November 2013 – June 2017	Agro-pastoral unit	2,000,000
			Formation of wildlife club in schools and exposure tours		<ul style="list-style-type: none"> School clubs established Sensitization and exposure tour of the teachers and students 	<ul style="list-style-type: none"> No. of clubs formed and operational No. of tours and No. of participants 	January 2013 - June 2017	Mathahlibaah	2,000,000
Sub-total									4,500,000
Crops	Roaming livestock and wildlife menace	Improve farm productivity to reduce cropland expansion and reduce crop production – wildlife conflict	Electric fencing of group farms	<ul style="list-style-type: none"> WRUA Farmers KWS IUCN MoA NDMA CDF WRUA CDF 	Groups farms (25) electric fenced	No. of farms electric fenced	January 2013 to December 2014	Agro-pastoral unit	60,000,000

Resource	Problems/ Objectives	Activities	Sub-activity	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
			Lining of concrete canals	<ul style="list-style-type: none"> MoA KWS MoWI NDMA 	Concrete canals established in group farms (25)	Km of concrete canals established	From April 2013 to Dec 2014	Agro-pastoral unit	40,000,000
			Provision of certified seeds, seedlings and fertilizers	<ul style="list-style-type: none"> MoA WRUA Farmers IUCN FaIDA LATF 	Inputs procured and distributed to group farms (25)	No. farms supported with inputs	October 2012 - June 2016	Agro-pastoral unit	2,000,000
			Training farmers on crop husbandry	<ul style="list-style-type: none"> MoA Farmer IUCN WRUA FaIDA 	Farmer groups (25) trained on crop production	No. of farmers trained	May 2012 – May 2015	Saka Centre	2,000,000
			Provision of irrigation pumps to group farms	<ul style="list-style-type: none"> MoA Farmer WRUA MoWI 	Pump sets provided to group farms (10)	No. of pumpsets provided	October 2013 – March 2014	All farms lacking pumps	7,000,000
Sub-total									111,000,000
Livestock	Decreasing livestock productivity	Improve productivity through livestock marketing, access to water, breeding and coordination	Establishment & support to livestock marketing groups to assist in marketing and training	<ul style="list-style-type: none"> MoLD KLMC County Gov't CDF LATF 	Functional marketing groups (2) in place	No. of marketing groups registered and functional	April 2013	Saka Location Daley Location	3,000,000
			Sensitization on protection of "Malkas" and opening up more for both livestock and wildlife to access the river (100m wide)	<ul style="list-style-type: none"> MoLD WRUA KWS WRMA Pastoralists Farmers MWI MoA IUCN FaIDA Administration 	Communities sensitized on protection of "Malkas" (at least 10)	No. of protected and functioning "Malkas"	February 2013 to June 2017	Agro-pastoral zone	1,000,000
			Promotion of best local breeds	<ul style="list-style-type: none"> MoLD KARI WRUA Local community breeding 	Breed of livestock species promoted (at least 4)	No. of breeds promoted	November 2013 – Dec 2016	Pastoral and agro-pastoral units	2,000,000
			Hold meetings and seminars to support coordination between livestock stakeholders	<ul style="list-style-type: none"> experts MoLD WRUA KWS WRMA Pastoral groups 	Coordination between stakeholders improved	No. of livestock coordination meetings	Every Feb from 2013 -2017	Saka sub-catchment	1,000,000
Sub-total									7,000,000
Total									141,500,000

Chapter 9: Capacity building

The chapter involves description of the WRUA training needs, measures needed to enhance governance and strengthening management capacity. The chapter identifies the capacity building needs at sectorial levels of WRUA and partners. It also provides an action plan for the implementation of capacity building activities to achieve the targets and goals in the sub-catchment.

The WRUA is young having been started July 2011 and has no office. The community has received some training on water and natural resource management from various NGOs, Government ministries and other agencies. IUCN has trained communities on: sustainable land and water management and conservation practices, integration of sub-catchment management plan and rangeland management plan to formulate ASCMP. Similarly, CARE trained WUAs on water conservation and WRMA on WRUA WDC in particular formation and registration of WRUA with various government departments. After receiving various trainings the WRUA officials held meetings to capacity build their members too. To gain maximum benefit and effectively implement proposed activities in the adapted SCMP community members and implementing partners need to be capacity built in several areas related to sustainable natural resource management.

The community cited the need to execute needs assessment but the following are also the tentative capacity building areas at sectorial levels as identified by the stakeholders:

Water

- Roles of WRUA members
- Exposure tours to other WRUAs
- Publicity on WRUA activities
- Training on environmental conservation and management
- Training on participatory monitoring and evaluation
- Training on data collection and monitoring on water levels and meteorological station
- Establishing of WRUA office
- Training on management and protection of water sources

Agriculture

- Training on pesticides and insecticides
- Training on management of farm pumps and irrigation infrastructure
- Marketing and value addition of farms produce
- Post harvesting techniques
- Diversification of crops and making it a business e.g. agro-forestry
- Crop husbandry
- Establishment of co-operative societies

Livestock

- Training on pest and disease control and administration vet drugs
- Training of overstocking and its impacts on environment
- Training on marketing and values addition of livestock
- Establishment of livestock groups to assist in marketing
- Training on pasture /fodder production
- Training on beekeeping, fish farming ,crocodile farming and bird farming

Wildlife

- Training on conservation of wildlife
- Training on data collection on signs and symptoms of outbreak of diseases for early reporting and action plan
- Life-saving skills from attacks of wildlife
- Sensitization of community and by-laws creation on land use and management (all sectors)
- Training on proposal writing and development

Minerals

- Training on exploitation and usage of minerals and uses of its equipment
- Training on marketing of ballast, building blocks and cement
- Entrepreneurial training
- Education tour to Matuu, Thika,
- Sensitization on the impacts of the exploitation process

Pasture and fodder production

- Sensitization on use of wet and dry season fodder during different periods
- Training on pasture and fodder production and storage e.g. hays farms
- Sensitization on dangers of causing wildfire
- Training on pasture and fodder seeding and re-seeding in rainy season
- Training on pasture/fodder marketing
- Training on Mathenge and bush control
- Storage for fodder produced.

Details on the execution of the above are in Table 16.

Table 16. Capacity building for community and partners on adaptive SCMP

Target: Enhance the capacity of the community and WRUA on activity implementation through networking and partnership
Overall output: Improved capacity to overcome existing challenges and capitalise on existing opportunities

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Inadequate capacity to execute and coordinate catchment management activities	Conduct capacity needs assessment and train on coordination	Sensitization of community on capacity needs assessment	<ul style="list-style-type: none"> WRUA MoA KFS KWS MoLD IUCN FaIDA WRMA Community CFA 	Sensitization report	Report documented and accepted	October 2012	All management units within the sub-catchment	100,000
		Execution of capacity needs assessment		Capacity needs of community and stakeholders identified	Assessment report	December 2012		300,000
		Share capacity needs report with community		Workshop report	Report successfully completed and accepted	February 2013		100,000
		Training on best ways to enforce by-laws in catchment		Enhanced enforcement of by-laws in place	No. of enforcement agents trained	July 2013– Sept 2015	Saka Centre	600,000
		Awareness creation on BDR Project implementation activities throughout the sub-catchment and beyond		Communities and partners informed on project activities to be implemented	No. of awareness creation meetings conducted	April 2013	All management units within the sub-catchment	400,000
		Sub-total						
Inadequate capacity in water management	Capacity building on water management	Training WRUA members on institutional development	<ul style="list-style-type: none"> WRUA MoA KFS KWS MoLD IUCN FaIDA WRMA Community CFA 	Training sessions (three) conducted and a manual developed	<ul style="list-style-type: none"> No. of trainings and participants No. of manual 	November 2012 to June 2017	Daley Hadley Saka	1,000,000
		Publicity of WRUA activities in the sub-catchment and beyond		Publications on WRUA activities produced (one per year) and awareness created	<ul style="list-style-type: none"> No. of publications No. of awareness campaigns 	January 2013 to January 2015	All management units within the sub-catchment	600,000
		Training on environmental conservation and management		Training (one) on environmental conservation and management conducted	No. of training and participants	December 2012		300,000
		Training on participatory monitoring and evaluation		Training (one) on participatory monitoring and evaluation conducted	No. of training and participants	February 2013	Saka Centre	400,000
		Training on data collection and monitoring of river levels and metrological centres		Training (one) on data collection and monitoring of river levels and metrological centres	No. of monitors identified and trained for the stations	October 2012	Saka Centre	300,000
		Training on management and protection of water resources		Training (one) on management and protection of water resources	No. of training and participants	June 2013	Saka Centre	300,000
Sub-total								2,900,000
Inadequate capacity in agricultural management	Capacity building on agriculture – crop production and agroforestry	Training on pests and diseases including early warning on the same	<ul style="list-style-type: none"> Farmers MoA Irrigation WRUA Operators MoA MoWI Line ministries 	Training on pests and diseases (one)	No. of training and participants	October 2012 – June 2017	Agro-pastoral unit	500,000
		Training on maintenance and operation of farm pumps and irrigation infrastructure		Training on operation of pumps and maintenance of irrigation infrastructure	No. of training and participants	October 2012 October 2015	Operators and farmers in Agro-pastoral unit	500,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)	
Inadequate capacity in agricultural management	Capacity building on agriculture – crop production and agroforestry	Training on marketing and value addition of farm produce	<ul style="list-style-type: none"> • Farmers • MoA 	Training on marketing strategies to value addition of farm produce (one)	No. of training and participants	April 2103	Agro-pastoral unit	300,000	
		Training on post-harvest techniques		Training manual developed (one)	No. of training, and participants	March - February 2013	Agro-pastoral unit	300,000	
		Training on diversification of crops and agro-forestry	<ul style="list-style-type: none"> • MoA • Farmers • MoLD • KWS • KFS • IUCN • FaDA • WRMA • WRUA 	Training conducted on diversification of crops and agro-forestry	No. farmers and pastoralists trained	October 2013 - October 2015	Agro-pastoral unit	600,000	
			<ul style="list-style-type: none"> • MoA • MoLD • Pastoral groups • KWS 	Co-operative society established (one)	No. of cooperative society with registered members and operational	April 2014	Agro-pastoral unit	200,000	
		Training on crop management	<ul style="list-style-type: none"> • MoA • MoLD • IUCN • FaDA • WRMA • WRUA • Farmers 	Trainings conducted on crop management (two)	No. of trainings and participants	October 2012 - June 2017	Agro-pastoral unit	500,000	
		Capacity building on livestock management	<ul style="list-style-type: none"> • MoLD • Pastoralist • Farmers • KWS 	Trainings conducted on pests, disease control and early warning and a manual developed	No. of trainings, participants, and manual developed	November 2012 – June 2017	Pastoral and agro-pastoral units	400,000	
Sub-total								2,900,000	
Inadequate capacity in Livestock management	Capacity building on livestock management	Training on marketing and value addition of livestock products	<ul style="list-style-type: none"> • MoLD • KWS • IUCN • FaDA • Pastoral groups 	Trainings conducted (two) on marketing and value addition of livestock products and a manual developed	<ul style="list-style-type: none"> • No. of trainings and participants • A training manual 	November 2012 – June 2015	Saka Centre	300,000	
		Training on range management and grazing system	<ul style="list-style-type: none"> • MoLD • IUCN • FaDA • WRUA • WRMA • Pastoral groups 	Training on range resources management conducted	No. of trainings and participants	December 2012 - June 2017	Pastoral and agro-pastoral units	500,000	
		Training on pasture/fodder production, storage & marketing	<ul style="list-style-type: none"> • IUCN • FaDA • WRUA • WRMA • MoLD • KFS • Pastoral groups 	Trainings conducted on pasture/fodder production, storage & marketing	No. of trainings and participants	May 2013 – June 2017	Pastoral and agro-pastoral units	600,000	

