REPUBLIC OF KENYA

MINISTRY OF WATER & IRRIGATION

COAST WATER SERVICES BOARD (CWSB)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT

FOR

REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Works carried out under

Contract No.: CWSB/WaSSIP-AF/C/25/2013

Report Prepared by:

Zamconsult Consulting Engineers

MAY 2017

ESIA EXECUTIVE SUMMARY

Background

The Coast Water Services Board (CWSB) is a Parastatal (Government Owned and Autonomous) created under Water Act, 2016 and established through a Gazette Notice No. 1328 of 27 February 2004.

CWSB (or the Board) is the agency charged with the responsibility for the effective and efficient provision of water and sanitation services within the Coast Province. The Board undertakes this by contracting Water Service Providers.

CWSB as part of its mandate intends to rehabilitate the Bura Irrigation Scheme domestic water supply, in Bura constituency, Tana River County, the water supply has been under the jurisdiction of the National Irrigation Board (NIB) as shown in the map below,

The site is located at UTM 37 co-ordinates 59218941E and 9869801S.

NIB will hand over the water supply to CWSB who will hand over the duties to an agreed upon WSP

Zamconsult Consulting Engineers has been contracted to undertake the ESIA and RAP for the proposed rehabilitation, as part of the WaSSIP projects with funding from the World Bank.

Study Methods

The study approach and methodology adopted included screening and scoping to determine the extent of the project and desktop data search and analysis for the baseline bio-physical and social environmental parameters of the project area. In addition, the consultant worked with the project design group and was briefed on design approaches to be used. These would provide a guideline on the requirements of the environmental reporting process, for which excerpts have been obtained on salient design information. The Consultant engaged on multi-faceted public consultation process which included; ad hoc roadside interviews, household social and environmental surveys using structured questionnaires duly analyzed, and key informant interviews to institutions and lead agencies and public consultation meetings. Based on these findings and expert judgment, the consultant has compiled the projected social and environmental impacts (positive and negative) likely to emanate from proposed project activities and also the Environmental and Social Monitoring and Management Plan (ESMMP) which details how adverse impacts will be reduced or eliminated and by whom.

Legislative Framework for this Study

The principal National legislation governing issues of environmental concern in Kenya is the Environmental Management & Coordination Amended Act (2015) typically referred to as EMCA. EMCA calls for Environmental Impact assessment (EIA) (under Section 58) to guide the implementation of environmentally sound decisions and empowers stakeholders to participate in sustainable management of the natural resources. Projects likely to cause environmental impacts require that an environmental impact assessment study to be carried out. It is under this provision that the current study has been undertaken.

Other legislation adhered to during this study are the regulations borne of EMCA namely the Environmental Impact Assessment and Audit Regulations 2003; The Environmental Management Act, Coordination (Waste Management) Regulations 2006; the Environmental Management Coordination (Water Quality) Regulations 2006; and the Environmental Management and Coordination (Noise and Excessive vibration pollution Control) Regulations2009 (Legal Notice 61), Air quality Regulations 2009 among others.

Sectoral legislation applicable to this Project include The Water Act 2016, The Irrigation Act, The Lands Act (2012), The Public Health Act (CAP. 242), and the Occupational Health and Safety Act among others.

In addition to the local legislation, the Consultant identified the various World Bank operational policies relevant to the project. These are highlighted in Chapter 4 of this report.

Expected impacts

The expected impacts emanate from the Planning phase, the Construction Phase, The Operation phase and the De-commissioning Phase of the project.

In general, successful implementation of the project will have high socioeconomic benefits to the people and will contribute to their health and well-being. Overall, negative expected impacts are related to rehabilitation of the water supply including the treatment works, pipelines, tanks and water kiosks water kiosks and expansion construction works and operations. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures. The severity and duration of these

impacts can be minimized by ensuring that the construction works are limited to short working sections, and that works are carried out rapidly and efficiently.

Significant Construction Phase impacts are generally significant in magnitude and socially and environmentally adverse but are also reversible, short-term and largely manageable. Construction camp impacts include generation and inappropriate disposal of solid and liquid wastes, increased spread of Sexually Transmitted Diseases (STD) and HIV/AIDs and change of cultural norms from migrant workers. Construction work impacts include noise, dust, disruption of services like water supply, electricity supply and disruption of storm water facilities, loss of flora and fauna. Other detrimental construction phase impacts derive from extraction of materials in borrow and quarry sites and their subsequent haulage and stockpiling. Positive construction phase impacts include economic boost from injected construction money which is spent in the local environment for purchasing food and other supplies, rental accommodation and local travel. Also, there will be opportunity for skills transfer and skills acquisition.

Operation phase impacts will largely be positive benefits accruing from operation of improved water supply and sanitation. These include less water-borne disease, reduced water costs and therefore reduced cost of living, improved access to water, improved comfort and regional prosperity. There will be overall improved quality of life due to multiplier benefits of improved service delivery. However, significant adverse impacts from operations include solid waste disposal from the facilities, and introduction of bills.

De-commissioning of the Project is not envisaged. Project components however will be rehabilitated over time having served their useful life.

Environmental & Social Mitigation and Management Plan (ESMMP)

This was prepared to reduce, minimize or altogether eliminate the adverse impacts. Positive impacts are project enhancements and do not require mitigation.

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
Resettlement	No resettlement is foreseen, as the project is located within the NIB's irrigation scheme and the board has maintained no encroachment to any of the project sites. However CWSB should initiate a meeting with NIB, the County government and WUA to map out a way forward and official hand over	Design/preparation	CWSB
Traffic Congestion	Road Signs and Notices of on-going works; Plan itineraries for site traffic on a daily basis, upon consultation with NIB; The Contractor should effect traffic controls and cleanliness; Control of onsite traffic the Contractor has to ensure that they	Construction	Contractor Supervising Engineer

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
Site Related Oil Spills	Prepare and implement the company procedures for dealing with spills and leaks. In case of spillage the Contractor should isolate the source of oil spill and contain the spillage to the source of leakage Ensure that there is always a supply of absorbent material for spillages; All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.	Construction	Contractor Supervising Engineer
Soil Related Impacts	The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use. Temporary drainage channels or holding ponds can be employed. After completion of the construction works, immediate restoration spreading piled top soil and by sowing adequate grass cover and planting of trees. Plan emergency response measures in case of accidental oil spills.	Construction	Contractor Supervising Engineer
Impact on water resources	Ensure proper solid and liquid wastes disposal mainly from the contractor's camps, sites and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Construction	Contractor, Supervising Engineer NIB Sub-County Water Officer
Socio – Economic Impacts	Unskilled construction and skilled (if available) labor to be hired from the local population. Use of manual labor where possible.	Construction	Contractor, Supervising Engineer Local Chiefs

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	Sensitize workers and the surrounding community on awareness, prevention and management of HIV/AIDS. Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members Enforce and maintain a code of conduct for his employees		
Air pollution	Vehicles and other equipment emissions would be kept to a minimum by servicing and maintaining the equipment to manufacturer's specification. The Contractor should also make use of the readily available labour.	Construction	Contractor Supervising Engineer
Noise and Dust	Avoid night time construction with loud machinery when noise is loudest. No discretionary use of noisy machinery within 50 m of residential areas and near institutions such as schools Good maintenance and proper operation of construction machinery. Where possible, ensure non mechanized construction to reduce the use of machinery	Construction	Contractor Supervising Engineer CWSB
Loss of flora and fauna	Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction. The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks; Provision of dustbin and sanitation facilities.	Construction	Contractor Supervisor – project Engineer to consult CWSB NIB
Public Health and Safety	Ensure that all construction machines and equipment are in good working conditions and to manufacturer's specifications. Establish a Health and Safety Plan (HASP). Appoint a trained health and safety team.	Construction	Contractor Supervising Engineer CWSB

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	Provide workers with appropriate personal protective equipment (PPE). Provide workers with adequate drinking water and breaks. Provide workers training on safety procedures and emergency. Water spray murram and earth roads. Provide appropriate human and solid waste disposal facilities Cordon off the trenches being worked on. Provide crossing points within trenches Provide clean toilets for workers.		
HIV and AIDS impacts	Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS. Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members	Construction	Contractor Local Administration Public Health Officer
Service Delivery Impacts	Provide appropriate signage. The contractor should communicate any intended disruption of the services to enable the people to prepare. Areas being trenched to be temporarily cordoned off. In the event that delivery trucks damage parts of the road, repair the spots in consultation with the local authorities.	Construction	The Contractor
Gender empowerment impacts	Ensure equitable distribution of employment opportunities between men and women Provide toilets and bathrooms.	Construction	The contractor The Supervising Engineer CWSB
Cultural Heritage	Use of "chance find" procedures by the contractor.	Construction	The Contractor County Government
Child Labour and Protection	Ensure no children are employed on site in accordance with the law	Construction	Contractor Supervising Engineer

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police		Local Administration
Gender Equity, Sexual Harassment	The works contractor should be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy. The contractor should prepare and implement a gender action plan,	Construction	Contractor Supervising Engineer Local Administration
Liability for loss of life, injury or damage to private property	Provision of PPE. The workers should receive requisite training. There should be adequate warning and directional signs. Ensuring that the prepared code of conduct for staff. Develop a site safety action plan. Cordon off unsafe areas Provide first Aid kit within the construction site. Recording of all injuries that occur on site. Contractor to ensure compliance with the Workmen's Compensation Act. The Contractor to repair any damage done to private property.	Construction	Contractor Supervising Engineer
Generation of solid and liquid waste	Provide adequate waste disposal facilities. Put in place adequate and efficient sanitary facilities for handling liquid waste. In the long term the respective WSPs and CWSB should invest in a waste water collection and treatment system.	Operation and Maintenance	Approved WSP CWSB
Introduction of Billing	Use of tariffs that incorporate WASREB tariff policy. Discussion between NIB, CWSB, the county and the WUA on duties and responsibilities in the operation and maintenance of the water supply	Operation and Maintenance	Approved WSP CWSB NIB County

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
Noise	All the vehicles and machinery should be operated in compliance with relevant vehicle emission standards and manufacturer's specification to minimize noise and air pollution.	Operation and Maintenance	Approved WSP
Impact on Water Resources	Wastewater will be channeled to the sewerage system if available or constructed septic tanks. Pit latrines can be used where sewerage system is not available or where construction of septic tank is not feasible. All solid waste will be collected from generation points, safely transported to the central place where it is sorted out by type and then safely disposed according to type.	Operation and Maintenance	Approved WSP County Government

Conclusion

The ESIA concludes that the project has a potential to improve both the social and economic aspects of the areas being affected. It will primarily bring about better distribution of water within the areas being served. It will also bring about employment during project implementation and supply sufficient potable water to meet projected future demands of domestic and other uses in the project area. In summary although the adverse impacts are present, the positive aspects outweighs them.

The adverse impacts on the physical and natural environment will be "in sum total," not significant, and can be handled through the recommended mitigation measures at a cost of K.Shs. 6,940,000.00.

Table of Contents

List of Tables

List of Figures

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
CBO	Community Based Organization
EMCA	Environment Management Coordination ACT
RAP	Resettlement Action Plan
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
GoK	Government of Kenya
HIV	Human Immunodeficiency Virus
ID No.	Identity Card Number
KAPP	Kenya Agricultural Productivity
K.Shs.	Kenya Shillings
KFS	Kenya Forestry Service
KWS	Kenya Wildlife Service
MDG	Millennium Development Goals
CWSB	Coast Water Services Board
MWI	Ministry of Water and Irrigation
NEMA	National Environment Management Authority
NIB	National Irrigation Board
NGO	Non-Governmental Organization
NMK	National Museums of Kenya
NPEP	National Poverty Eradication Plan
O&M	Operation and Maintenance
PEC	Poverty Eradication Commission
WUA	Water Users Association
WSB	Water Services Board
WSP	Water Services Provider
WSS	Water Supply and Sanitation Services
m^3	cubic metres

1 INTRODUCTION

The Coast Water Services Board (CWSB) is a Parastatal (Government Owned and Autonomous) created under Water Act, 2016 and established through a Gazette Notice No. 1328 of 27 February 2004.

CWSB (or the Board) is the agency charged with the responsibility for the effective and efficient provision of water and sanitation services within the Coast Province. The Board undertakes this by contracting Water Service Providers.

Seven Water Services Providers (WSPs) whose areas of jurisdiction correspond with the seven initial districts of Coast Province, namely, Mombasa, Malindi, Kilifi, Kwale, Taita and Taveta, Lamu and Tana River have been appointed by the Board to provide water and sanitation services in their respective jurisdictions. The WSPs are Mombasa Water and Sanitation Company (MOWASCO), Malindi Water and Sanitation Company (MAWASCO), Kilifi Water and Sanitation Company (KIMAWASCO), Kwale Water and Sanitation Company (KWAWASCO), Taita and Taveta Water and Sanitation Company (TAVEVO), Lamu Water and Sanitation Company (LAWASCO) and Tana River respectively.

Unlike in other parts of the country, CWSB is also the water undertaker for the Coastal Bulk Water Supply System. Additionally, the Board is the asset holder of all public water and sanitation facilities within its area of jurisdiction.

CWSB as part of its mandate intends to rehabilitate the Bura Irrigation Scheme domestic water supply, in Bura constituency, Tana River County, the water supply has been under the jurisdiction of the National Irrigation Board (NIB), however there will be a transfer duties once the construction is complete.