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Inadequate capacity in Livestock management	Capacity building on livestock management	Training on beekeeping	<ul style="list-style-type: none"> WRUA Bee farmers IUCN FaIDA CARE NDMA Fisheries MoLD MoA WRMA 	Training conducted on beekeeping	No. of training and participants	January 2015	Agro-pastoral unit	300,000
		Training on fish farming		Training conducted on fish farming	No. of training and participants	February 2015	Agro-pastoral unit	300,000
Sub-total								2,400,000
Inadequate capacity in wildlife management	Capacity building on wildlife management	Training and awareness on wildlife conservation	<ul style="list-style-type: none"> KWS WRUA Community IUCN MoLD KFS Farmers NEMA 	Sensitization conducted on wildlife conservation (two)	No. of sensitization meetings and participants	December 2012	All management units within the Sub-catchment	500,000
		Training on data collection on signs and symptoms of outbreak of diseases for early warning	<ul style="list-style-type: none"> KWS WRMA Community scouts IUCN FaIDA MoLD KFS 	Community training on data collection - signs and symptoms of outbreak of diseases	No. of training and participants	July 2013	Saka Centre	300,000
		Training on Life-saving skills from wildlife attacks	<ul style="list-style-type: none"> KWS MoH Prov. Admin. Red cross St. John 	Community trained on life-saving skills from wildlife attacks	No. of training and participants	May 2013	Saka Centre	300,000
	Sub-total							
Inadequate capacity in land use planning and management	Capacity building on land use planning and management	Sensitization on land use and management	<ul style="list-style-type: none"> IUCN FaIDA All line ministries (HoDs) Community WRUA 	Community sensitized on land use and management	No. of sensitization sessions and participants	September 2012 – June 2017	All management units within the Sub-catchment	500,000
	Capacity building on mineral use and management	Training on sustainable use of minerals	<ul style="list-style-type: none"> MoENR WRUA Admin. County Gov't 	Community training on sustainable mineral use conducted	No. of trainings and participants	August 2013 August 2014	Saka	500,000
Inadequate capacity on Mineral use		Training on marketing of ballast, building blocks and cement (mineral products)	<ul style="list-style-type: none"> Mines and Geology Dept NEMA Admin WRUA Ministry of Trade County Gov't 	Community trained on marketing of mineral products	No. of training and participants	September 2013	Saka	300,000
		Entrepreneurship training and educational tour	<ul style="list-style-type: none"> Ministry of Trade Admin. NGOs HoDs 	Community facilitated with an exposure tour (one)	No. of exposure tour and participants	September 2014	Saka Thika Matuu	800,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Inadequate capacity on Mineral use	Capacity building on mineral use and management	Sensitization on the impacts of minerals exploitation process	<ul style="list-style-type: none"> NEMA Mines and Geology Dept MoH MPHS Admin. 	Community sensitized on the impacts of minerals exploitation process	No. of sensitization meeting and participants	December 2014	Saka Sub-total	300,000
Sub-total								1,900,000
Inadequate capacity on Pasture and fodder production	Capacity build on pasture and fodder production	Sensitization on use of dry and wet season fodder production during different periods	<ul style="list-style-type: none"> MoLD MoWI NDMA KWS KFS CARE IUCN FaDA MoA 	Community sensitized on use of dry and wet season fodder production	No. of sensitization meeting and participants	October 2012 – June 2016	Saka	1,000,000
		Training on prevention of <i>Proxopis juliflora</i> (Mithenge) and bush control	<ul style="list-style-type: none"> KFS MoA WRUA WRMA MoWI MoLD 	Community trained on prevention and control of Mithenge and bush	No. of training and trainees	Every year November (2012 – 2016)	Pastoral and agro-pastoral units	1,000,000
Sub-total								2,000,000
Total								15,200,000

Chapter 10: Infrastructure development to boost resource conservation and mitigate against disasters and conflicts

The chapter provides details on the strategy for infrastructure development to boost resource conservation, mitigate disasters and conflicts.

Infrastructure is vital in the conservation of natural resources. The current status of infrastructure in Saka sub-catchment are poor therefore, there is urgent need for improvement. Major constraints to conservation related to infrastructure development in the sub-catchment are drought, floods, conflicts, inadequate water for domestic use and shrinking “Malkas” (water corridors). Furthermore, the situation is worsened by lack of modern early warning systems making community to rely on indigenous technical knowledge (ITK). Moreover, roads network is poor. Innovative solutions such as integrated early warnings systems (both modern and ITK), construction of check dams along the “Laghas” as well as diversification livelihoods and promotion of water corridors to reduce conservation constraints (Table 17).

Table 17. Implementation of infrastructure development to boost resource protection and conservation

Target: Increase availability and accessibility to natural resources within the sub-catchment

Overall output: Improve infrastructure to access and utilise natural resources within the sub-catchment

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Inadequate early warning system (EWS) against drought	Establish early warning system for drought	Establishment of meteorological station	<ul style="list-style-type: none"> WRMA Met. Dept WRUA MoA IUCN KWS FaIDA NDMA 	A met. station	No. of meteorological centre	October 2012	Saka Administration Police camp	300,000
		Strengthening and enhancing of traditional EWS and documentation	<ul style="list-style-type: none"> WRUA WRMA Community Met Dept NDMA IUCN FaIDA MoA KWS Administration 	One traditional EWS documented and availed	No. of documentation	October 2013	Saka	300,000
		Support and share the production of bulletins on drought	<ul style="list-style-type: none"> NDMA MoLD MoA MoWI KWS KFS WRUA Met. Dept 	Bulletin produced and disseminated on quarterly basis	No. of issues produced and shared	Quarterly October 2012 – June 2017	Saka	1,000,000
Sub-total	Establish early warning system for floods	Drought contingency plan	<ul style="list-style-type: none"> NDMA WRMA IUCN FaIDA Line ministries WRUA 	One Saka community contingency plan developed per year	No. of contingency plans developed	January and June every year (2013 - 2017)	Saka	1,000,000
		Establishment of RGS	<ul style="list-style-type: none"> WRMA WRUA IUCN FaIDA NDMA Line ministries 	At least one RGS station established	No. of RGS stations	April 2013	Saka	300,000
		Establishment of flood information sharing system	<ul style="list-style-type: none"> WRMA KENGEN WRUA Red cross MoLD IUCN FaIDA Media 	Flood information generated and shared per year (two)	No. of flood information shared and implemented	October 2012 – June 2017	Saka	500,000
								2,600,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
		Flood contingency plan	<ul style="list-style-type: none"> WRMA KenGen Red cross MoLD IUCN WRUA NDMA FalDA Line ministries 	Saka community flood contingency plan developed each year	No. of contingency plans developed	October/March every year (2012 - 2017)	Saka	1,000,000
Sub-total								1,800,000
Inadequate early warning on natural resource use conflicts	Strengthen conflict resolutions	Establishment of EWS on natural resource conflicts	<ul style="list-style-type: none"> WRMA WRUA Peace Committee NDMA KWS Elders IUCN FalDA Chief Line ministries 	EWS on natural resource conflict developed per year to reduce conflicts (At least two)	<ul style="list-style-type: none"> No. of conflicts resolved No. of peace meetings held 	One meeting/yr (2013 – 2017)	Saka centre	1,000,000
Inadequate water supply	Improve availability of water for domestic and livestock use	Construction of water pans along "laghas"	<ul style="list-style-type: none"> MoW CDF WRUA LATF County Govt 	Water pans constructed (three structures each 30,000 m ³)	No. of water pans constructed	January-Dec 2014	Pastoral unit (at Hila, Fadiweyne, Suban)	10,000,000
		Purchase of rainwater harvesting structures in institutions	<ul style="list-style-type: none"> MoWI WRMA IUCN FalDA WRMA 	Eight water tanks of 10,000 m ³ and accessories for institutions - schools, dispensaries	<ul style="list-style-type: none"> No. of structures appropriately installed No. of beneficiaries 	October 2012 – November 2014	Settlement unit (at Daley, Saka, Mathahlibaah, Hadley, Hirbat)	5,000,000
		Construction of dams along the "laghas" to harness runoff	<ul style="list-style-type: none"> MoW CDF WRUA LATF County govt 	Dams constructed to harness runoff	No. dams constructed	January-Dec 2014	Pastoral unit (Habarow lagaha)	30,000,000
		Drilling of boreholes	<ul style="list-style-type: none"> MoWI CDF WRUA FalDA IUCN 	Boreholes drilled & equipped (at least two)	No. of boreholes drilled & equipped	January-Dec 2014	Settlement unit (Saka Junction, Balambala Junction)	30,000,000
		Disilting of existing water pans and construction of inlets	<ul style="list-style-type: none"> MoWI CDF WRUA IUCN 	Water pans (five) distilled and inlets constructed	No. of water pans distilled and with inlets	January-Dec 2015	Settlement and pastoral units (Saka Junction, Balambala Junction, Ohio, Urow, Aqalaar)	10,000,000
Sub-total								85,000,000
Inadequate coordination at community level	Strengthen WRUA as a coordination unit	Establishing of WRUA office (materials to be provided by community)	<ul style="list-style-type: none"> WRUA WRMA Line ministries 	Functional WRUA office Roads bush cleaned & graded (at least 50 km)	Office structure established and operational	September 2013	Saka Centre	300,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)	
Poor roads	Improve roads	Bush clearing & grading	<ul style="list-style-type: none"> • Min. of Roads • NEMA • WRUA • Chief • County govt • NYS • CDF • LATF 	Micro-processing machines	Km bush cleared & graded	November 2012 –June 2017	Daley to Hirbai Saka to Saka Junction	200,000,000	
	Lack of market place	Improve access to markets and value addition	Provision of micro processing machine for crop and livestock produce (value addition)	<ul style="list-style-type: none"> • MoA • NEMA • WRUA • Farmers • Pastoralists 	established for vegetables, fruits, milk and meat	No. of products processed	December 2013	Saka centre	4,000,000
Establishment of livestock market for sale of animals			<ul style="list-style-type: none"> • NEMA • MoLD • County Council • WRUA • Administration • Public health 	Livestock market for sale of animals on known market day established (one)	A functional livestock market established	January 2013	Saka centre	800,000	
Purchase of block cutting machine		Construction of slaughter house and tannery	<ul style="list-style-type: none"> • NEMA • MoLD • County govt • WRUA • Administration • Public Health 	Slaughter house (one)	A functional slaughter house established	December 2013	Saka centre	10,000,000	
		Establishment of cement factory (based on the outcome of the baseline survey)	<ul style="list-style-type: none"> • NEMA • MoLD • County Council • WRUA • Administration • Public Health 	Small scale cement factory	Operational cement factory established	December 2014	Daley	10,000,000	
Sub-total									29,800,000
Total									320,500,000