Zamconsult Consulting Engineers has been contracted to undertake the ESIA for the proposed rehabilitation project, as part of the WaSSIP projects with funding from the World Bank.

1.1 OBJECTIVES OF THE ASSIGNMENT

Objectives of the ESIA carried out by Zamconsult Consulting engineers were;

- To fulfil the legal requirements as outlined in EMCA EIA regulations.
- To fulfil the World Bank policies on any development project.
- To obtain background biophysical information of the site, legal and regulatory issues associated with the project;
- To assess and predict the potential Impacts during site preparation, construction and operational phases of the project;
- To propose mitigation measures for the potential significant adverse environmental impacts and safety risks;
- To assess the legal and regulatory framework governing the project;
- To allow for public participation;
- To lower project cost in the long term;
- To prepare an Environmental and Social Management and Mitigation Plan
- To prepare an environmental and social monitoring plan; and
- To compile an EIA Project Report for submission to NEMA.

1.2 METHODOLOGY OF WORK

The ESIA was carried out in a manner considered to be commensurate with the scale, technicality and sensitivity of the project. The chief stages in the process included proposal definition, screening, scoping, key informant & household consultations, impact assessment, mitigation, review, decision making and monitoring. To maintain high standards for this ESIA, recommendations have been inculcated into the project development process. This is meant to serve as a stepping-stone to consent from environmental regulators and financial backers and a management tool for use during project planning and execution. It will also help evade unnecessary impacts, delays and unanticipated costs.

By use of a holistic approach, the consultant obtained the necessary baseline data and information on the key aspects of the ESIA study. The following two major data collection and analysis processes were applied to carry out the ESIA.

1.2.1 Desktop Studies

This mainly involved;

- Checklist that consists of a simple catalogue of environmental factors which are compared to the activities to be developed.
- Early meetings with the Client to deliberate on the proposed project, keeping in mind the various sites and activity options under consideration;
- Assembly and review of baseline data, maps, reports and any relevant information on the existing environmental and social conditions of the Project Area influenced by the proposed development;
- Review of existing Legislation, Regulation and Policies relevant to the proposed Project;
- Review of proposed Project Engineering Designs, previously carried out ESIA reports and Construction Inputs, including anticipated technical processes if any.

1.2.2 Field Investigations

Activities implemented during field investigations involved;

- Site visits to the Project Area and the neighboring areas within the zone of influence of the project.
- Photographing the significant aspects to aid in describing baseline environmental and social conditions of the Project area and its influence zone.
- Acquisition of relevant documents from the authority such as Local government, licensing board which is within the Project influence zone.
- Public Consultations

The main purpose of the field investigation was to verify information and data collected during the desktop study and earlier field investigation and collection of any new information that may assist in the assessment of impacts and design mitigation measures.

2 PROPOSED PROJECT DESCRIPTION

2.1 LOCATION

Bura Irrigation and Settlement Scheme Domestic Water Supply is located in Meti sub location in Bura location of Tana North sub-County, Tana River County about 50Km North of Hola as shown in the map below:

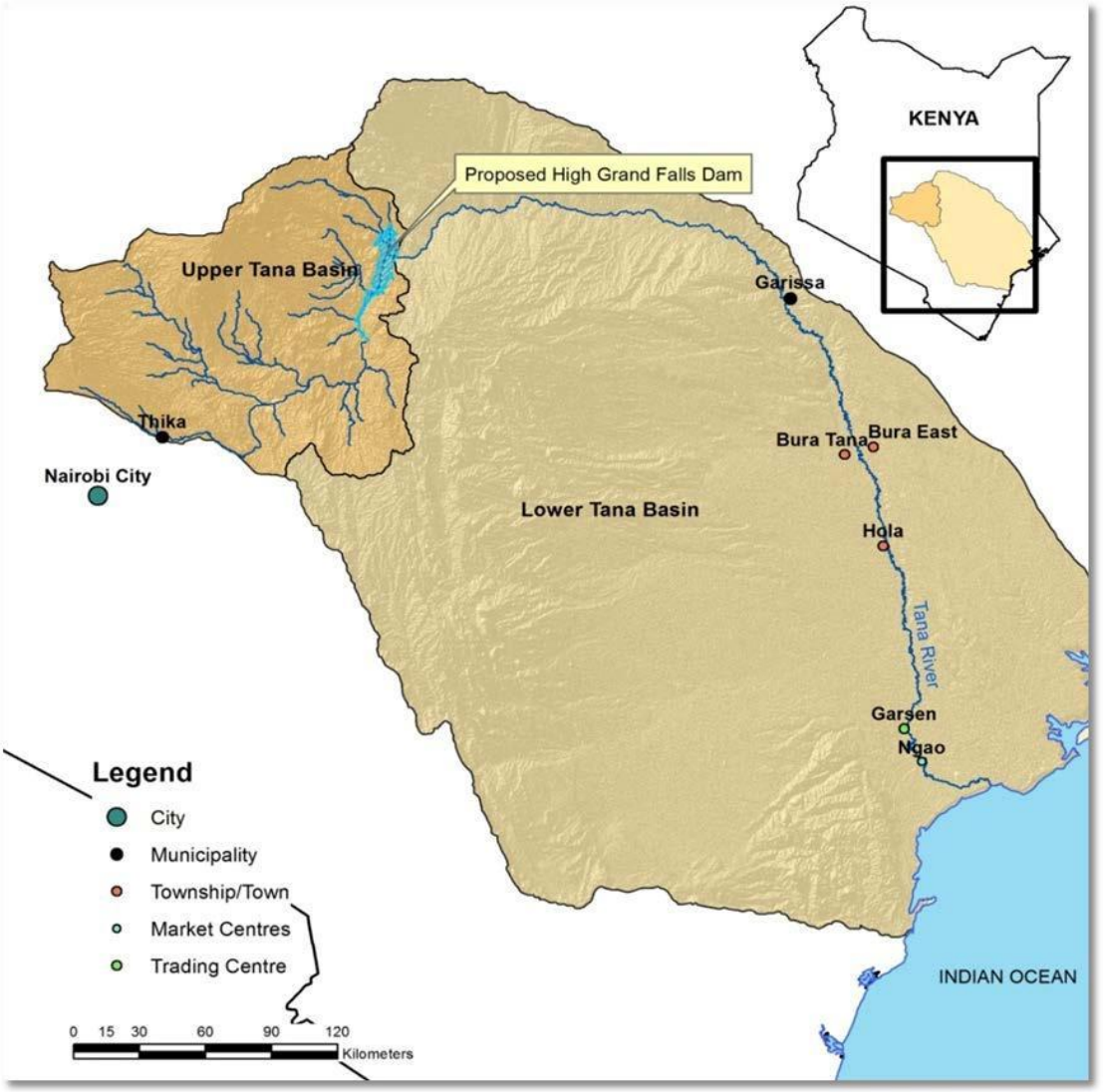

Figure 2-1: Map Showing the Location of the Project Area

The project is located epicenter is located at UTM 37 co-ordinates 59218941E and 9869801S, this area houses the water treatment works, from here the water is distributed to the various centres including:

1. The Main town centre which is known as Manyatta.
2. Villages 1-10.
3. The staff houses at the scheme.

2.2 THE EXISTING WATER SUPPLY

The existing water supply system was constructed in 1982 with an aim of providing the residents of the Bura Irrigation Scheme, its employees with domestic water. The water supply is currently under the National Irrigation Board, that operates all components of the project currently, however it will hand over all aspects of the water supply to Coast Water Services Board for rehabilitation and maintenance in the future. The current water supply system serves all areas of the Irrigation Scheme which include:

1. The Main town centre which is known as Manyatta.
2. Villages 1-10.
3. The staff houses at the scheme.

2.2.1 Source of Water

The water supply system sources water from the main canal that draws water from the River Tana at Nanighi, a distance of 43Km from Bura. The domestic water gets water from the main canal just upstream of Manyatta centre and the Treatment works. Where it flows by gravity to the treatment works.

The water from the River Tana enters the main canal via a pumping system and flows by gravity to the farms. The farmers in the area pay a fee to NIB to maintain the pumping of water in the canal, as such never had to pay for the treated water, since it was included in the payment.

2.2.2 Intake Works to the Treatment Works

Bura Domestic Water supply intake is comprised of a short diversion channel from the Main

Irrigation Canal with a control gate allowing water to gravitate through 18'' UPVC pipe that delivers the water into a raw water sump at the Water Treatment Plant about 300m away. The water is made to pass through screens before being collected into a sump from where the raw water low lift pumps pump it to the two raw Water collection tanks for commencement of the treatment process.

The intake is currently in good working condition. The screens require replacement and the collection sump requires minor repair work.

2.2.3 Water Treatment Works

The treatment works were constructed in the late 1970's and were constructed to treat more than 5200m^3 of water a day.

The existing system is currently made up of two 900m^3 Sedimentation tanks with cascading aerators, six vertical flow clarifiers, six rapid sand filters and a clear water tank. The treated water is stored in two reinforced concrete tanks from which it is pumped by a high lift pump to a 25m high tank that distributes water to the scheme.

The current treatment works are currently dilapidated and are not efficient in treating the water. Thus the water being distributed is very turbid and not fully treated as shown in the figure below:

Figure 2-2: Sedimentation Tank

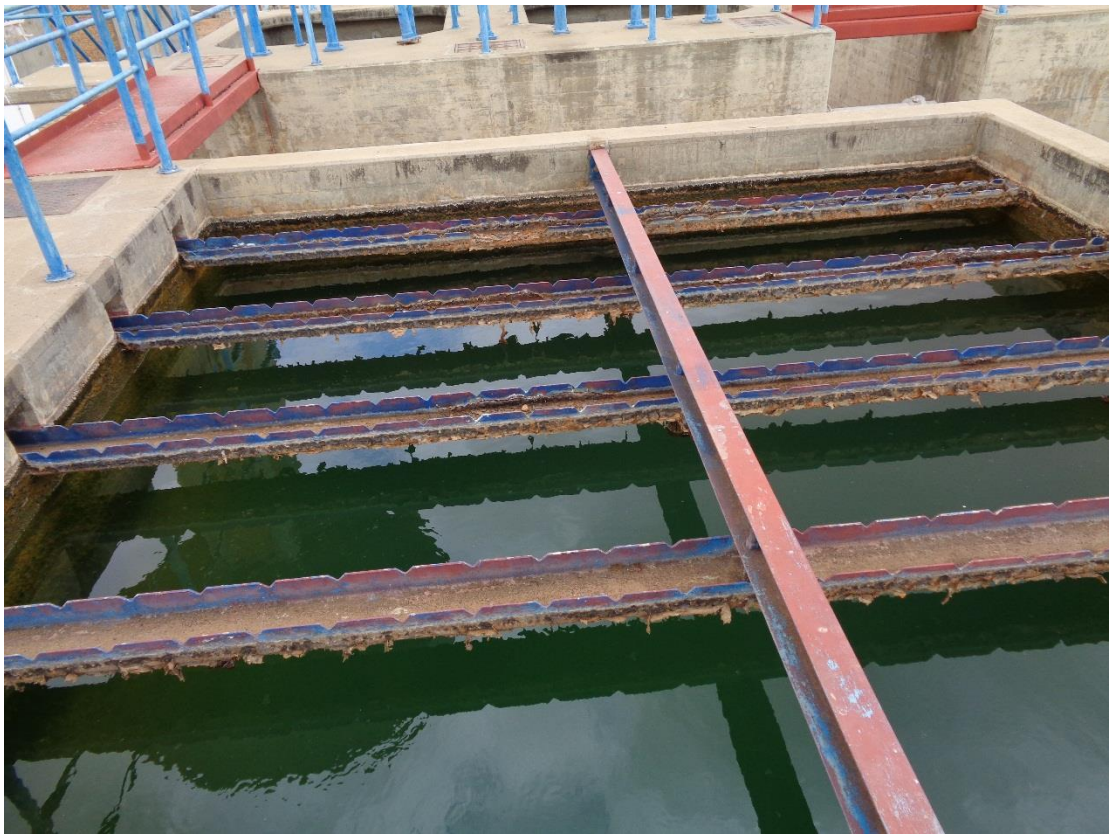

Figure 2-3: Clear Water Tank

The pump house, office and dosing lab are currently not functional. Thus forcing people to fetch water directly from the treatment works using motorcycles and carts.