Chapter 11: Stakeholder analysis for right based approach and poverty reduction

The chapter explores the coordination and collaboration of different stakeholders (e.g. permanent, occasional and outsiders) and their roles based on rights, responsibility, relationship and revenues to avoid conflicts and gender disparities while promoting good governance to access and manage land and water resources within the sub-catchment. Furthermore, water and land resources are basic human rights under the new constitution and play a considerable role on economic activities in arid areas therefore harmonized coordination of WRUA plans with stakeholders concerns to reduce poverty, gender parity and alternative livelihoods is paramount.

Stakeholders were identified at different levels e.g. local, intermediate and NGOs & International agencies. The following are identified stakeholders at different levels:

11.1 Local level

- a) WRUA
- b) Chiefs
- c) Village elders
- d) Peace committee
- e) Religious leaders e.g. Imams
- f) Environmental committee
- g) Farmers/ pastoralists
- h) Extension officers
- i) Women leaders
- j) Youth leaders
- k) Parent teachers associations (PTA)/ school management committee (SMC)
- l) Health Facility management committee(FMC)
- m)Relief Committee (RC)
- n) Councilor

The relationship between all these institutions is in Figure 2

11.2 Intermediate level

- a) Ministry of Water and Irrigation (District Water Officer)
- b) Water Resource Management Authority (WRMA)
- c) Office of the President (District Commissioner/District Officer)
- d) Ministry of Livestock Development (District Livestock Production Officer/District Veterinary Officer)
- e) Ministry of Agriculture (District Agricultural Officer)
- f) Ministry of Northern Kenya and Other Arid lands(National Drought Management Authority-Drought Management Officer)
- g) Ministry of Public health and Sanitation (District Public Health Officer)
- h) Ministry of Education(District Education Officer)
- i) Ministry of Local Government (Garissa County Council)

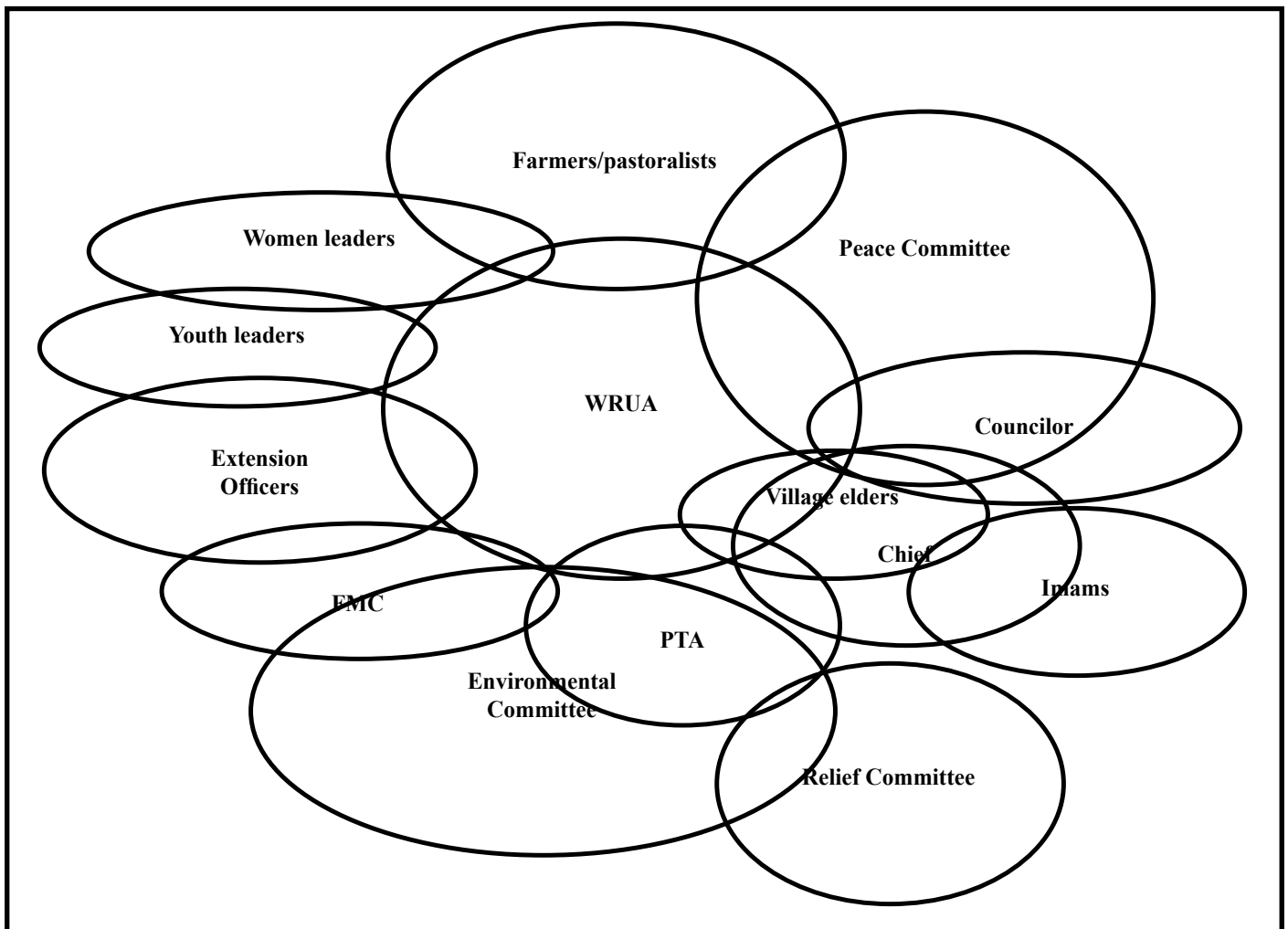


Figure 2. Venn diagram for Saka Community – Local level collaboration and coordination

- j) Ministry of Forestry and Wildlife - Kenya Wildlife Services (KWS), Kenya Forest Service (KFS)
- k) Ministry of Environment and Mineral Resources - National Environment Management Authority (NEMA), Mines and Geology Department

11.3 NGOs and international agencies

- a) Kenya Red Cross Society (KRCS)
- b) Fafi Integrated Development Association (FaIDA)
- c) Care International
- d) World Concern
- e) International Union for Conservation of Nature (IUCN)
- f) Mkono International
- g) Japan International Corporation Agency (JICA)
- h) Veterinaries San Frontier-Belgium(VSF-B)
- i) SIMAHO
- j) Mercy USA
- k) African Development Solutions (Adeso)

11.4 Roles of Local Stakeholders

The community indicated the roles, strengths and weaknesses of local stakeholders (Table 18).

The community and participants developed planned matrix to improve coordination and collaboration between multi-sectoral institutions for harmonization of plans, right based approach and poverty reduction (Table 19).