2.2.4 The Distribution Network

The entire scheme is covered by the distribution system as shown in the figure below:

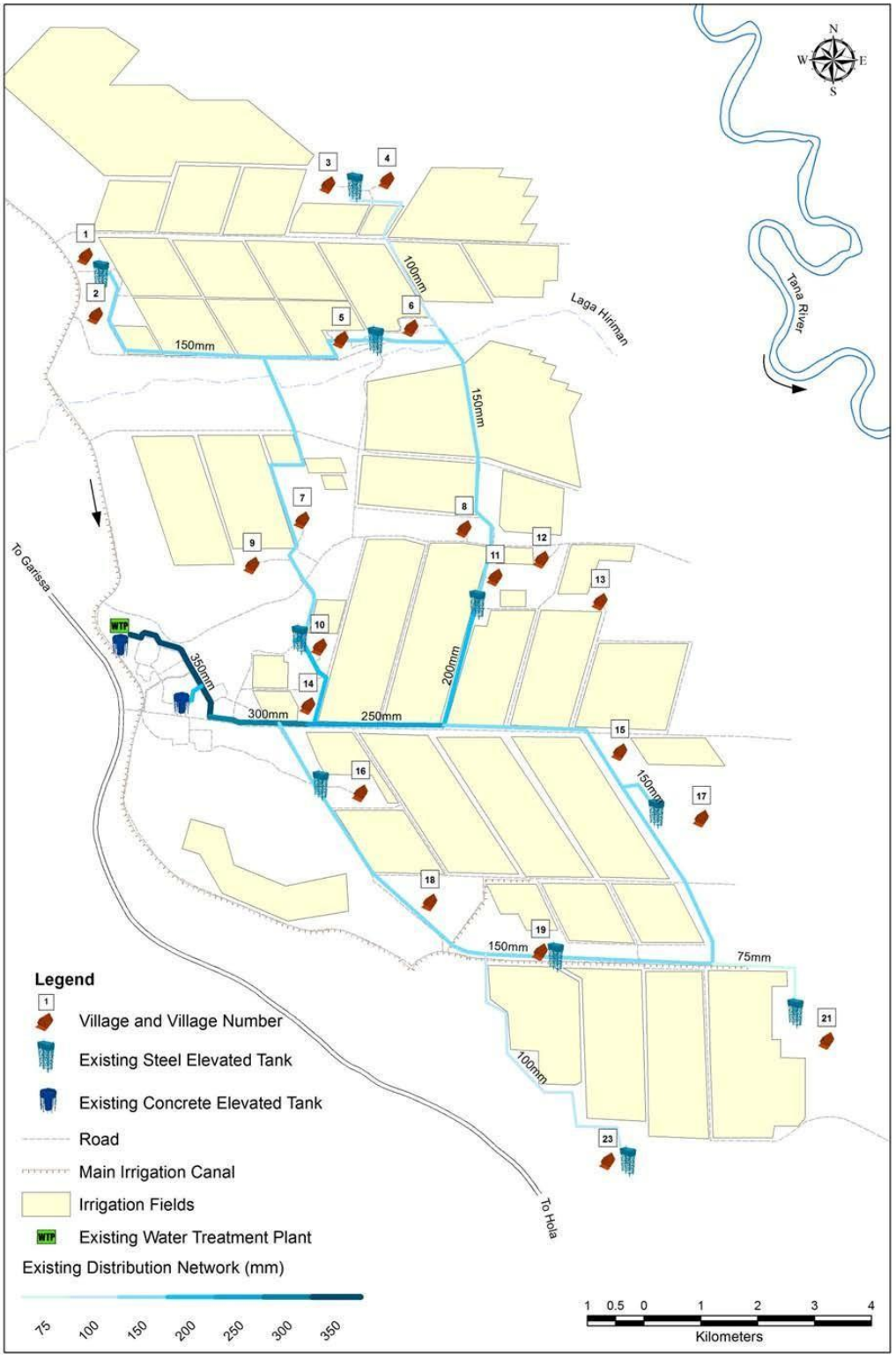

Figure 2-4: Existing Distribution Network in the Scheme

The distribution network covers village 1 - 10 within the scheme as well as the main town centre known as (manyatta).

The pipeline network is in place however water tests have not been conducted and are not in use. Some of the pipelines have fallen into disrepair at some sections.

2.2.5 Storage Facilities

The entire scheme is served by the following tanks:

1. 6 elevated tanks that serve villages 1-10
2. 1 concrete elevated tank of 600m^3 capacity to feed the village tanks

Water Kiosks are also in place.

Most of the steel tanks are in disrepair and are currently not in use. The main tank at the treatment works is also not in use due to the lack of oil for the high lift pump.

2.3 OBJECTIVES OF THE PROJECT

The main objective of the project is to rehabilitate the dilapidated elements of the water supply system in Bura Irrigation Scheme. CWSB will take over the water distribution system from the National Irrigation Board.

2.4 PROJECT FEATURES

The rehabilitation works include the following works:

1. Repair of water works structures: pump house, Concrete water tower, offices, Laboratory, stores, sedimentation tanks, coagulation basins, filters, valve chambers, workshops and chemical dosing room
2. Equipping of the dosing Laboratory
3. Equipping of all offices with furniture and Desktop computers together with accessories.
4. Repair of Distribution Mains to the Rural Centre, Manyatta and Godia, 4" diameter UPVC line of 4Km.
5. Construction of Resident Engineer's Office as per drawing to be used by WSP after Completion.
6. Construction of Water Kiosks in 10 villages.
7. Repair of Rising and distribution mains to the first 10 villages. 250- 100mm diameters of 1.5Km
8. Repair of Bura Pick up G.K A168L and purchase of 4 No. motor Bikes for use by the Water Supply after project completion.
9. Repair of 6No. Steel elevated tanks, 1 No. elevated concrete tank and all 7 No. Chain link fences of 20m x 20m.
10. Power connection and purchase of 60 litres of Transformer Oil for pump testing.
11. Purchase and replacement of 3No pressure gauges, 4 No Bulk meters20 No consumer meters, 20 No valves and fittings.

Most of the sites have a fixed location with the exception of the pipelines. The proposed 4 Km of pipeline to be fixed is an estimate for repair works to be done along the pipelines, after leak detection during the proposed water tests. Thus the repairs to be carried out will be on areas where leaks occur.

2.5 PROJECT COSTS

The proposed project is estimated to cost K.Shs. 80,000,000.30 (Eighty One Million and Thirty Cents) Summarised in the table below:

Table 2-1: Breakdown of Project Costs

No.	ITEM	COST IN K.SHS.
1	Repair of water works structures: pump house, Concrete water tower, offices, Laboratory, stores, sedimentation tanks, coagulation basins, filters, valve chambers, workshops and chemical dosing room	11,000,000.00
2	Equipping of the dosing Laboratory	1,400,000.00
3	Equipping of all offices with furniture and Desktop computers together with accessories.	1,500,000.00
4	Repair of Distribution Mains to the Rural Centre, Manyatta and Godia, 4" diameter UPVC line of 4Km.	12,000,000.00
5	Construction of Resident Engineer's Office as per drawing to be used by WSP after Completion.	5,000,000.00
6	Construction of Water Kiosks in 10 villages.	4,000,000.00
7	Repair of Rising and distribution mains to the first 10 villages. 250- 100mm diameters of 1.5Km	9,000,000.00
8	Repair of Bura Pick up G.K A168L and purchase of 4 No. motor Bikes for use by the Water Supply after project completion.	1,700,000.00
9	Repair of 6No. Steel elevated tanks, 1 No. elevated concrete tank and all 7 No. Chain link fences of 20m x 20m.	6,500,000.00
10	Allow for site camp and other contractual requirements.	3,000,000.00
11	Allow for supervision	1,795,925.00
12	Power connection and purchase of 60 litres of Transformer Oil for pump testing.	2,000,000.00
13	Purchase and replacement of 3No pressure gauges, 4 No Bulk meters20 No consumer meters, 20 No valves and fittings.	3,200,000.00
14	Allow for General cleaning and system testing.	600,000.00
	SUB-TOTAL	**62,695,925.00**
	Add 10% contingency	6,269,592.50
	TOTAL	**68,965,517.50**

No.	ITEM	COST IN K.SHS.
	Add 16% VAT	11,034,482.80
	GRAND TOTAL	**80,000,000.30**

2.6 ALTERNATIVES TO THE PROJECT

Currently, there are no alternatives to the proposed project, since majority of the structures are in place and are only in need of rehabilitation.

2.6.1 Do Nothing Alternative

This alternative involves not carrying out the rehabilitation on the project. This will leave the treatment works in disrepair leaving the people in the project area without access to clean and treated water, forcing them to rely on the untreated often contaminated water from the canals as shown in the figures below:

Figure 2-5: Children Fetching Water and Swimming in one of the Canals

Figure 2-6: Children Fetching Water in Manyatta

3 PHYSICAL, BIOLOGICAL AND SOCIAL BASELINE CONDITIONS OF AFFECTED ENVIRONMENT

This Section discusses the baseline situation in respect of climate, topography, air quality, soils and geology, hydrology, terrestrial ecology, cultural heritage sites and socio-economic structure as well as existing infrastructure and utilities such as water, sewerage, transportation network, electricity, air transport and telephone/telecommunications and solid waste management in the region of the proposed project.

3.1 ENVIRONMENTAL AND SOCIAL ECONOMIC SURVEY

3.1.1 Bura Irrigation Scheme Domestic Water Supply

The socio-economic situation of the area was captured based on findings of a household survey carried out using a structured questionnaire. A sample group of 200 households was interviewed for purposes of the analysis.

1) Population dynamics and household characteristics

The study established that 5-18 and 19-35 years were the dominant age groups in the area as shown in Figure 3-1. This indicates that the youth are majority (43% and 25% respectively). With the possibility of the youth lacking sustainable jobs, they should be involved in a project they can term as their own.

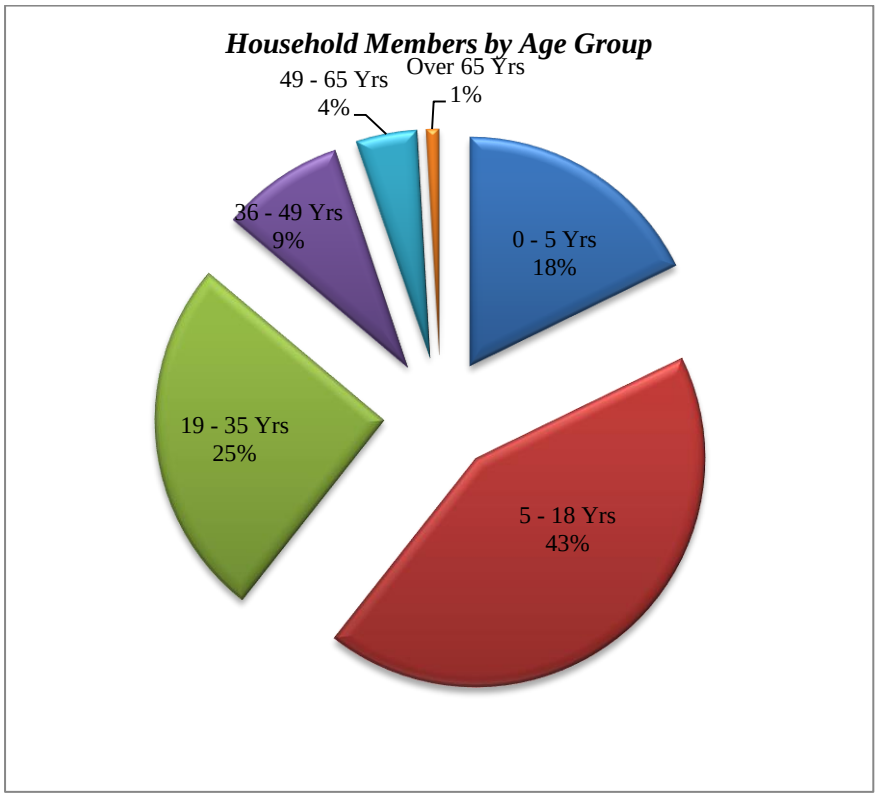

Figure 3-1: Age of Population

Source: Survey Data

A significant portion of Bura residents have attained the basic education as indicated in the figure below. The illiterate represent 27% of the population implying that something has to be

done to take the figure lower. With education, residents may have little or no trouble in understanding the project and the benefits they would reap from it.

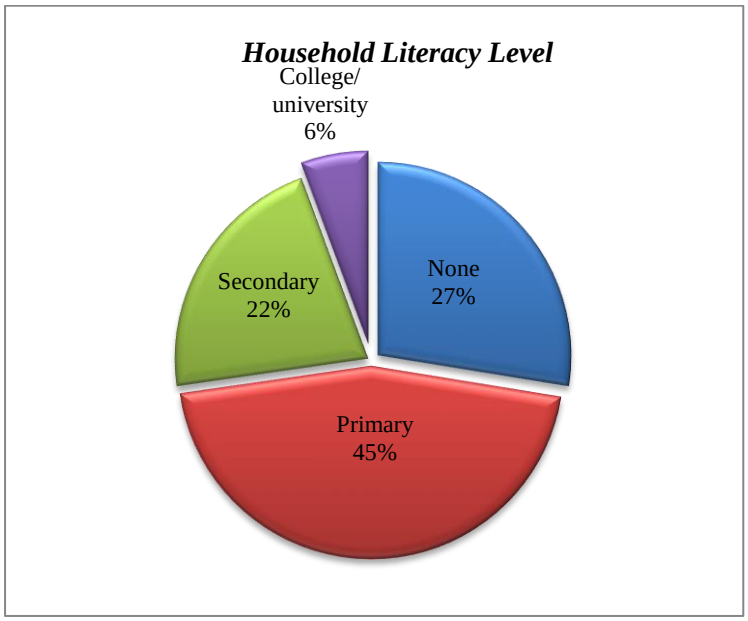

Figure 3-2: Household Literacy Levels

Source: Survey Data

Muslim is the dominant religion in this region as shown in figure 3-3 (83%). Christianity is the only other religion as represented by the sampled population.

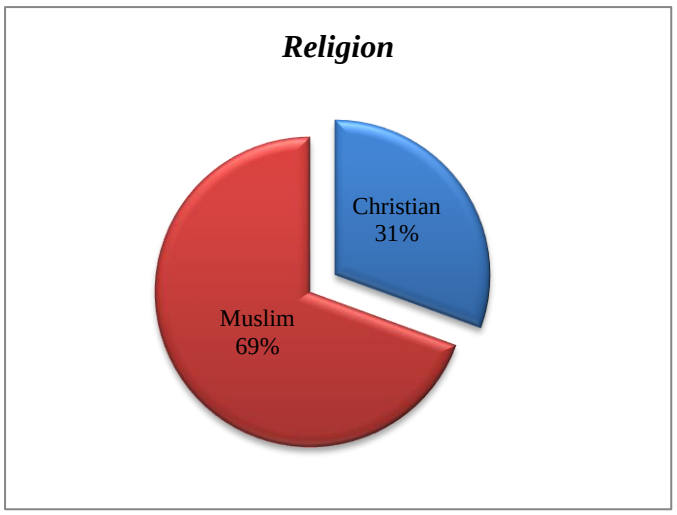

Figure 3-3: Religion of Population

Source: Survey Data

Firewood (50%) and charcoal (47%) are the most used sources of fuel as indicated in figure 3-4. The commonly used sources of fuel imply the destruction of the environment ecosystem. Afforestation and reforestation should be practiced and more environmental friendly fuels should be used. Sensitization on effects of destruction of the forest should be encouraged to the local community and other options given to avoid environmental destruction.

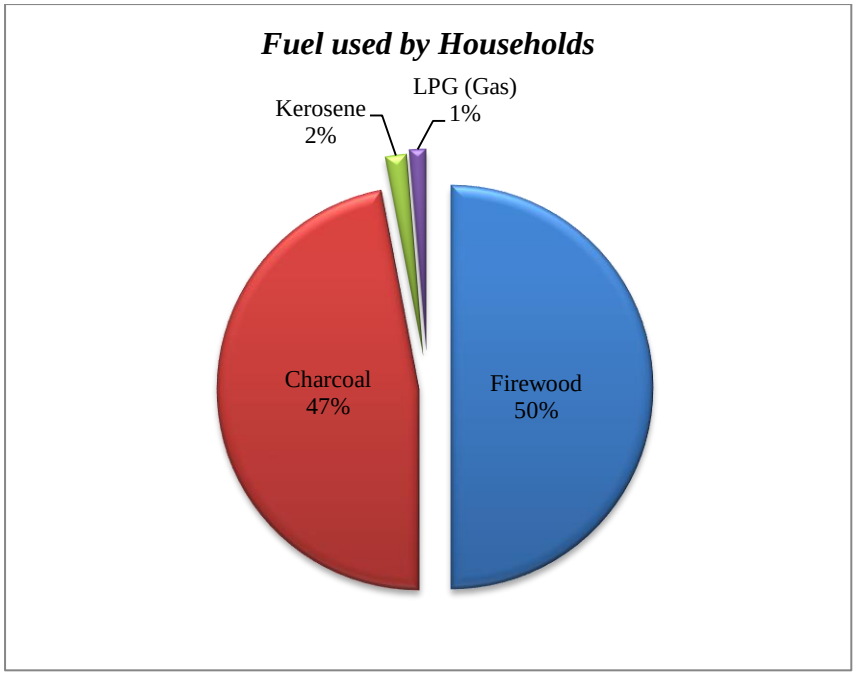

Figure 3-4: Source of Energy

Source: Survey data.

2) <u>Socio-economic activities and land use patterns</u>

Farming is the principal economic activity practiced in the area. There is need for diversification to reduce on the overdependence on farming and the negative effects that may result due to lack of water.

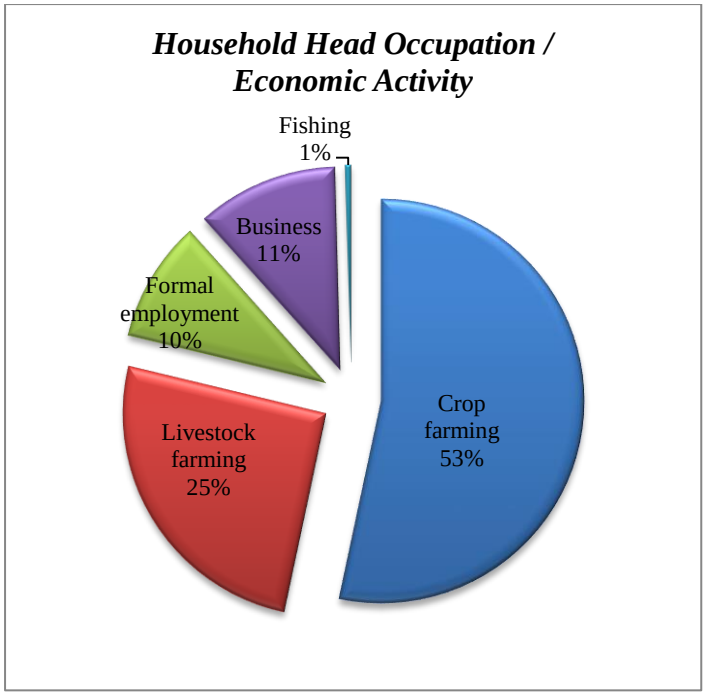

Figure 3-5: Household Socio-economic Activities

Source: Survey data.

Most of the people earn below Kshs.15,000 (81%) and Kshs.30,000 (17%) as indicated in figure 3-6

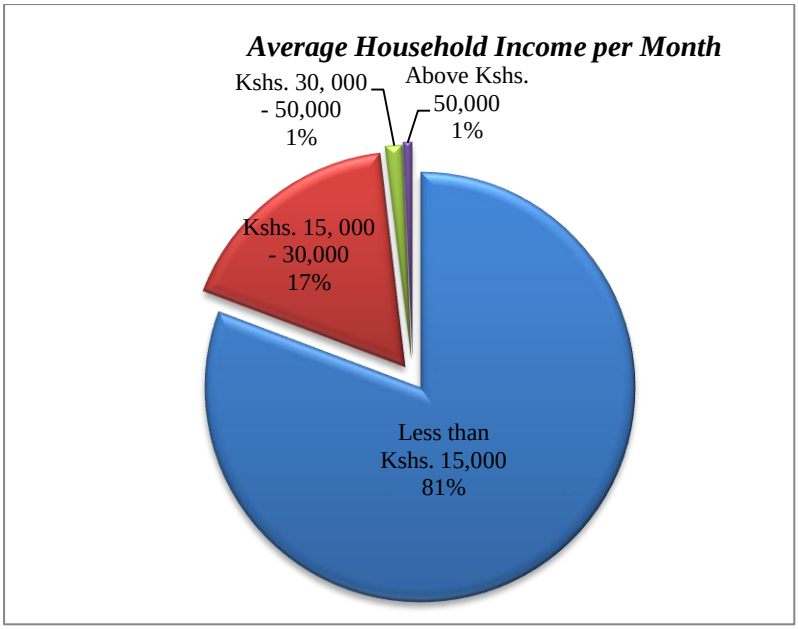

Figure 3-6: Average Household Income per Month

Source: Survey data.

Maize is the major crop grown in the area comprising 93% of the total crops grown. Other crops grown in a minor scale are vegetables, beans and cashew nuts. There is a need to diversify the crops being planted in order to have a variety of nutritious meals.

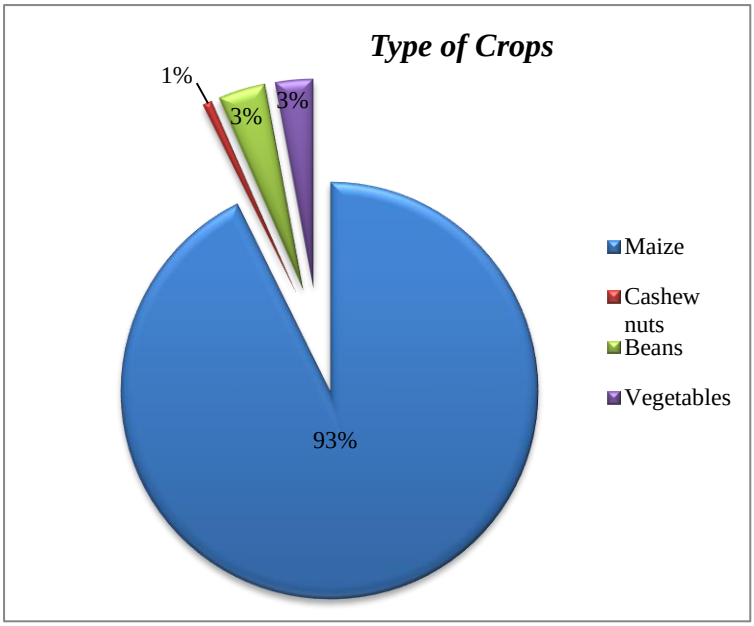

Figure 3-7: Type of crops

Source: Survey data.

The main livestock in the area are goats and sheep, comprising 85% of the livestock reared in Bura. Industries could be built to make products from the animals' raw materials and create employment. Training on how to rear livestock should be conducted so as to rear the hybrids and maximize on production.

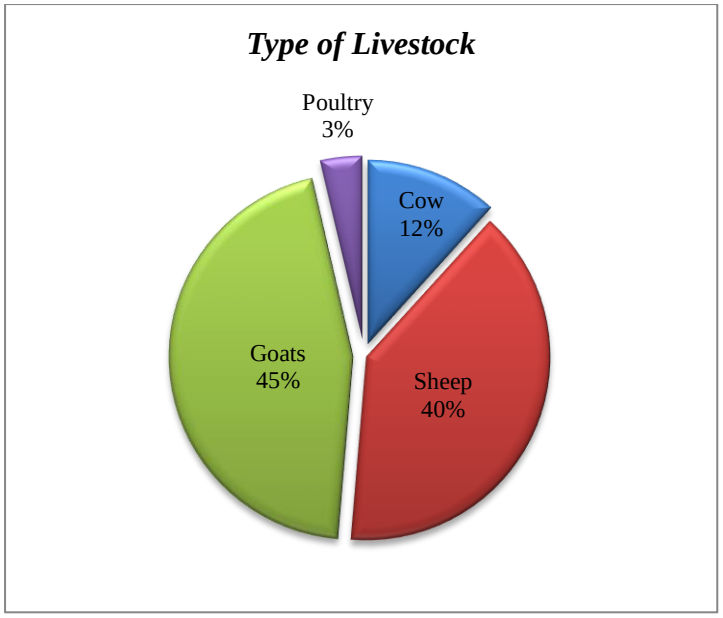

Figure 3-8: Main Livestock Owned

Source: Survey data.

The type of businesses owned mostly by residents are Shops comprising more than half the business population. Grocery business is done at a minor scale, followed by the Jua Kali business and M-Pesa. Bodaboda business is not so popular in the area as it accounts for only 6% of the business population.

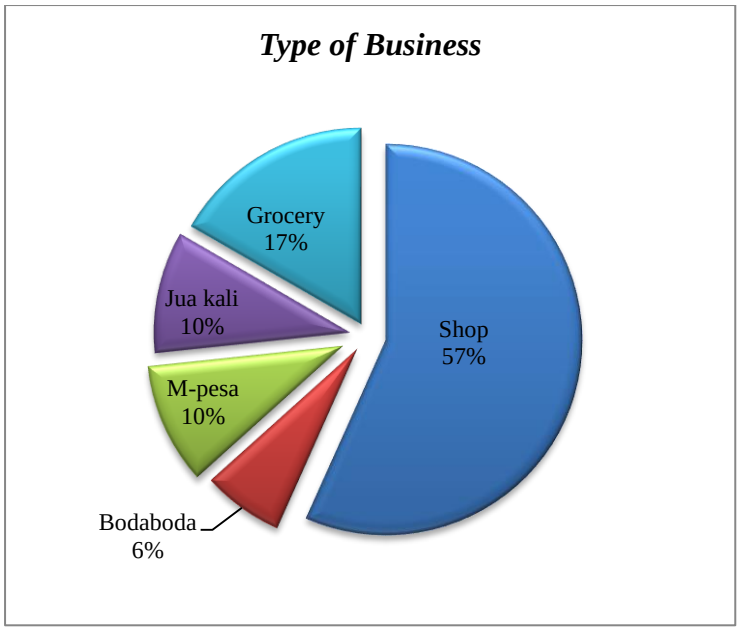

Figure 3-9: Type of Business Carried Out

Source: Survey data.

3) <u>Water supply</u>

Public water is the main sources of water in the area constituting 57%. However, other sources such as private water, water pans and shallow wells exist as shown in the figure below.

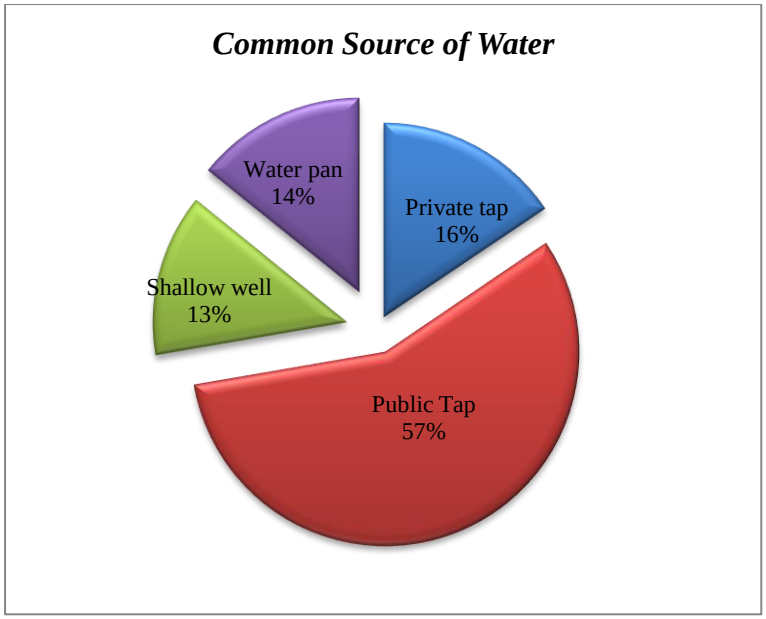

Figure 3-10: Main Sources of Water for the Community

Source: Survey data.