Table 18. Analysis of local stakeholders in Saka

STAKEHOLDERS	ROLES	STRENGTH	WEAKNESS
WRUA	<ul style="list-style-type: none"> Conservation and management of resources within Saka division Awareness creation on natural resource management Ensure the quality and quantity of natural resource products Grazing management Peace building and conflict resolution Access to water and pasture for pastoralist especially along the River Tana Pest and disease surveillance for human, livestock, crops and wildlife Early warning for drought, flood and conflicts 	<ul style="list-style-type: none"> They are the voice of the community Represent the unity with by-laws Registered by A.G and ministry of social services Have tangible resources conservation through their effort A strong leadership structure (officials/management) 	<ul style="list-style-type: none"> Inadequate knowledge and capacity in natural resources management Lack of exposure Cannot be everywhere within the vast Saka
Chief	<ul style="list-style-type: none"> Sensitization or awareness creation in Barazas Peace building Enforcement of laws and by-laws against natural resource use Monitoring of development activities 	<ul style="list-style-type: none"> Close working relationship with local institution including WRUA Strong influence in abiding of law 	<ul style="list-style-type: none"> Rare in monitoring/ surveillance Few law enforcement officers (administration police) under his/her disposal Inadequate capacity and knowledge on natural resource management
Elders	<ul style="list-style-type: none"> Protection and conservation of natural resources (management and use) within the villages Sensitization and awareness creation Peace building 	<ul style="list-style-type: none"> They have earned trust by the community Strong support from the chiefs, peace committee and government officials Rely on the good will of the youth to give information and enforce 	<ul style="list-style-type: none"> Inadequate knowledge on natural resource use Limited support to traditional institutions and rules, which they rely on No income for their efforts
Peace committee	<ul style="list-style-type: none"> Peace building Maintain law and order Awareness creation Conflict resolution Conflict analysis 	<ul style="list-style-type: none"> Rapid response to conflict resolution Strong support from the government and community 	<ul style="list-style-type: none"> Inadequate knowledge on natural resource management conflict resource resolutions
Religious leaders e.g. imams, sheikhs	<ul style="list-style-type: none"> Sensitization on resource conservation and protection Peace building 	<ul style="list-style-type: none"> Very much trusted Work with community (use religious message to influence on conservation) 	<ul style="list-style-type: none"> No source of income Inadequate knowledge on natural resource management and use
Environmental committee	<ul style="list-style-type: none"> Conservation 	<ul style="list-style-type: none"> Good knowledge on indigenous technical knowledge 	<ul style="list-style-type: none"> Weak traditional institutions and rules, which they rely on
Farmers/pastoralist	<ul style="list-style-type: none"> Food production Income generation Environmental conservation Report on incidence of environmental degradation Surveillance 	<ul style="list-style-type: none"> Very dedicated because it is their livelihood Innovative in developing technologies on natural resource 	<ul style="list-style-type: none"> Conflicts Inadequate knowledge and inappropriate practices in natural resources

STAKEHOLDERS	ROLES	STRENGTH	WEAKNESS
Extension officers	<ul style="list-style-type: none"> Sensitization, training and technical advice on natural resources protection and conservation (agriculture, forestry, soil and water conservation, environmental conservation, livestock production and health, water development) Service delivery Data collection Peace building Community mobilization Surveillance reports Disseminate information on EWS, technology 	<ul style="list-style-type: none"> Work closely with WRUA chiefs/pastoralist and farmers Enhance capacity building Dedicated and volunteers (some) 	<ul style="list-style-type: none"> Poor communication in relation to coverage Inadequate skills on natural resources management Inadequate capacity to respond to emerging issues Inadequate facilities/funds
Youth leaders	<ul style="list-style-type: none"> Sensitization and mobilization Peace building Reporting on incidence on natural resources management Volunteering 	<ul style="list-style-type: none"> Provide link between community and extension workers They have information and knowledge They are trusted and work well the community and elders Dedicated to community natural resource conservation 	<ul style="list-style-type: none"> Inadequate skills on conservation Unemployed Not well recognized by the community
Women leaders	<ul style="list-style-type: none"> Participation in environmental conservation such as tree planting Peace building Engaged in sanitation Food production Provide domestic water use Surveillance reporting 	<ul style="list-style-type: none"> Dedicated Conflict resolution and peace building initiatives 	<ul style="list-style-type: none"> Inadequate capacity on NRM Poor infrastructure curtails their activities
PTA	<ul style="list-style-type: none"> Educate on environmental conservation Sanitation and health Afforestation Peace building Livestock keeping (4K clubs, Wildlife clubs) 	<ul style="list-style-type: none"> Formed clubs health/sanitation and 4K clubs Income generation from sale of goats 	<ul style="list-style-type: none"> Inadequate knowledge on NRM Poor communication and facilities and germplasm seedlings and seeds No fence for conservation
FMC	<ul style="list-style-type: none"> Health and sanitation Sensitization and awareness Environmental conservation 	<ul style="list-style-type: none"> Established/ active environmental conservation 	<ul style="list-style-type: none"> Inadequate knowledge Poor communication
Relief committee	<ul style="list-style-type: none"> Ensure environmental conservation through FFA Peace building and conflict resolution Provide information on food needs 	<ul style="list-style-type: none"> Supply food for work Resolve conflicts 	<ul style="list-style-type: none"> Inadequate information on NRM Corruption Inequality in resource allocation

11.5 Intermediate, National and International Stakeholders and Their Roles

The roles of stakeholders have been summarized below:

	STAKEHOLDER	ROLE(S)
1	Provincial Administration	Sensitization /mobilization of members of the public through Barazas and any other forum, Monitoring of sites once rehabilitated /reprocessed, Enforcing existing laws on conservation, Assist in identifying degraded areas for rehabilitation, Provide the security for all.
2	Kenya Forest service	Give technical advice on tree nursery establishment & management, Rehabilitation of degraded sites, community education, Water bodies conservation (Water friendly trees, Water unfriendly trees, River line maintenance.
3	Ministry of Public Health and Sanitation (MoPHS)	Pollution control through awareness creation in both domestic and community levels e.g. storage/harvesting methods, preservation of water in barazas, Monitoring the water usage in relation to human activities that they render water unfit for human consumption, Controlling and preservation of water as food, Protection of water bodies e.g. springs, dams, shallow /deep wells e.t.c Treatment of water at domestic and community level by provision of chlorine (aqua tabs, water guard and PUR).
4	Ministry of Water & Irrigation(MWI)	Monitoring of water resource management, Supervisory, Provision of technical support e.g. design of water infrastructure
5	Ministry of Agriculture (MoA)	Soil conservation-Mobilization, Laying out of soil conservation structures, Training on importance of soil conservation, Nursery establishment-Mobilization, Training on nursery establishment and management, Training on Agroforestry tree establishment and management, River bank protection-Mobilization, River bank pegging, Training on water friendly trees, Water harvesting-Training, Laying out of water harvesting structure, Efficient use of water (best method for irrigation)
6	Local Authorities – County Council	Sensitization through Baraza, Caretaker of public land- council are trustees of all public land which are sometimes wetlands and wells encroachment can be prevented by county council, Tree planting, Resettlement issues, Funds for protection of springs from –LATIF
7	Religious Institutions	Announcements/ sensitization, Local media, Religious forum to invite the stakeholders
8	National Environmental Management Authority (NEMA)	Water Resources management as per (EMCA), Management of wetlands and water resources, monitoring of environmental degradation and pollution through Environmental Impact Assessment, Enforcement of the Act
9	Irrigation Department	Give technical advice on production of topographic surveys of proposed project, design of irrigation project and BQs and costing, co-implementation of the project with stake holders and farmers, Training of farmers in collaboration with MOA on right crop, soil and water relationship, Assist in design of any recommended drainage works, Educate public on effective and efficient use of water.
10	Fisheries Department	Fisheries data collection-monthly fisheries production data, Regulation of fisheries activities, issuing of licenses and permit to fishermen and fish traders. Promote fish farming activities, technical advice on fish pond construction and fish farming, extension service through collaboration with other stakeholders.
11	Kenya Wildlife Service	Sustainably conserve and manage Kenya's wildlife and its habitat in collaboration with stakeholders for posterity and the future generation, conserve and manage Kenya's wildlife scientifically, responsibly and professionally, community mobilization on wildlife awareness and give technical advice where necessary, carry out control on stray wildlife on the (P.A.C) problematic, assist in groups that have common interest in wildlife conservation and management technical advice and provide funds if available.
12	National Drought Management Authority (NDMA)	Project implementation at community level provision of funds for emergency services, mitigation of drought and enhancing adaptation to droughts.
13	Ministry of livestock and marketing	Give technical advice on livestock production, optimum No livestock on a given squire area, types of pasture and marketing of their products, animal treatment vaccination provision of lab services.
14	Ministry of Education	Provisionbasic education, skills and talent to young people, physical education andschool feeding programme.
15	Mines and Geology Department	Exploration of minerals, keeping of inventory of minerals and other natural resources, provide technical advice on exploitation of minerals, issuing permits and licenses.
16	NGOs and International agencies	Provision of relief food, provision of water and sanitation, provision of seed/seedlings, farm tools to the locals, sensitization and capacity building, promotion of conservation and environmental awareness provision of microfinance to the community members and assisting of school i.e. providing.

11.6 Stakeholder Analysis

The roles of stakeholders at community level have been summarized below:

STAKEHOLDER	RIGHTS	RESPONSIBILITIES	RELATIONSHIP	REVENUES
Permanent user				
WRUA	<ul style="list-style-type: none"> Control and manage access to the natural resources 	<ul style="list-style-type: none"> Equitable distribution of natural resources Formation of by-laws and enforcing them Minimize resource based conflicts (resolving conflicts) Capacity building community Monitoring the resources use Advocacy on proper use Link the community to other stakeholders 	<ul style="list-style-type: none"> Mutual Reciprocal 	<ul style="list-style-type: none"> Membership contributions (money, food, fodder) levy through WRUA Pride/image
Environmental committee (wildlife, range and forest)	<ul style="list-style-type: none"> Control and manage of sector resources 	<ul style="list-style-type: none"> Environmental conservation (sector based) 	<ul style="list-style-type: none"> Mutual Reciprocal 	<ul style="list-style-type: none"> Membership contribution levy charges Income from sale of products
Community Saka(farmers and pastoralists)	<ul style="list-style-type: none"> Equitable access and distribution of all resources Right to usage and management 	<ul style="list-style-type: none"> Conservation and use of natural resources conservation Respect and abide by the by-laws Monitor use natural resource Advocacy on proper use Train on natural resources 	<ul style="list-style-type: none"> Mutual 	<ul style="list-style-type: none"> Food Taxes from products
Government ministries and agencies	<ul style="list-style-type: none"> Support and appreciate the use and management 	<ul style="list-style-type: none"> Sensitization on proper use and management of natural resources Conflicts resolution Protection of natural resources by use of policy Advocacy on proper use Facilitate protection and conservation 	<ul style="list-style-type: none"> Supportive 	<ul style="list-style-type: none"> Fines/levies Permit charges on livestock and crop products and wildlife
Occasional users				
Neighboring Balambala and Sankuri communities	<ul style="list-style-type: none"> Enforce law on natural resources Access to pasture and water use Right to peace Right to information on existing by-laws 	<ul style="list-style-type: none"> Abide by the laid by-laws Ensure and maintain peace Protect and conserve the existing resources 	<ul style="list-style-type: none"> Mutual Reciprocal 	None
Casual labours	<ul style="list-style-type: none"> Peace By-laws 	<ul style="list-style-type: none"> Abide by the by-laws Help in conservation 	<ul style="list-style-type: none"> Mutual 	Income
Outsider group				
Lagdera, Fafi, traders, livestock on transit to livestock market	<ul style="list-style-type: none"> Right to peace Right to information on existing by-laws Access to available water and pasture 	<ul style="list-style-type: none"> Ensure peace Abide by the existing by –laws Protect and conserve the existing resources 	<ul style="list-style-type: none"> Mutual Reciprocal 	Income water and pasture