The ownership of the water sources is indicated in the chart below:

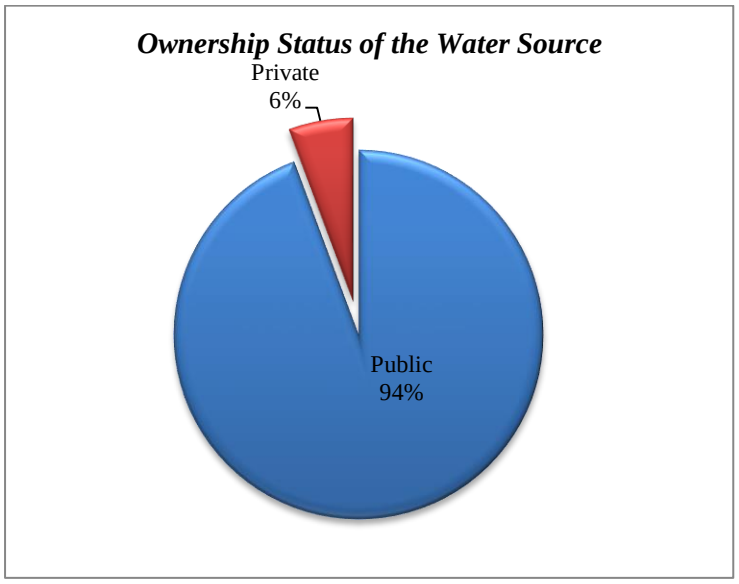

Figure 3-11: Ownership Status of Water Sources

Source: Survey data.

The cost of water varies from Ksh.5 to above Ksh.10 depending on the ownership status 58% of the population pay for water.

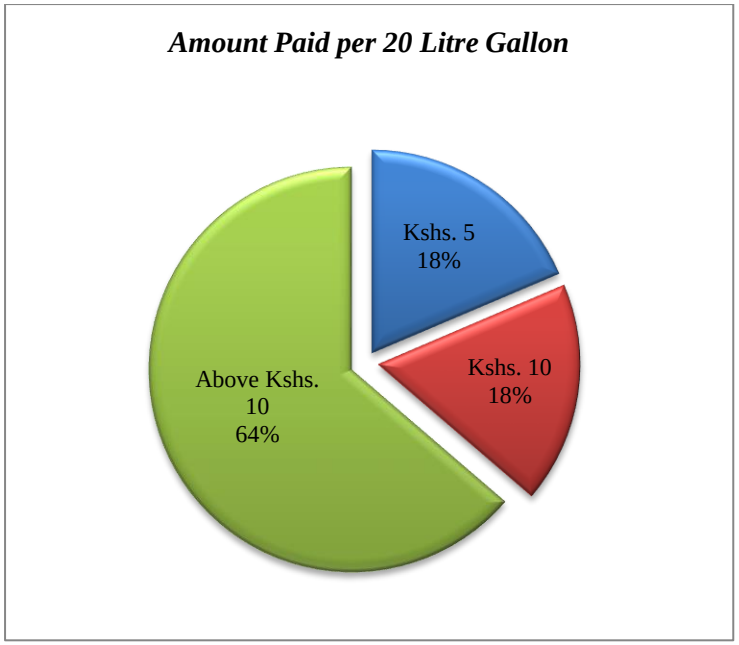

Figure 3-12: Cost of 20 Litre Jerry can of Water

Source: Survey data.

The water quality is generally in a bad state as shown in the figure 3-13.

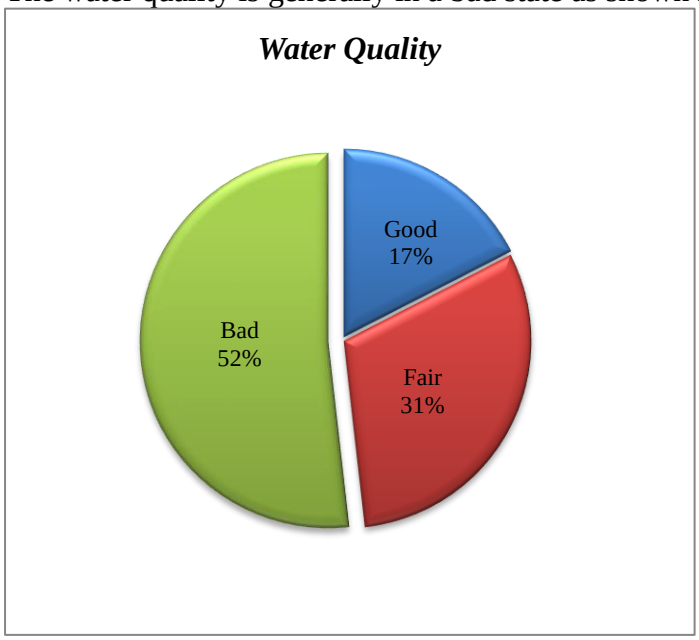

Figure 3-13: General Quality of Water

Source: Survey data.

Most of the sampled residents feel that the water supply is inadequate. A minimal percentage of the residents (37%) felt that the water being supplied was adequate.

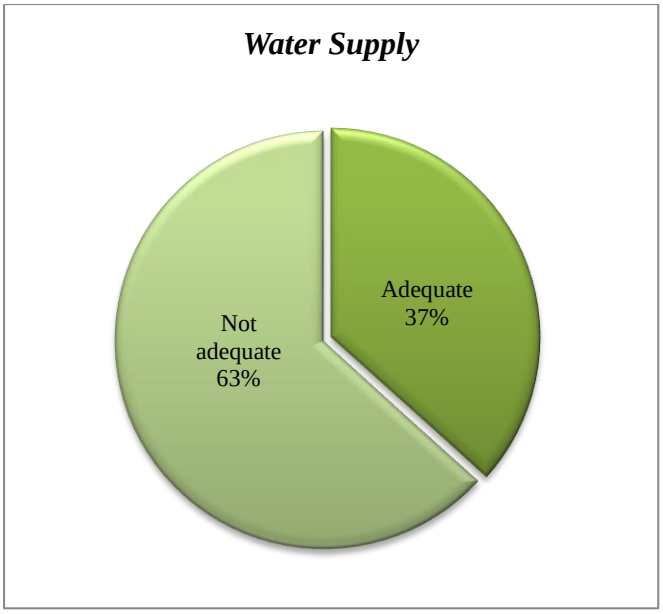

Figure 3-14: Adequacy of Water Supply

Source: Survey data.

84% of the population fetch water every day of the week while 14% fetch every alternate day of the week. Only a mere 2% fetch water once a week.

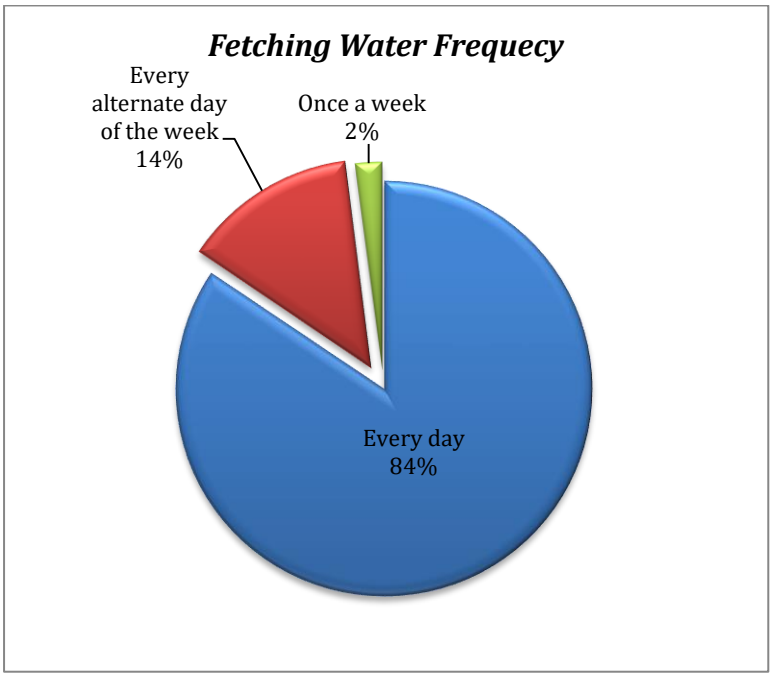

Figure 3-15: Frequency of Fetching Water

Source: Survey data.

Only 19% of the population walk for less than 0.2Km to water fetching points, as indicated in the figure below. This presents a great source of fatigue that may cause inactivity in other sectors such as business. The distance if reduced would lead to an improvement in other sectors such as farming, since more time will be availed for that.

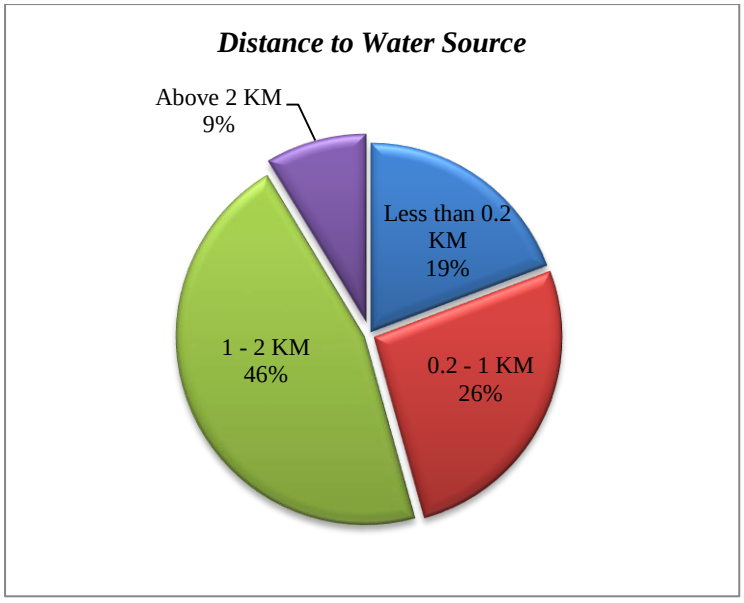

Figure 3-16: Distance to Water Source

Source: Survey data.

The common mode of transporting water is by carrying on the head which accounts for 56% of the population. The other modes of water transport are represented in the figure below.

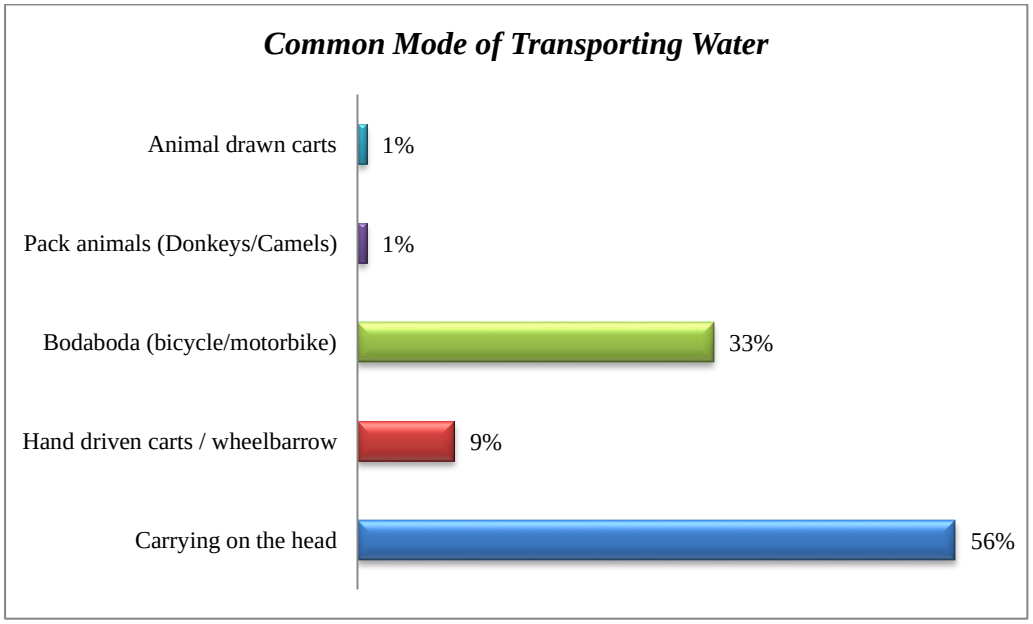

Figure 3-17: Common Modes of Transporting Water

Source: Survey data.

The common challenges faced in transporting water include physical fatigue 56% and loss of time due to long distances travelled to get to the water sources 44%.