Table 19. Improve stakeholder coordination and collaboration for harmonization of plans, right based approach and poverty reduction

Target: Foster coordination and collaboration of stakeholders to reduce poverty and overcome barriers in accessing and managing land and water resources
Overall output: Strengthened coordination and collaboration to equitably access and manage natural resources

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Limited coordination between stakeholders, imbalance gender involvement and recurrent conflict on natural resource management	Improve coordination and gender parity in decision making	Strengthen dialogue between traditional and formal institutions to mitigate exacerbation of hazards	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries • Community • NGOs 	Dialogue meetings	Minutes/proceedings of dialogue meetings held per year for three years	May 2013 May 2015 May 2017	Garissa	1,200,000
		Meetings to harmonize implementation of adapted sub- catchment management plan with institutional plans	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries • NGOs 	Technical work plans	No. of work plans developed per year to be endorsed by DSG	March each year (2013-2017)	Garissa	2,000,000
		Facilitate Exchange visits to improve capacity and exposure to drought resilience through effective catchment management	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries 	Exchange visits to other sub-catchment of similar conditions	No. of visits per year for three years Reports	Nov 2013 Nov 2015 Nov 2016	Tana, Ewaso and Athi catchments	2,000,000
		Development of action plan to follow up on learning areas identified through exchange visits	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries • DSG • NGOs 	Action plan developed after every exchange visits	No. of community actions plans developed	Dec 2013 Dec 2015 Dec 2016	Garissa	600,000
		Training on multi-stakeholder processes to reduce conflict over natural resources within the catchment area	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries 	NRM conflict reduction trainings (per year for three years)	No. of trainings and trainees Training report	August 2013 Aug 2015 Aug 2016	Garissa	900,000
		Mainstreaming of gender issues into WRUA activities	<ul style="list-style-type: none"> • WRUA • WRMA • MoG • IUCN • FaIDA • Line ministries 	Gender and mainstreaming workshop	No. of participants Workshop report	December 2012	Garissa	300,000
Sub-total								7,000,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Dry with information especially at local level	Improve information dissemination	Dissemination and packaging of NRM information to local stakeholders	<ul style="list-style-type: none"> • WRUA • WRMA • IUCN • FaIDA • Line ministries 	NRM information packaging and dissemination meeting at community level (one meeting per year for three years)	No. meetings No. of NRM packages developed	Oct 2012 –June 2017	Saka centre	1,000,000
	Promotion of alternative livelihoods to reduce pressure on natural resources and reduce spilling poverty	Identification, promotion and strengthening of alternative livelihood with stakeholders						
Sub-total Total		Development of work plan for identified livelihood activities	Work plan developed per year for three years	No. plans developed	Every year 2013 – 2017	Gariisa	900,000	
		Training and implementation on identified alternative livelihood priorities e.g. restocking		Livelihood projects implemented per year (two per year)	No. of projects implemented and subsequent reports	October 2012 – June 2017	Saka Sub- catchment	5,000,000
Sub-total								6,900,000
Total								14,900,000

Chapter 12: Participatory monitoring and evaluation

Participatory monitoring and evaluation of the water and land resources is a key element in the management of natural resources. Monitoring requires routine measurements and visits to allow the assessment to extract the required information (both quality and quantity). It should identify the pertinent parameters to assess at a given quality in time and space and evaluate the present and future demands. It is necessary to ensure that natural resources and the catchment monitoring systems provide accurate data. It is also advisable for the data to be assessed and analysed in a way that the information needed from the Sub-catchment is available, accurate and timely. Parameters identified for different natural resources are listed in Table 20.

Table 20. Parameters to monitor for different natural resources

RESOURCE	PARAMETERS
Water	<ul style="list-style-type: none"> • Amount (litres/m³) for domestic, livestock, crops/trees, wildlife, environmental flow • Attitude change (No.) • Capacity building (No. of trainings/meetings/trainees, No. and types of training materials, No of exchange visits) • Levels of contamination and pollution for domestic consumption • Type and no. of technologies/practices introduced and practiced
Pasture and forest	<ul style="list-style-type: none"> • Coverage (acres, ha or %) • Livestock body conditions • Survival of seedlings (% , No.) • Attitude change (No.) • Type and no. of technologies/practices introduced and practiced • Capacity building (No. of trainings/meetings/trainees, No. and types of training materials, No of exchange visits)
Wildlife	<ul style="list-style-type: none"> • Species type and abundance • Incidence of poaching • Incidence of human-wildlife conflict • Incidence of pests and diseases • Diversity • Habitat • Attitude change • Capacity building • Capacity building (No. of trainings/meetings/trainees, No. and types of training materials, No of exchange visits) • Type and no. of technologies/practices introduced and practiced
Crops	<ul style="list-style-type: none"> • Yield per ha/acre • Change in land use cover (%) • Amount agro-processed • Capacity building • Attitude change • Quality of agro-processed products • Type and no. of technologies/practices introduced and practiced • Capacity building (No. of trainings/meetings/trainees, No. and types of training materials, No of exchange visits)
Livestock	<ul style="list-style-type: none"> • Species type and abundance • Incidence of pests and diseases • Yield per species or hive (honey) • Amount agro-processed • Quality of products before and after processing • Type and no. of technologies/practices introduced and practiced • Capacity building (No. of trainings/meetings/trainees, No. and types of training materials)
Livelihoods diversification	<ul style="list-style-type: none"> • No. of sustainable NRM business opportunities and their levels of income

The community has natural resource monitoring mechanisms in place especially for pasture, fodder, water and animal body conditions. Pastoral elders and young men travel to far distances in search of better water and pasture for livestock (locally called Sahaan) before the household migrate to the identified sites. The WRUA and chiefs also monitor to control wanton cutting of fodder trees, charcoal burning and conflicts over resource before intervention whenever necessary. To ensure participatory monitoring and evaluation systems during SCMP implementation process community members and other stakeholders involved in SCMP preparation identified activities that need to be formulated (Table 21).

Table 21. Participatory Monitoring and Evaluation of natural resources within Saka Sub-catchment

Target: Establish and strengthen participatory monitoring and evaluation for sustainable management of natural resources and reliable database

Overall output: Enhanced participatory monitoring and evaluation system and natural resource data availed at all levels

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Lack of monitoring plan	Joint monitoring planning	Prepare joint monitoring plan	<ul style="list-style-type: none"> WRUA IUCN WRMA Met Dept NDMA Community Administration Line ministries 	Annual monitoring plan	Yearly monitoring plan developed	Annually (2013-2017)	Saka Centre	500,000
Water quantity and quality	Joint monitoring of water sources	Monitor contamination and pollution levels for all water sources (boreholes, water pans, shallow wells and river)	<ul style="list-style-type: none"> WRUA IUCN WRMA Met Dept NDMA Community Administration Line ministries 	Contamination and pollution levels of all water sources improved	No. of water sources and equipment monitored for contamination, pollution, early warnings, consumption and performance	Annually (2013-2017)	Saka Sub-catchment	500,000
		Monitor water levels, amount consumed and climate data (for all river gauging and hydromet stations, water meters)	<ul style="list-style-type: none"> Community Administration Line ministries 	Status of equipment and data monitored and improved				500,000
Sub-total								1,000,000
Pasture and forest resources	Joint monitoring of pasture and forest resources	Performance of pasture and forest activities (coverage, No and diversity of species, survival rates, regeneration rates, No. of hay bales produced)	<ul style="list-style-type: none"> DPLO WRMA IUCN Environmental committee WRUA FalDA 	Species diversity, cover, regeneration, survival and production	<ul style="list-style-type: none"> Size and status of rehabilitated sites Survival rates of species 	Annually (2013-2017)	100 acres per management unit (pastoral and agro-pastoral) per year within the sub-catchment	1,000,000
		Strengthen traditional monitoring	<ul style="list-style-type: none"> MoA NDMA KFS 	“Sahaan” traditional monitoring of pasture and water strengthened	Improvement to “Sahaan” traditional system	Annually (2013-2017)	500,000	
Sub-total								1,500,000
Wildlife	Joint monitoring of wildlife activities	Performance of wildlife and diversity within Mathahlibaah sanctuary	<ul style="list-style-type: none"> KWS Community WRUA IUCN FalDA MW&E 	<ul style="list-style-type: none"> Species diversity and body conditions Income from conservation of wildlife 	<ul style="list-style-type: none"> Performance of species Amount of income generated 	Annually (2013-2017)	Mathahlibaah Sanctuary	1,000,000
		Monitor performance of crops, fruits and fodder on farms	<ul style="list-style-type: none"> WRUA Community Chiefs MoA MoLD KFS IUCN FalDA MWI WRMA NDMA 	Performance of crops and fodder production (in 25 group farms)	<ul style="list-style-type: none"> Yields per year (for consumption and market) No. of hay bales of harvested and stored Incidence of pests and diseases 	Annually (2013-2017)	Agro-pastoral unit	1,000,000
Sub-total								1,000,000

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Livestock	Joint monitoring of livestock activities	Monitor livestock performance	<ul style="list-style-type: none"> WRUA Community Chiefs MoA MoLD KFS IUCN FaIDA MWI WRMA NDMA 	Livestock production and health	<ul style="list-style-type: none"> Livestock yields (milk, meat, honey, fish meat, hides and skins) produced, consumed/ marketed per season/yr Incidence of pests and diseases 	Annually (2013-2017)	Pastoral and agro-pastoral units	1,000,000
Infrastructure	Joint monitoring of infrastructure	Monitor performance of infrastructural structures	<ul style="list-style-type: none"> WRUA Community MoA MoLD MoWI MoR KFS IUCN FaIDA MWI WRMA NDMA 	Status of infrastructure	Distance, number and size of structures constructed/ rehabilitated	Dec 2014	Saka Sub-catchment	1,000,000
Evaluation	Internal evaluation by implementing partners	Joint evaluation of proposed targets and outputs	<ul style="list-style-type: none"> WRUA Community MoA MoLD MoWI MoR KFS IUCN FaIDA MWI WRMA NDMA 	Evaluation report	Evaluation report documented and accepted	Dec 2016	Saka Sub-catchment Total	2,000,000
Total								9,000,000

Chapter 13: Finance and implementation of project activities

Natural resource management has suffered from chronic under investment for many years. This means that investment needs to be targeted to obtain maximum beneficial impact. At the same time innovative and sustainable approach to financing need to be piloted and established. Potential sources of funds are: Revenue generated by WRUA, WDC funds, Partner funds, Private sector and local funds. The establishment of efficient, effective and sustainable financing mechanism will enable the implementation of adapted SCMP activities.