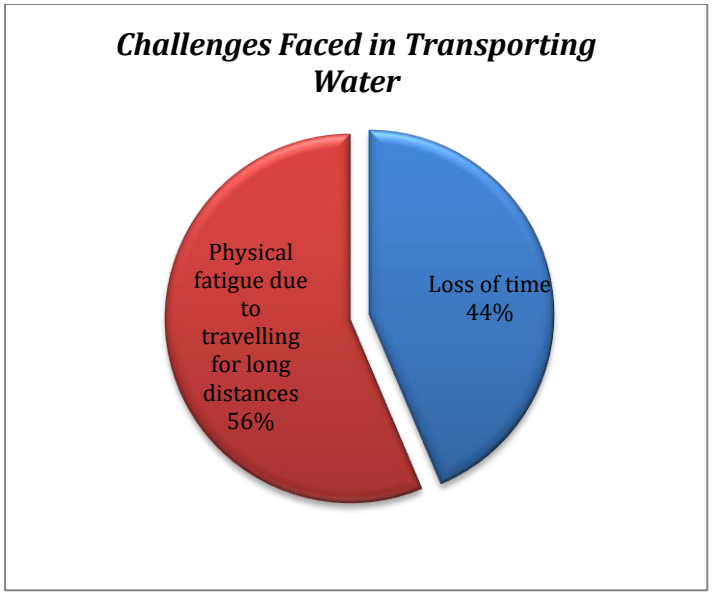

Figure 3-18: Challenges Faced in Transporting Water

Source: Survey data.

4) Environmental situation

The environmental concerns in the area include water shortage, invasive species, extinction of endangered species, mosquitos and malaria spread, overgrazing, deforestation, drought and solid wastes.

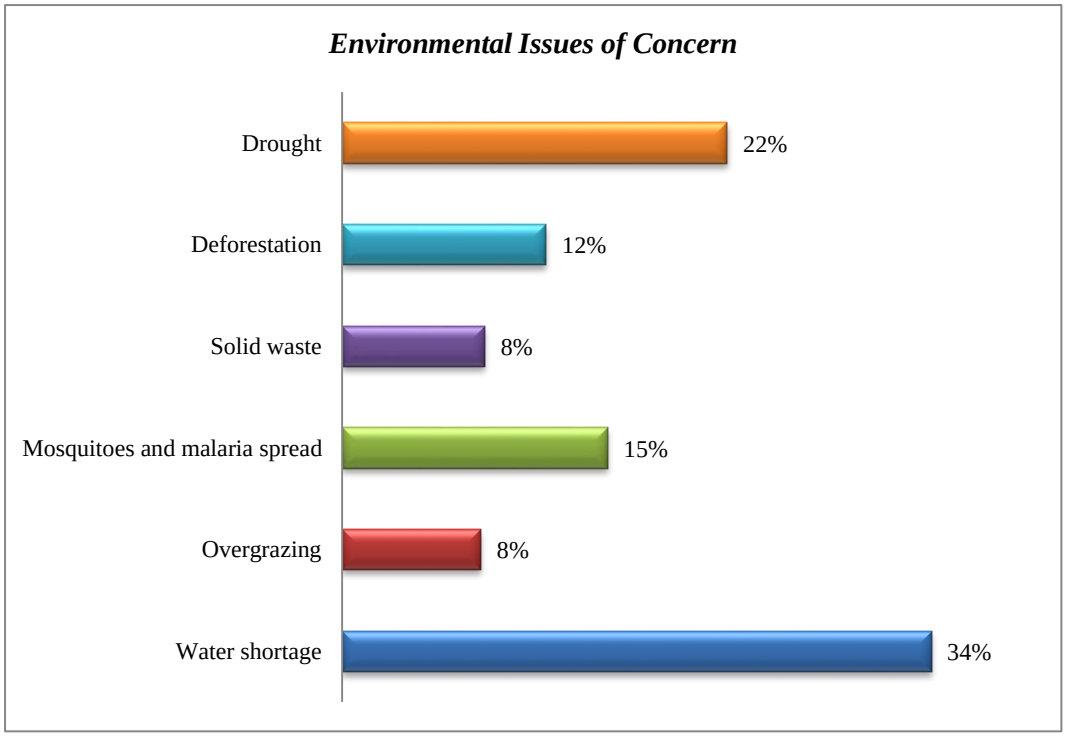

Figure 3-19: Environmental Issues of Concern

Source: Survey data.

There are a number of environmental conservation initiatives in the area such as tree planting, educating the public on environmental conservation and clearing of mosquito breeding sites, collection of solid wastes, others (burning waste, sweeping compounds and clearing bushes).

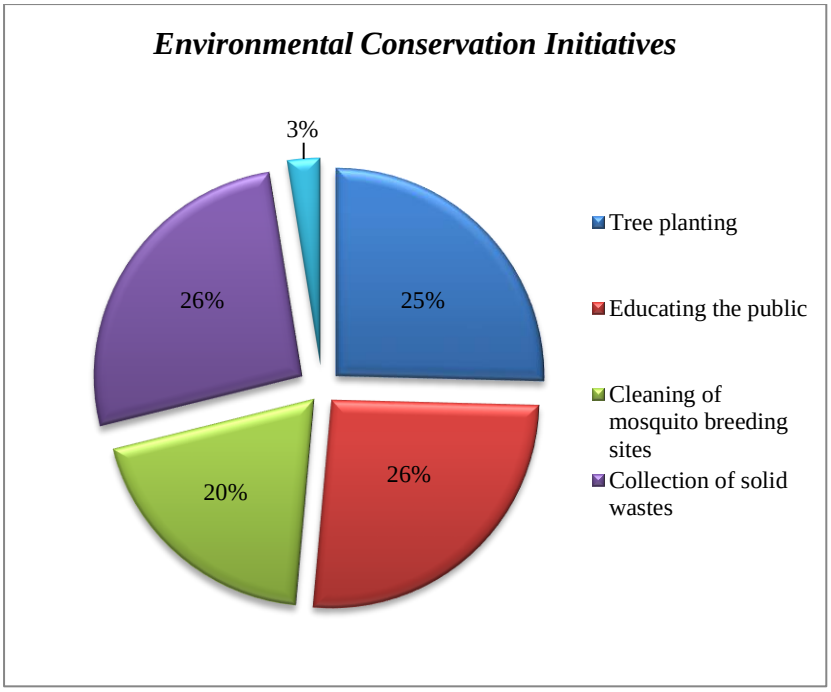

Figure 3-20: Environmental Conservative Initiatives

Source: Survey data.

These activities are carried out by youth groups, women groups, NGOs, CBOs, individuals and the County Council as shown in the figure below:

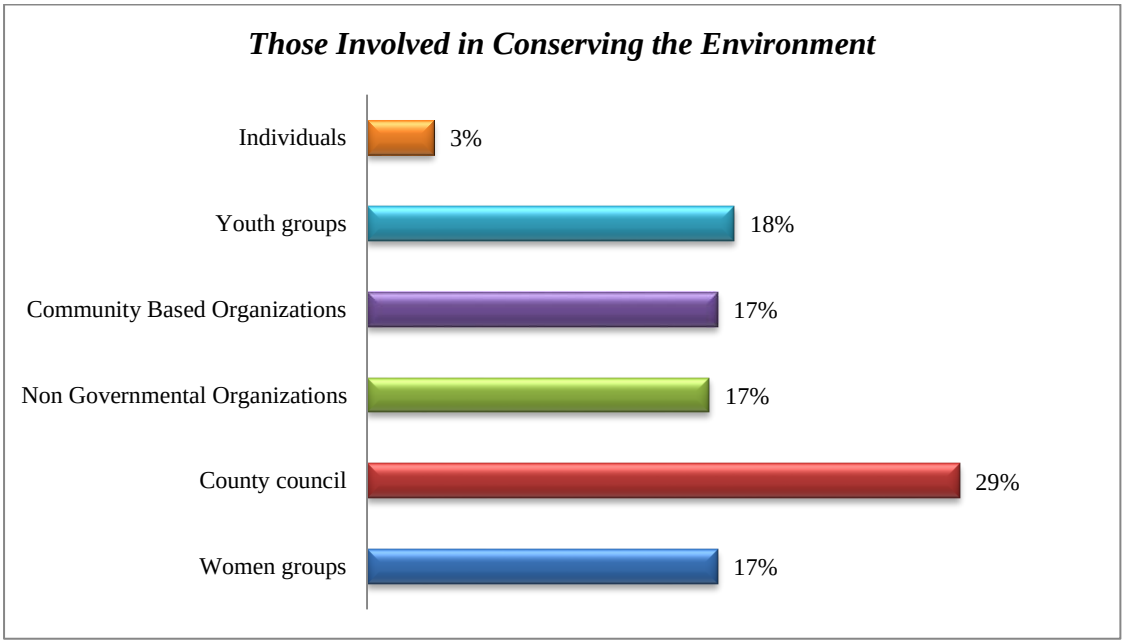

Figure 3-21: Implementers of the Environmental Conservation Initiatives

Source: Survey data.

86% of the population feel that the project will help conserve the environment while 14% feel that it will not.

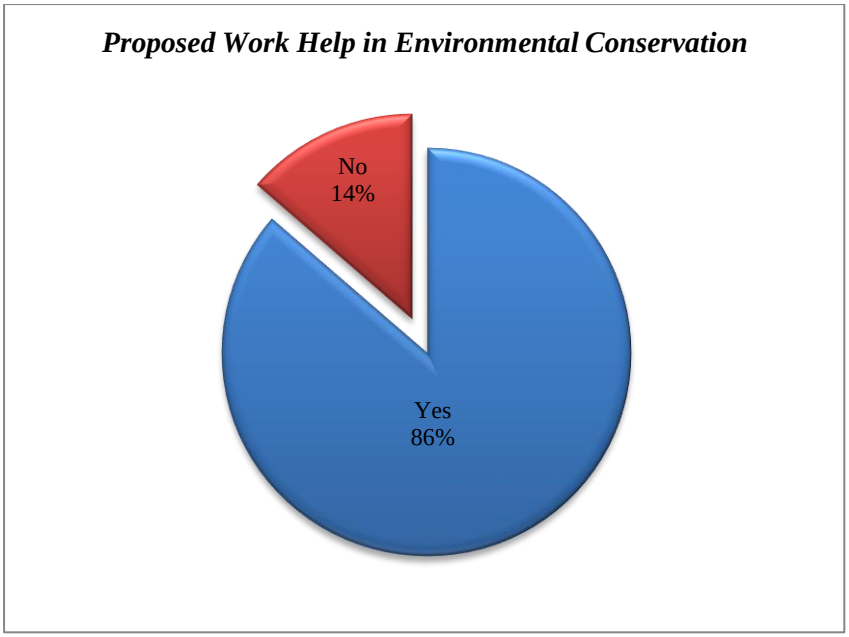

Figure 3-22: Effectiveness of the Environmental Conservation Initiatives

Source: Survey data.

5) Health status

The prevalence diseases in the area are malaria, diarrhea, eye problems, skin rashes cholera, diarrhea and others as shown in the figure below.

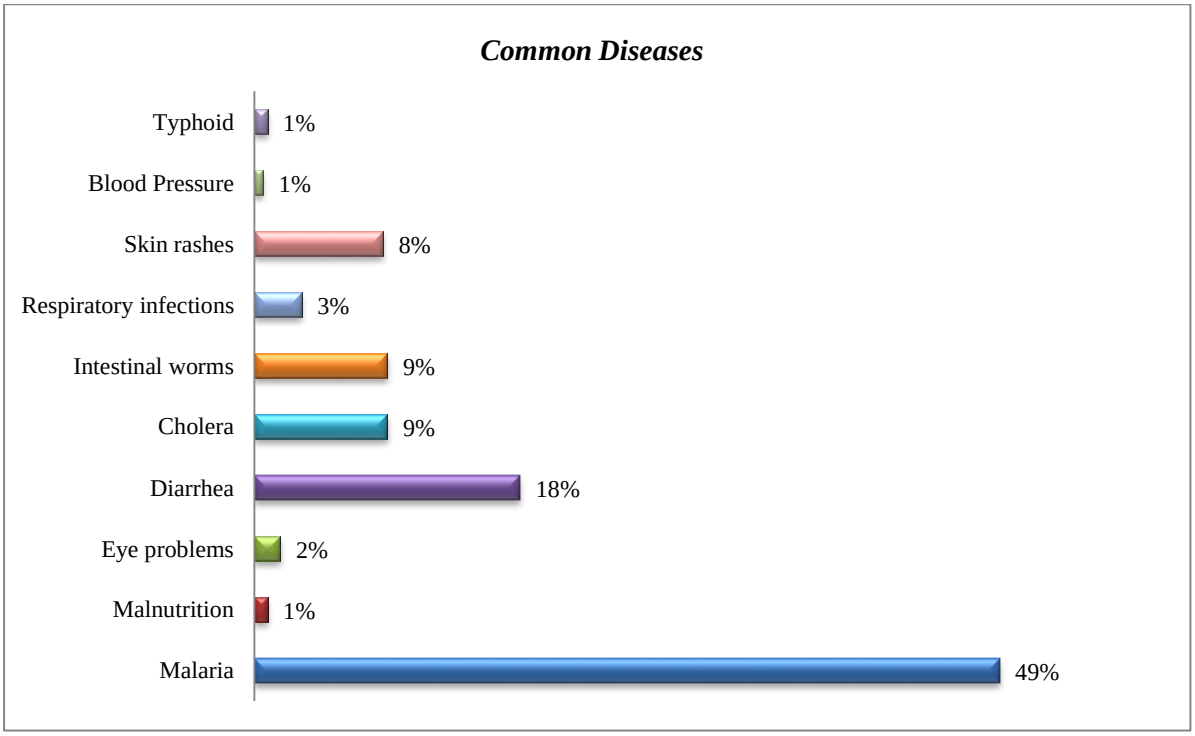

Figure 3-23: Prevalent Diseases in the Area

Source: Survey data.

Most of the respondents when sick seek medical attention from a health center.

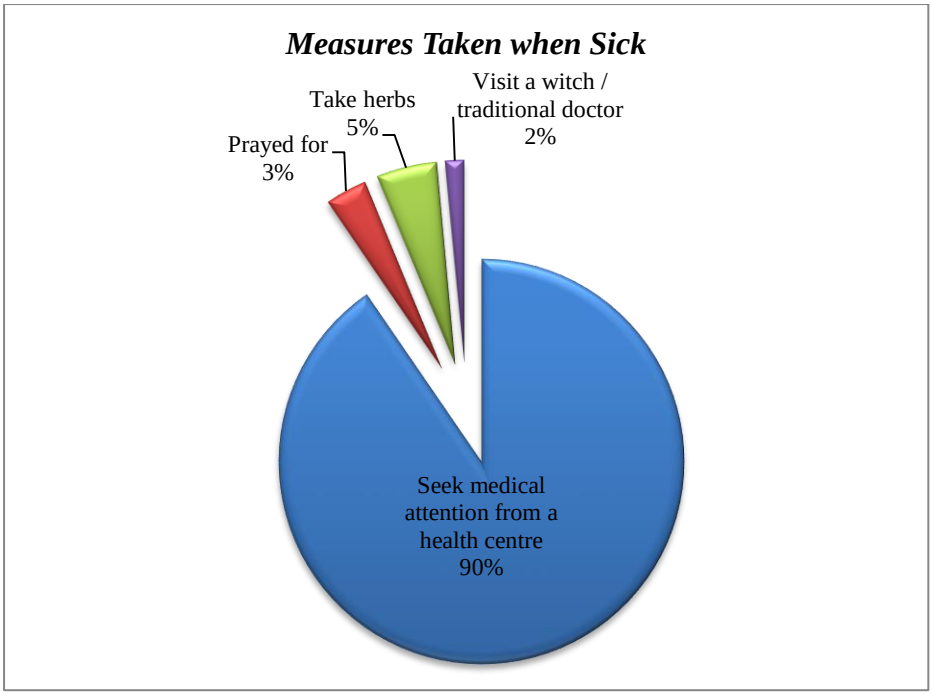

Figure 3-24: Treatment Sought when ill

Source: Survey data.

The health facilities where the people in the area seek help are mainly government health centers.

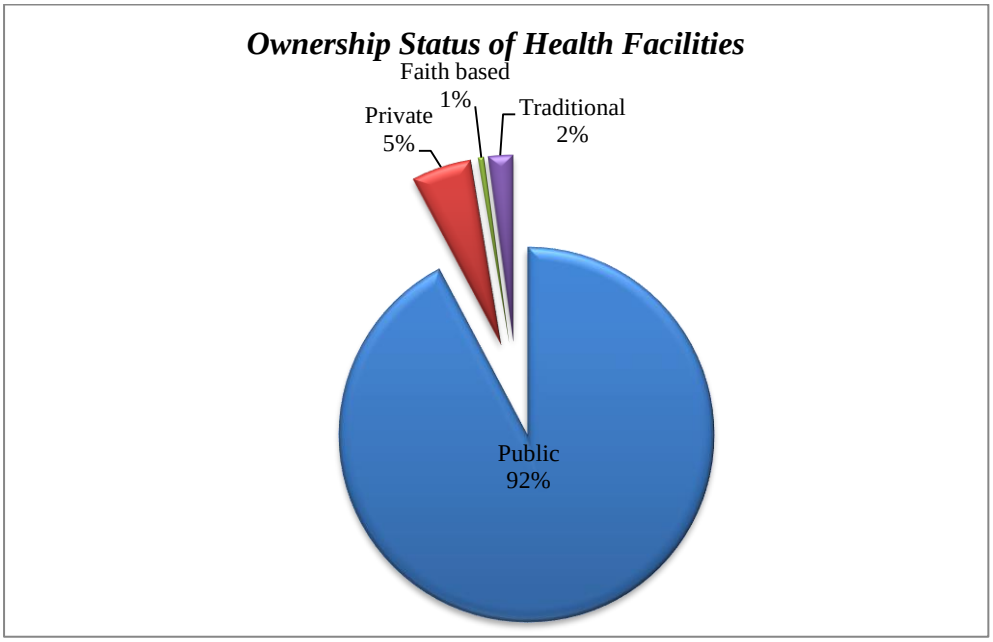

Figure 3-25: Ownership Status of Health Facilities

Source: Survey data.

20% of the population walk for under a kilometer to the health facilities indicating a considerable distance between residential areas and health facilities. The distances covered by the respondents to their health facilities are represented in the figure below.

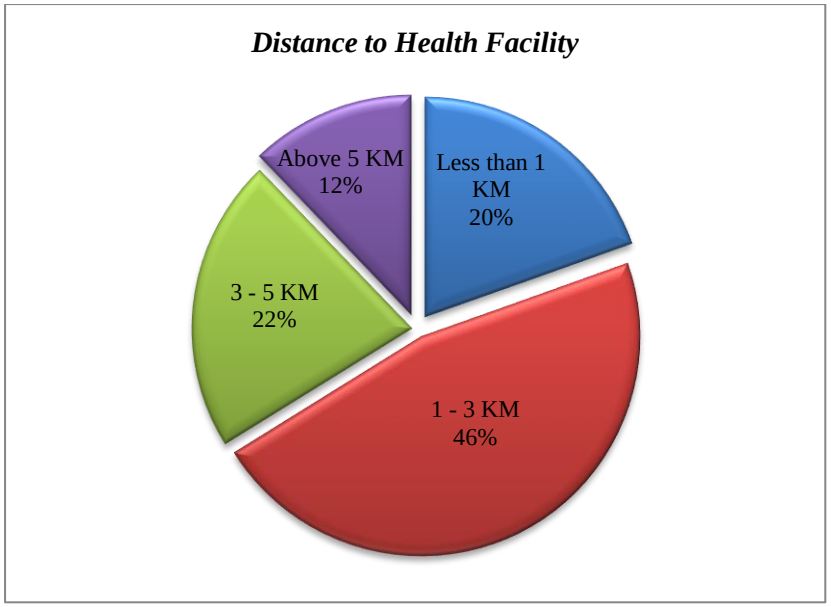

Figure 3-26: Distance to Health Facilities

Source: Survey data.

The level of HIV/AIDS awareness is high. 98% of the population are aware of HIV/AIDS.

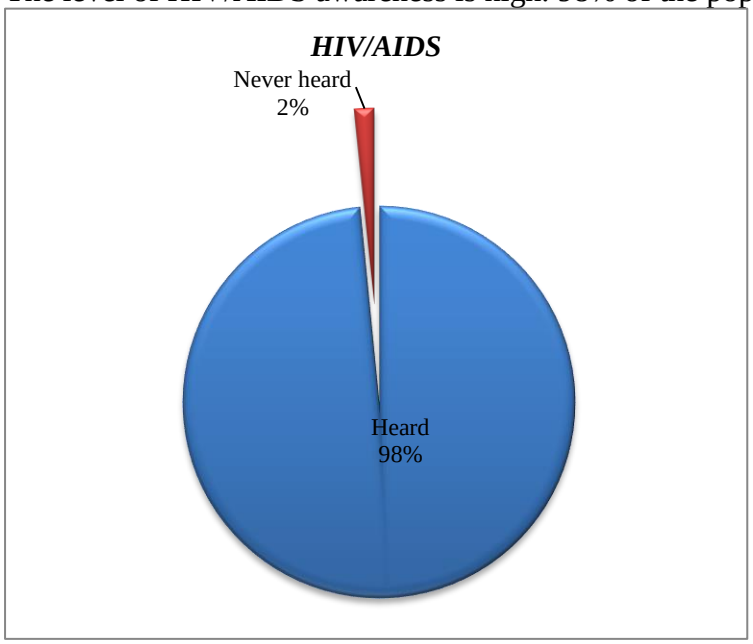

Figure 3-27: Level of Awareness on HIV/AIDS

Source: Survey data.

Information about HIV/AIDS is mainly got from the media, family members and friends, health workers and the newspapers as shown in the figure below.

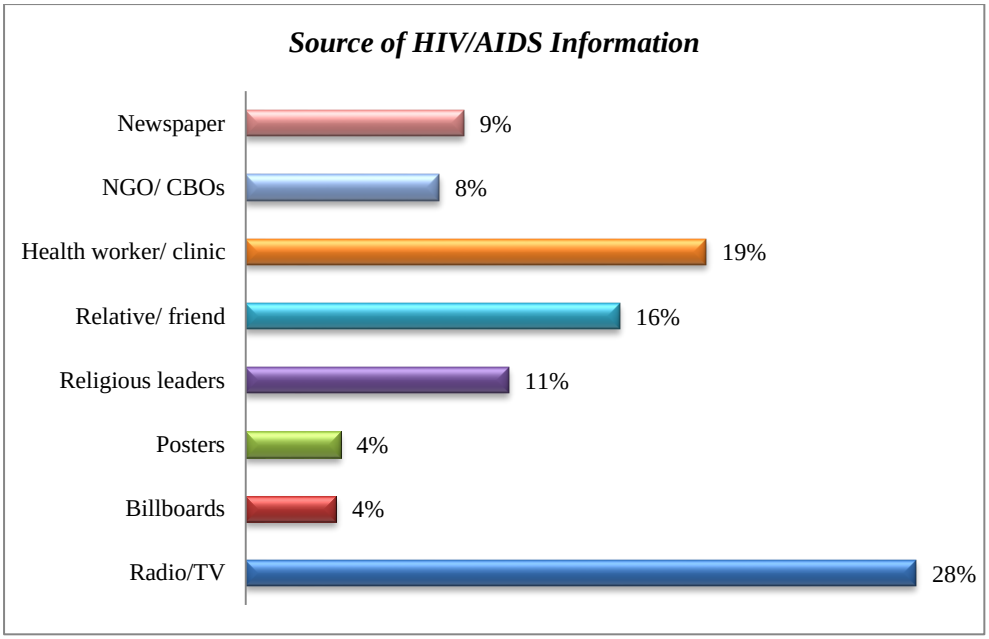

Figure 3-28: Source of Information on HIV/AIDS

Source: Survey data.

6% of the respondents' families have been affected by the disease.

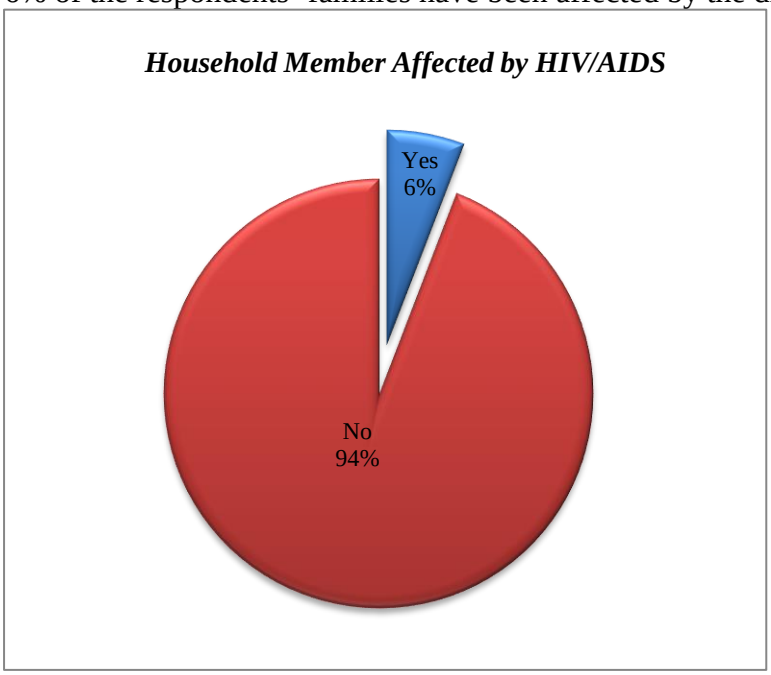

Figure 3-29: Households Affected by HIV/AIDS

Source: Survey data.

83% of the respondents feel that HIV/AIDS can be prevented while 14% says it cannot be prevented. 3% of the respondents have no idea if it can be prevented.

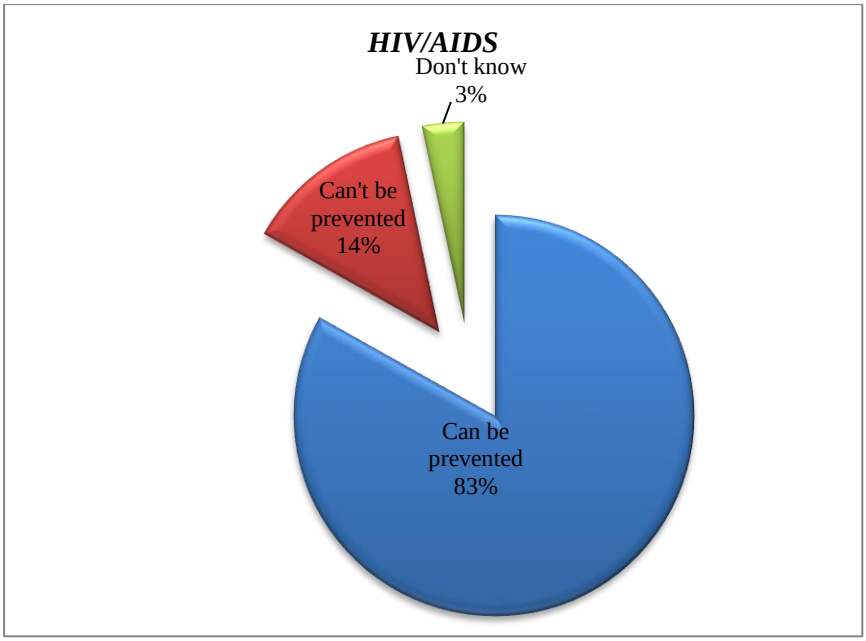

Figure 3-30: Knowledge on Whether HIV/AIDS Can be prevented

Source: Survey data.