Currently, the main income for the WRUA is monthly contributions from members but contribution from members is paltry due to lack of financial ability of members to raise the necessary amount for development. The WRUA has treasurer and sub-committee on financial sourcing and management but lacks financial skills. The WRUA management requires intensive and comprehensive capacity building on proposal development and report writing, negotiation skills and resource mobilization, record keeping e.g. adult education, financial and procurement management, information sharing, networking and partnership, sustainability, ownership, operation and maintenance and training on leadership and governance (Table 22). Sound mechanisms for financial sourcing and management will help in initiation and implementation of the proposed activities.

Table 22. Capacity Building on Finance and Implementation of project activities

Target: Capacity build WRUA on finance and resource mobilization (both internal and external) for successful execution of planned ASCMP activities

Overall output: A financially strong and proactive WRUA that implements planned activities on time in place

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Capacity building on proposal development and writing	Capacity build WRUA on proposal development	Training on proposal development and writing	<ul style="list-style-type: none"> WRUA WRMA MoWI IUCN FaIDA MoPV 	A community training (per year for three years)	<ul style="list-style-type: none"> Training reports No. of proposals developed and funded 	October (2013-2015)	Saka Centre	900,000
Negotiation skills and resource mobilization	Capacity build WRUA on resource mobilization	Training on negotiation skills and resource mobilization		A community training (per year for three years)	<ul style="list-style-type: none"> Training reports Level of adaptability to the skills and negotiations 	January (2013-2015)	Saka Centre	900,000
Record keeping	Capacity build WRUA on record keeping	Training on record keeping		A community training (per year for three years)	<ul style="list-style-type: none"> Training reports No. of records developed 	March (2013-2015)	Saka Centre	600,000
Cash books								
Petty cash								
Invoices		Adult education to improve knowledge on reading and writing skills including refresher course	<ul style="list-style-type: none"> MoE WRUA WRMA MoWI IUCN FaIDA 	An adult education centre supported (continuous) for 5 years	<ul style="list-style-type: none"> No. Training sessions No. of trainees able to read and write 	February 2013 – June 2017	Saka Centre	2,000,000
Farm records								
minutes								
Sub-total								2,600,000
Information sharing, networking and partnership	Capacity build WRUA on information sharing and networking	Training on external and internal resource generation	<ul style="list-style-type: none"> WRUA WRMA MoWI IUCN FaIDA MoPV 	A community training (per year for two years)	<ul style="list-style-type: none"> Training reports Skills in use on resource generation 	May 2013 May 2014	Saka Centre	400,000
		Establishment of information centre		An information centre in place	Information centre established and supported	June – Sept 2013	Saka Centre	500,000
Sub-total								900,000
Financial and procurement procedures	Capacity build WRUA on procurement and finance	Training on procurement procedure and financial management	<ul style="list-style-type: none"> Finance and procurement sub-committee of WRUA WRMA MoWI IUCN FaIDA MoPV 	A training per year for two years	<ul style="list-style-type: none"> Training reports Procurement procedures laid and followed in acquisition of items 	April 2013 April 2014	Saka Centre	400,000
Sustainability, ownership, operation and maintenance	Capacity build WRUA on operation and maintenance of equipment	Training on sustainability, ownership, operation and maintenance	<ul style="list-style-type: none"> WRUA WRMA MoWI IUCN FaIDA MoPV 	A training per year for three years	<ul style="list-style-type: none"> Training reports No. Successful projects executed 	Dec 2013 Dec 2014 Dec 2015	Saka Centre	600,000
Upscale leadership and governance on natural resource management	Capacity build WRUA on leadership and governance	Training on leadership and governance	<ul style="list-style-type: none"> WRUA WRMA MoWI IUCN FaIDA MoPV 	A training per year for two years	<ul style="list-style-type: none"> Training reports 	July 2013, July 2015	Saka Centre	900,000
Total								7,200,000

Chapter 14: Mainstreaming and up-scaling of the approach

The adapted SCMP approach is to deliver development goals as well as environmental sustainability that are currently a challenge to development in the arid pastoral zones. The community based approach is a dream plan for the Saka community that currently faces adverse effects of climate change. The community promised to implement and promote the approach within a time frame using own resources and support from the Government and partners. They pledged to embrace appropriate technologies, jointly monitor and evaluate planned activities.

However, the anticipated consequence of the successful implementation of the adapted SCMP in the sub-catchment will be influx from the neighboring areas due to thriving status of natural resources especially pasture and water thereby affecting the benefits to be achieved. Furthermore, it is likely to create natural resource based conflicts within and around the Saka “oasis”. Accordingly, if the plan yields the desired results it’s essential and indispensable to scale up the approach to neighbors, entire Balambala District, Garissa County, ASAL communities, the region and the world to avert the foreseen degradation and achieve similar status on natural resource management.

To scale up the approach, the Government and partners will be required to provide technical and financial support in implementing activities within appropriate time frame (based on seasonal calendar), ensure peace and contribute resources. Also county government and partners are required to mainstreaming adapted SCMP into their development programs, participate in monitoring and evaluation, introduce and seek approval of adapted SCMP by the DSG and development of supportive policies (Table 23). The coming in force of county government system also offer an opportunity for community members and residents of the county to participate actively in management of their resources through adoption of the practices that fit their local conditions than adapt prescriptive management practices applicable to different areas that has different socio-economic and environmental conditions. The devolved government also offer platform where community members and residents of the county can organize themselves to formulate rules on resource management and also strengthen the existing regulations and practices.

Adapted SCMP developed through participatory process can be one of the earlier documents presented to county government for adoption.

Table 23. Activities for mainstreaming and up scaling of the adapted SCMP approach.

Target: Mainstream and scale up the ASCMP approach to sub-catchments in Garissa and other counties with similar environment

Overall output: Adapted SCMP approach mainstreamed into county planning process and adopted by counties and WRUAs

Problem/ Objectives	Activities	Sub-activities	Responsibility	Outputs	Indicators	When	Where	Budget (kshs)
Activities in line with seasonal calendar	Harmonize ASCMP activities with seasonal plans of Saka Community	Seasonal calendar planning	<ul style="list-style-type: none"> WRUA WRMA IUCN FalDA Line ministries 	A plan matrix for adapted SCMP based on seasonal calendar developed	Seasonal calendar based adapted SCMP in place	October 2012	Saka	300,000
Adoption and mainstreaming ASCMP	Mainstream ASCMP into county planning processes	Consult county governments on best ways to mainstream ASCMP into county plans	<ul style="list-style-type: none"> FalDA IUCN WRMA County Gov't 	ASCMP mainstreaming plan formulated	Mainstreaming plan agreed upon by stakeholders	July 2013	Garissa	100,000
		Present ASCMP to Sub-county Steering Group (SCSG) for endorsement and adoption	<ul style="list-style-type: none"> FalDA IUCN WRMA SCSG WRUA County Gov't 	ASCMP presentation and adoption report	SCMP presentation and adoption report successfully completed	Sept 2013	Balambala	200,000
		Present ASCMP to county government for adoption and implementation		Minutes of meetings	Minutes documented and accepted for implementation	Sept 2013	Garissa	100,000
Sub-total								400,000
Up scaling of ASCMP to counties and sub-catchments with similar environment	Up scaling of ASCMP to counties and sub-catchments with similar environment through skills development and formulation of policies on adapted SCMP	Sensitization on adapted SCMP to partners (local and intermediate) in different forums	<ul style="list-style-type: none"> WRUA WRMA IUCN FalDA Line ministries 	Sensitization meetings for partners on the adapted SCMP (two)	Sensitization reports	Nov 2012 March 2013	Saka Balambala	400,000
		Training of partners on adapted SCMP and mainstreaming it into sectoral plans		Partners training on ASCMP at sub-county, county and national levels	Training report No. of partners that mainstreamed ASCMP	Nov 2013 Jan 2014 March 2014 May 2014	Balambala Garissa Mombasa Nairobi	2,000,000
		Contribute to the development of supportive policies for the adapted SCMP		A contribution to policy on sustainable NRM for pastoral areas	Policies in place and functional	April 2013	Garissa Nairobi	500,000
Sub-total								2,900,000
Total								3,600,000

Annexes

Annex 1: Challenges related to forests/woodlands and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Deforestation	Reduced vegetation cover Inadequate fodder Soil erosion Environmental degradation	Pastoralists Agro-pastoralists	Afforestation Reforestation Bylaws Patrols by community scouts, KFS, KWS, Chiefs, environmental committee Sensitization & awareness creation
Fire	Deaths & injuries of animals and people Reduced pasture & fodder cover Reduced biodiversity	Pastoralists Agro-pastoralists, Settlement dwellers Businessmen	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation
Drought	Loss of livelihoods Conflicts over natural resources Influx from outside the sub catchment Overgrazing	Pastoralists Agro-pastoralists, Settlement dwellers, Businessmen	Diversification of livelihoods Bylaws on conflict resolutions
Overgrazing	Reduced pastures and water Soil erosion	Pastoralists Agro-pastoralists	Bylaws Sensitization & awareness creation Grazing management by environmental committee
Soil erosion	Siltation of pans Increased river bank erosion Reduced grass cover	Pastoralists Agro-pastoralists, Settlement dwellers	Bylaws Sensitization & awareness creation Grazing management by environmental committee River bank stabilization
Polythene menace	Livestock feeding on poly bags leading to death pollution of environment	Pastoralists Agro-pastoralists, Settlement dwellers	Recycling & re-use Reduce use of polythene
Charcoal burning	Deforestation of high value trees Inadequate fodder Wildfires	Pastoralists Agro-pastoralists	Afforestation Reforestation Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation
Pollution of water sources	Water sources grossly contaminated and polluted	Pastoralists Agro-pastoralists, Settlement dwellers	Sensitization & awareness creation Dialogue and networking with upstream users Treatment and piped water systems
Mushrooming and haphazard settlements	Reduced vegetation cover – poles and withies for shelter, firewood, charcoal Inadequate fodder and loss of pasture lands	Pastoralists Agro-pastoralists, Settlement dwellers	Sensitization & awareness creation No new settlements Physical planning

Annex 2: Challenges related to rivers and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
River diversion	Reduced water quantity Source of conflicts	Pastoralists Agro-pastoralists, Settlement dwellers	Enforcement of Water Act 2002 Bylaws
Change of river course	Loss of arable land Deaths & injuries livestock and humans Increased erosion	Pastoralists Agro-pastoralists, Settlement dwellers	Monitoring of river course Sensitization and awareness River bank stabilization
Floods	Reduced access to water Loss property Injuries to animals & humans Displacement of settlements Increased bank erosion Increased incidence of water-borne diseases	Pastoralists Agro-pastoralists, Settlement dwellers	Early warning systems Sensitization & awareness creation Settlement to higher grounds River bank stabilization
River bank erosion	Increased soil erosion, Collapsing of river bank Influences change of river course & floods	Pastoralists Agro-pastoralists	Enforce Water, Agriculture Acts and EMCA on riparian reserve Stabilization of river banks Sensitization and awareness creation
Destruction of farms lands	Reduced crop production Loss of livelihood and income	Agro-pastoralist	Early warning systems Sensitization and awareness creation Diversification of livelihoods River bank stabilization
Crocodile menace	Death and/or injuries of animals & humans	Pastoralists Agro-pastoralists, Settlement dwellers	Sensitization and awareness creation Crocodile farming
Mosquito infestation	Increased incidence of malaria & other mosquito related diseases	Pastoralists Agro-pastoralists, Settlement dwellers	Control of stagnant water near settlement Sensitization on mosquito control methods
Spread of <i>Prosopis juliflora</i> (Mathenge) invasive weed	Aggressively competes with indigenous species Loss plant biodiversity Loss cropland and pastures	Pastoralists Agro-pastoralists, Settlement dwellers	Control and management of Mathenge

Annex 3: Challenges on farmlands and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Human-wildlife conflicts	Death &/or injuries of humans Increased game killings	Agro-pastoralists Pastoralists	Sanctuary for wildlife Sensitization and awareness Electric fencing of farms
Inadequate irrigation infrastructure	Low crop production Exposure to risk like crocodile attacks Inefficient use of water	Agro-pastoralists	Development of irrigation infrastructure
Flush floods	Increased erosion Risk of displacement No/limited access to farms causing loss of farm products	Pastoralists Agro-pastoralists, Settlement dwellers	Diversion of floods to pans & rangeland pastures
Destruction of crops and other properties	loss of farm products & properties leading to increased poverty levels	Pastoralists Agro-pastoralists	Early warning systems Sensitization and awareness creation Re-build livelihoods
Lack of fence and protection	Loss of farm products Increased human-wildlife conflicts	Agro-pastoralists	Electric fences Patrols by community scouts, KWS, Environmental committee
Pest and diseases	Loss of farm produce & income	Agro-pastoralists	Integrated pest & disease management
Inadequate capacity on crop production	Low farm yields	Agro-pastoralists	Capacity build farmers
Frequent breakdown of water pumps	Low farm yields High cost of maintenance	Agro-pastoralists	Training pump operators Acquisition of appropriate pumps
Pastoralist-farmers conflicts	Death &/or injuries of humans Loss of property	Pastoralists Agro-pastoralists	Bylaws Patrols by Chiefs, Environmental committee Sensitization & awareness creation Dialogue & conflict resolution by peace committee
Poor roads	Limited access to farms Loss of farm produce & income	Pastoralists Agro-pastoralists	Bush clearing, grading of access roads
Poor market for farm produce	Low income	Agro-pastoralists	Market value chain analysis Construction of market facilities Value additions

Annex 4: Challenges on livestock and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Pests and diseases	Loss of livestock & livestock products	Pastoralists Agro-pastoralists Wildlife	Vaccination & treatments Early warning systems Sensitization and awareness creation
Predators e.g. Hyenas, crocodiles, baboons and lions	Spread of contagious diseases Loss &/or injuries to livestock and humans	Pastoralists Agro-pastoralists	Early warning systems Sensitization and awareness creation Creation of wildlife sanctuaries
Drought	Loss and weakening of livestock herds Reduced quality of livestock products	Pastoralists Agro-pastoralists, Settlement dwellers	Grazing management Livelihood diversification Early warning systems Sensitization and awareness creation
Poor market	Low income	Pastoralists Agro-pastoralists	Market value chain analysis introduction of market days Value additions
Inadequate extension services e.g. veterinary service	Poor livestock body conditions and livestock products Trail & error treatments	Pastoralists Agro-pastoralists	Sensitization, training and awareness to community resource persons
Wild fire caused by charcoal burning	Destruction of fodder, pasture and injuries to animals	Pastoralists Agro-pastoralists	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation
Inadequate pasture	Poor livestock body conditions and/or deaths Increased incidence of livestock/human-wildlife conflicts	Pastoralists Agro-pastoralists	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation Pasture/fodder production Grazing management
Influx from neighboring villages	Overgrazing & depletion of water Increased conflicts over resources Increased incidence of pests & diseases	Pastoralists Agro-pastoralists	Respect bylaws Sensitization & awareness creation Grazing management Conflict resolution
Obstruction of watering corridors	Increased conflicts over access to river water Reduced access to water & overcrowding in accessible corridors	Pastoralists Agro-pastoralists	Respect bylaws Sensitization & awareness creation Conflict resolution Opening up of permanent water corridors
Conversion of pasture land into farmlands	Reduced access to pasture Increased conflicts over pastures	Pastoralists Agro-pastoralists	Respect bylaws Sensitization & awareness creation Conflict resolution
Inadequate water for livestock use	Poor livestock body conditions and/or deaths Increased incidence of livestock/human-wildlife conflicts Long trekking distances	Pastoralists Agro-pastoralists	Strategic water sources

Annex 5: Challenges on wildlife and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Inadequate water	Death/or weakening of animals Increased human-wildlife conflict due to encroachment to human settlement & farms	Wildlife Pastoralist Agro-pastoralist Settlement dwellers	Establish strategic water points Access to existing water sources Opening up of permanent water corridors to the river
Pests and diseases	Loss of animals Spread of diseases to livestock & humans (wild animals as vectors of diseases)	Wildlife Pastoralist Agro-pastoralist	Vaccination & treatments by KWS Early warning systems Sensitization and awareness
Conversion of rangelands to cropland	Reduced access to pasture Increased human/livestock - wildlife conflicts over pastures	Wildlife Pastoralist Agro-pastoralist	Respect bylaws Sensitization & awareness creation Conflict resolution Create wildlife sanctuaries
Increased human-wildlife conflicts	Death &/or injuries of humans Increased game killings	Agro-pastoralists, pastoralist, settlement dwellers, wildlife	Create wildlife sanctuaries Sensitization and awareness creation
Predation by hyenas and crocodiles	Loss &/or injuries to livestock and humans	Wildlife Pastoralist Agro-pastoralist Settlement dwellers	Early warning systems Sensitization and awareness creation Create wildlife sanctuaries Crocodile farming
Destruction of crops and fruits by elephants and Hippos	Loss of farm produce Loss/injury to humans, livestock & wildlife	Wildlife Pastoralist Agro-pastoralist Settlement dwellers	Electric fence Beekeeping Patrols by community scouts, KWS, Chiefs, Environmental committee
No direct income from wildlife	Increased hatred for KWS and wild animals Increased human – wildlife conflict	Wildlife Pastoralist Agro-pastoralist Settlement dwellers	Sensitization and awareness creation on importance of wildlife in local economy Promotion of game farming & ecotourism in the area Create wildlife sanctuaries Game scouts Wildlife clubs

Annex 6: Challenge on fodder and pasture and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Frequent drought	Loss/inadequate pasture and fodder Conflicts over natural resources Influx and overgrazing	Pastoralists Agro-pastoralists, Wildlife	Diversification of livelihoods Bylaws on conflict resolutions Pasture and fodder production and conservation Reseeding Promotion of natural regeneration on degraded sites
Wild fire	Reduced pasture & fodder Reduced biodiversity	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation Fire breaks and grazing management
Overgrazing	Reduced pastures and fodder coverage Soil erosion	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation Grazing management
De-vegetation	Reduced vegetation cover Inadequate fodder	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Afforestation Reforestation Reseeding Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation
Mushrooming of settlement and inland water sources	Reduced vegetation cover – poles and withies for shelter, firewood, charcoal Inadequate fodder and loss of pasture lands	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Sensitization & awareness creation No new settlements and unnecessary inland water sources
Invasive weeds e.g. <i>P. juliflora</i>	Competition with indigenous species Loss plant biodiversity Loss pastures	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Control and management of the weeds
Inadequate water to access far away pastures	Poor livestock body conditions and/or deaths Long trekking distances	Agro-pastoralists, Pastoralists	Strategic water sources
Livestock influx especially those for Garissa market	Overgrazing Spread of pests and diseases Conflicts on resource use	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Bylaws Patrols by community scouts, KFS, KWS, Chiefs, Environmental committee Sensitization & awareness creation of Garissa livestock traders
Wildlife-livestock conflict especially during the dry spell	Death &/or injuries of livestock Increased game killings	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Sanctuary for wildlife Sensitization and awareness Conflict resolution

Annex 7: Challenges on minerals and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Erosion	Loss or depletion of minerals	Pastoralist Agro-pastoralist Settlement dwellers	Building pans??? Rehabilitation of the degraded sites
Poor management and market	Low investment and exploitation Low income Degradation	Pastoralist Agro-pastoralist Settlement dwellers	Market value chain analysis Value additions
Poor market for building blocks, hardcore and gravels	Low investment and exploitation Low income	Pastoralist Agro-pastoralist Settlement dwellers	Market value chain analysis Value additions
Inadequate skills to exploit	Low exploitation levels Health impacts	Miners, settlement dwellers	Capacity building on skills and safe technologies Sensitization and awareness on impacts of exploitation

Annex 8: Challenges on shallow wells and management of the resource in Saka WRUA

CHALLENGE	EFFECTS	AFFECTED	SOLUTION OPTIONS
Collapsing of walls	Deaths and injuries to humans, livestock and wildlife Reduced access to water	Pastoralist Agro-pastoralist Settlement dwellers	sensitization and awareness creation Avoid digging deep wells
Polluted and contaminated water	Diseases and malfunctions Death Reduced productivity	Pastoralist Agro-pastoralist Settlement dwellers	Treatment of water Alternative sources for domestic water
Conflicts between wildlife, human and livestock	Death/or injuries to humans, livestock and wildlife	Pastoralist Agro-pastoralist	Create wildlife sanctuaries Construction of watering points for wildlife Granting wildlife access to existing water sources
Human conflicts	Death and/or injuries Displacement Reduced productivity	Pastoralist Agro-pastoralist Settlement dwellers	Conflict resolution by peace committee Sensitization and awareness creation
Spread and transmission of pest and diseases	Increased incidence of disease Rapid spread and transmission of infectious and contagious diseases	Pastoralist Agro-pastoralist Settlement dwellers Wildlife	Vaccination and treatment of livestock and wildlife Sensitization and awareness creation
Lagha waters filling shallow wells with eroded materials	Reduced access to water Increased contamination and pollution	Pastoralist Agro-pastoralist Settlement dwellers	Strategic construction of shallow/infiltration wells
Labor intensive	Time consuming	Pastoralist Agro-pastoralist Settlement dwellers	Provision of digging equipment's Training on new technologies

Annex 9: List Participants for Adapted SCMP-SAKA

No.	PARTICIPANTS NAME	INSTITUTION	TITLE
1	ABDINOOR D. ABDIRAHMAN	NDMA	DEPUTY-DMO
2.	JUSTUS MUSEE	MWI	DWO-BALAMBALA
3.	NAOMI YATICH	WRMA	TECHNICAL OFFICER
4.	JOHN MUREFI	KWS	DEPUTY WARDEN
5.	BENARD MUSYOKA	MOA	DAO-BALAMBALA
6.	ERIC MWATUNI	MOLD	DLPO-BALAMBALA
7.	HASSAN HAJI FARAH	SAKA WRUA	CHAIRMAN
8.	ADEN DAGANE GEDI	SAKA WRUA	SECRETARY
9.	YUSSUF ADEN GEDI	SAKA WRUA	MEMBER
10.	HALIMA BASHIR ELMOGE	SAKA WRUA	MEMBER
11.	GEDI DIRIYE	SAKA WRUA	MEMBER
12.	MOHAMEDQANI FARAH	SAKA WRUA	MEMBER
13.	ABDI SALAT	SAKA WRUA	MEMBER
14.	MUSE FARAH MUHUMED	SAKA WRUA	MEMBER
15.	HUSSEIN OSMAN	SAKA WRUA	MEMBER
16.	ABDI TORJI ABIKRA	SAKA WRUA	MEMBER
17.	NOOR ADEN	SAKA WRUA	MEMBER
18.	DAUD AHMED KORANE	SAKA WRUA	MEMBER
19.	HASSAN MOHAMED MERIR	SAKA WRUA	MEMBER
20.	DAHIR MOHAMED AHMED	SAKA WRUA	MEMBER
21.	AHMED MUKTAR ALI	SAKA WRUA	MEMBER
22.	ABDULLAHI ABDI NOOR	SAKA WRUA	MEMBER
23.	MOAHMED DUBAT SABAL	SAKA WRUA	MEMBER
24.	ABDULLAHI HUSSEIN	SAKA WRUA	MEMBER
25.	ABDULLAHI AHMED YAROW	SAKA WRUA	MEMBER
26.	MOHAMED IBRAHIM HIRMOGE	SAKA WRUA	MEMBER
27.	ASHA BARE	SAKA WRUA	MEMBER
28.	ATHAN KUNE HUSSEIN	SAKA WRUA	MEMBER
29.	IDRIS ABDIKADIR	SAKA WRUA	MEMBER
30.	BUROW DUBAT	SAKA WRUA	MEMBER
31.	ADAN GABANE	SAKA WRUA	MEMBER
32.	SAHARA ADEN	SAKA WRUA	MEMBER
33.	HUSSEIN SULTAN	SAKA WRUA	MEMBER
34.	KHEIR DAKANE	SAKA WRUA	MEMBER
35.	ABDI GEDI	SAKA WRUA	MEMBER
36.	IBRAHIM KUNE	SAKA WRUA	MEMBER
37.	DR. AHMED MOHAMED	IUCN	PROGRAMME OFFICER- WATER AND WETLANDS
38.	JAAFARSADIQ HASSAN	FaIDA	NRM OFFICER

Annex 10: Coordinates of Major Centres in Saka Sub-Catchment-from transact drives/walks

No.	Name of centre	Coordinates
1.	Hirbai	S 00005'339" E 039011'976" Altitude 221m
2.	Hadley	S 000 06'452" E 0390 14'619" Altitude 208m
3.	Qabobey	S 00007'088" E 039017'456" Altitude 198m
4.	Saka	S 00008'013" E 039019'644" Attitude 192m
5.	Mathahlibah	S 00008'290" E 039019'663" Attitude 189m
6.	Magatho	S 00009'162" E 039023'242" Altitude 190m
7.	Daley	S 00010'612" E 039024'136' Altitude 179
8.	Darderey	S 00010'904' E 039025'555" Altitude 174m
9.	SakaJunction	N 00002'071' E 039022'538" Altitude 296m

Annex 11: Coordinates of Major Laghas and Water Pans in the Sub-Catchment from transact drives/walks

Name of Lahga	Coordinates	
	Start	End
Fadiweyne	S00007'255'' E039015'664'' Altitude 190m	S00006'816'' E039013'015'' Altitude 210m
Qabobey	S00007'425'' E039016'729'' Altitude 191m	S00007'369'' E039016'940'' Altitude 189m
Habarow	S00007'492'' E039018'796'' Altitude 192	
Hadley	S00006'164'' E039013'544'' Altitude 207m	
Masala	S00008'290'' E039019'663'' Altitude 190m	
Mathahlibah	S00008'578'' E039021'414'' Altitude 189m	
Higle	S00002'540'' E039020'540'' Altitude 273m	
Durdarane	S00008'747'' E039022'167'' Altitude 192m	
Abdikadir	S00010'824'' E039025'222'' Altitude 173m	
Suban	S00010'982'' E039025'934'' Altitude 172m	
Jilarba	S00011'238'' E039026'315'' Altitude 172m	
Name of water pan	Coordinates	
Gesilay-Saka junction	N00001'628'' E039022'064'' Altitude 300m	
Nageye-CARE pan	N00002'567'' E039022'635'' Altitude 297m	

Annex 12: Coordinates of minerals sites- from transact drives/walks

Type of mineral	Coordinates
Mud stone	S00009'768'' E039023'122'' Altitude
Ballast and white sand	S00006'219'' E039020'066'' Altitude 214
Hardcore and red sand	S00001'782'' E039020'746'' Altitude 306m
Sand and stone	S00005'238'' E039011'334'' Altitude 212

Annex 13: Plant species (Trees, shrubs and herbs) in Saka

No.	Botanical name	Common Name	Local name (Somali)
1.	<i>Acacia tortilis</i>	Umbrella thorn	Abaq
2.	<i>A. Seyal</i>		Fulai
3.	<i>A. Senegal</i>	Gum Arabic tree	Edad
4.	<i>A. elatior</i>		Bura
5.	<i>A. nilotica</i>	Nile thorn	Tuwer
6.	<i>A. mellifera</i>	Honey acacia	Biliil
7.	<i>A. paolii</i>		Gomor-jerin
8.	<i>A. reficiens</i>		Riig
9.	<i>A. horrida</i>		Sarmaan
10.	<i>Azadirachta indica</i>	Neem tree	Gedqarerow
11.	<i>Balanites aegyptica</i>	Desert dates	Kulanbadhed
12.	<i>B. rotundifolia</i>		Kulan
13.	<i>Boscia coriacea</i>		Qalanqal
14.	<i>B. minimifolia</i>		Megag
15.	<i>Maerua</i> sp		Dumai
16.	<i>Boswellia neglecta</i>	Frankincense	Mirefur
17.	<i>Commiphora africana</i>		Hamesa
18.	<i>C. erythrea</i>		Hagar ad
19.	<i>C. rostarata</i>		Jinow
20.	<i>Commiphora</i> sp		Damaje
21.	<i>Delonix elata</i>		Lebi
22.	<i>Cordia sinensis</i>		Marerwebi
23.	<i>C. quercifolia</i>		Marer
24.	<i>Dobera glabra</i>		Garas
25.	<i>Grewia tenax</i>		Deka
26.	<i>G. villosa</i>		Kamasha
27.	<i>Hyphaene compressa</i>	Doum palm	Baar
28.	<i>Maerua decumbens</i>		Abarmog
29.	<i>Salvadora persica</i>	Toothbrush,	Adhey
30.	<i>Terminalia polycarpa</i>		Hareri
31.	<i>Indigofera</i> spp		Dirqe
32.	<i>Seracocomopsis pallida</i>		Balamabal
33.	<i>Ipomea donaldsonii</i>		Bariborti
34.	<i>Tephrosia</i> spp		
35.	<i>Anistosis tannensis</i>		Mirdis
36.	<i>Duospermum</i> sp		Seerin
37.	<i>Chrysopogon aucheri</i>		Deremo
38.	<i>Chloris roxburghiana</i>		
39.	<i>Sporobolus helvolus</i>		Jerbi
40.	<i>Dactyloctenium aegyptium</i>		Oosdanaan
41.	<i>Entropogon macrostachyus</i>		
42.	<i>Litepes senegalensis</i>		Ilmoqor
43.	<i>Bleriperisperum</i> spp		Banya

Annex 15: Field visit photos



Wildlife of Saka – dung beetle, birds and reticulated giraffe



River bank erosion along Lagha Habarow and overgrazing in communal pastures near Saka Junction



Haphazard settlement and water tankering in Saka