94% of the respondents know where to go for voluntary counselling and testing for HIV/AIDS, while 6% do not.

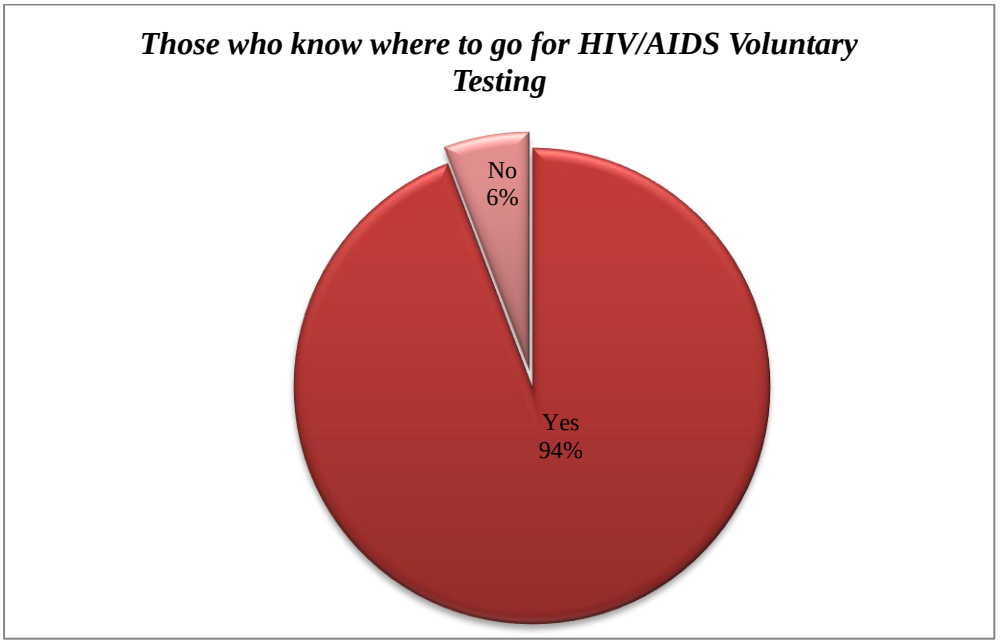

Figure 3-31: Respondents Who Know Where to go For Voluntary HIV/AIDS Testing

Source: Survey data.

6) Waste management

The methods used by the population to dispose refuse are by burning, burying/using a compost pit, recycling, dumping in open areas, and collection by the county council as shown in the chart below.

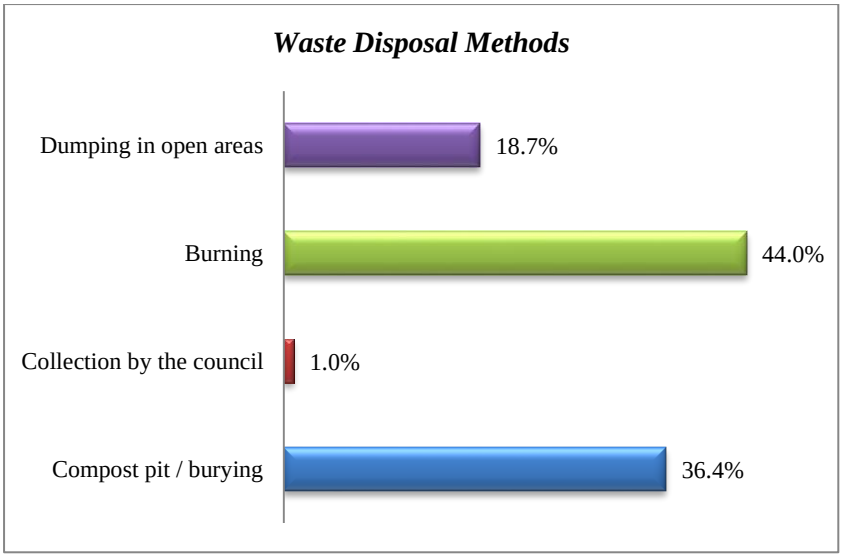

Figure 3-32: Common Waste Disposal Methods

Source: Survey data.

69% of households in the project area are have toilets. 31% lack this basic requirement.

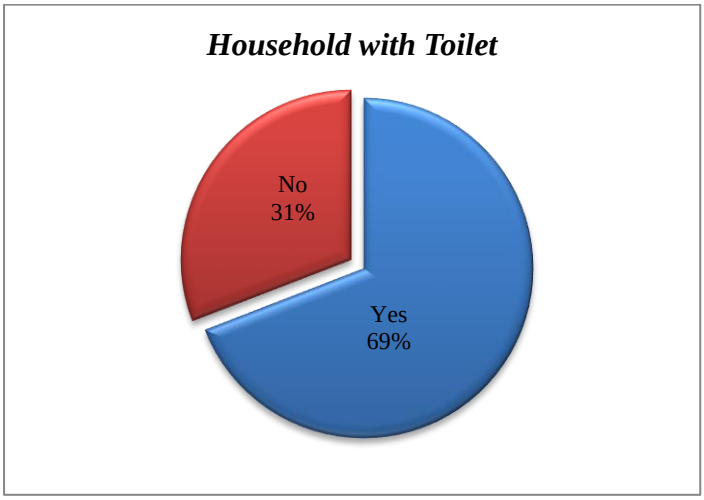

Figure 3-33: Respondents Who Have Toilets in Their Compound

Source: Survey data.

99% of the population in the project area use pit latrines. Only 1% of the respondents are connected to the sewer line.

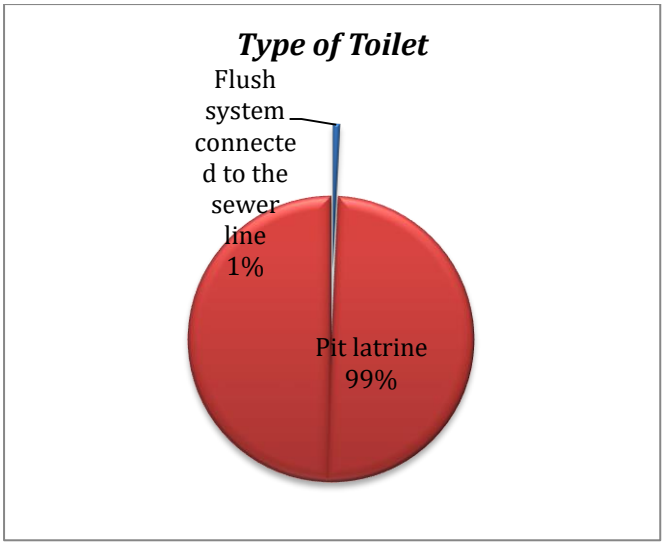

Figure 3-34: Types of Toilets Respondents Have in Their Compound

Source: Survey data.

7) <u>The Coast Water Service board pipeline water supply</u>

An equal percentage of the residents are aware of the intended construction of the pipeline as those who are not aware, as shown in the figure below:

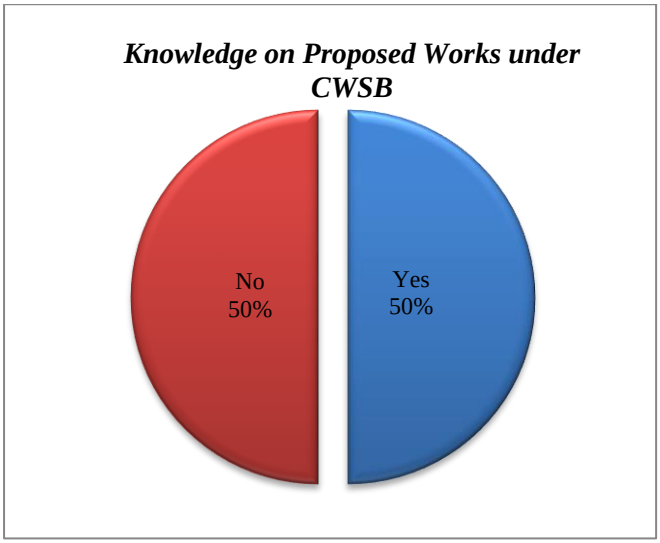

Figure 3-35: Public Awareness of the Intended Construction of the Pipeline

Source: Survey data.

88% of the respondents perceived that the construction of the pipeline will bring positive impacts while 12% percent, adverse impacts.

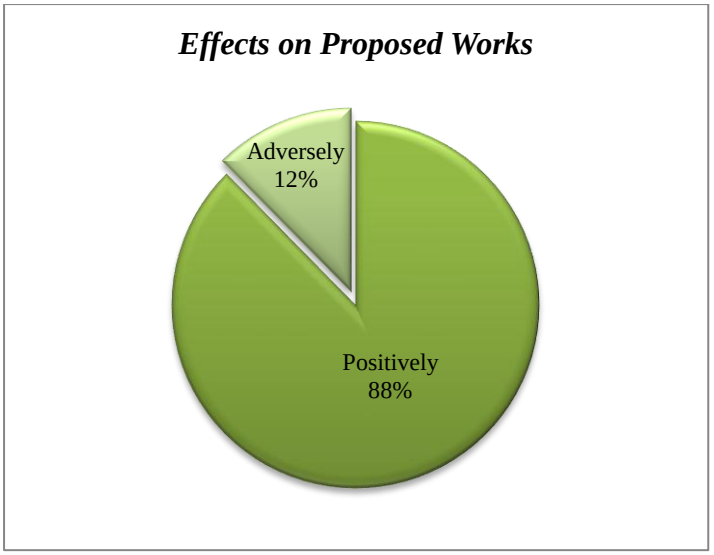

Figure 3-36: Perceived Impact of the Water Supply Project

Source: Survey data.

The positive impacts expected include reduced time and cost of travel to look for water, alleviate water shortages, improved hygiene, reduced cases of waterborne diseases, improved businesses, growth of town with the water supply, and employment for the youth as shown in the figure below.

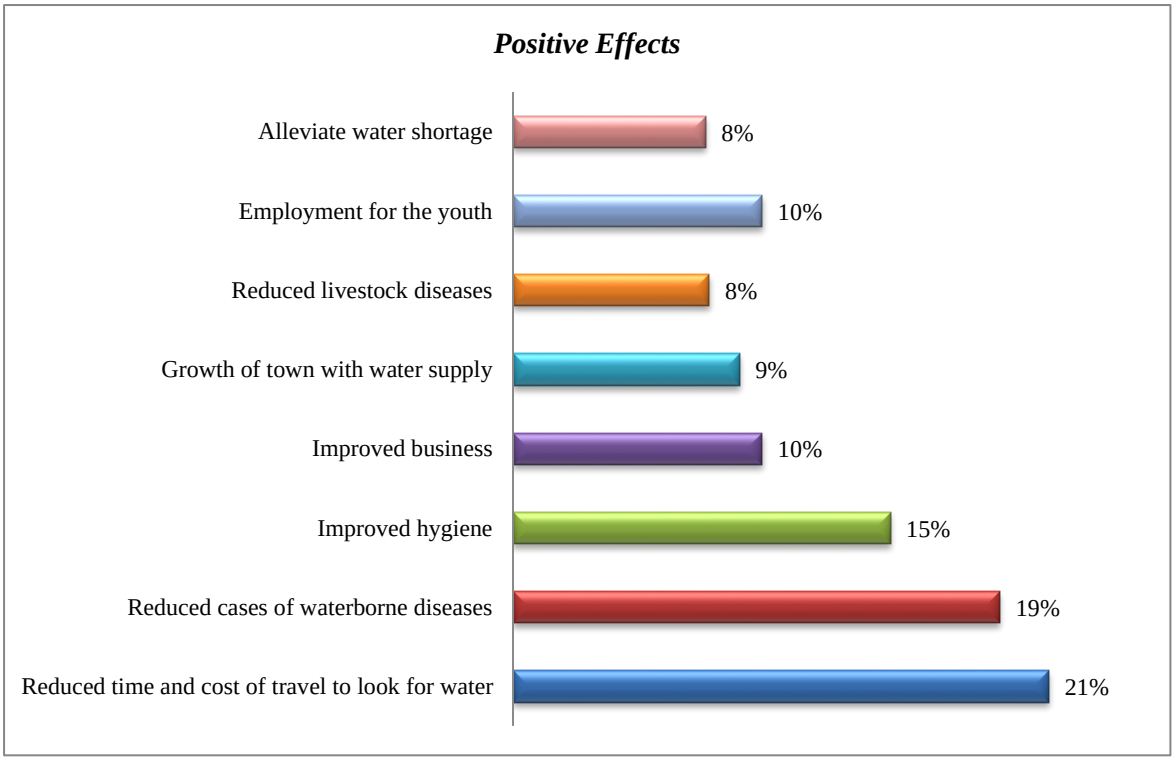

Figure 3-37: Positive Impact of the Proposed Project

Source: Survey data.

The negative impacts expected include loss of land/trees/crops, demolition of structures, interruption of services (electricity, water and transport), soil erosion and spread of diseases.

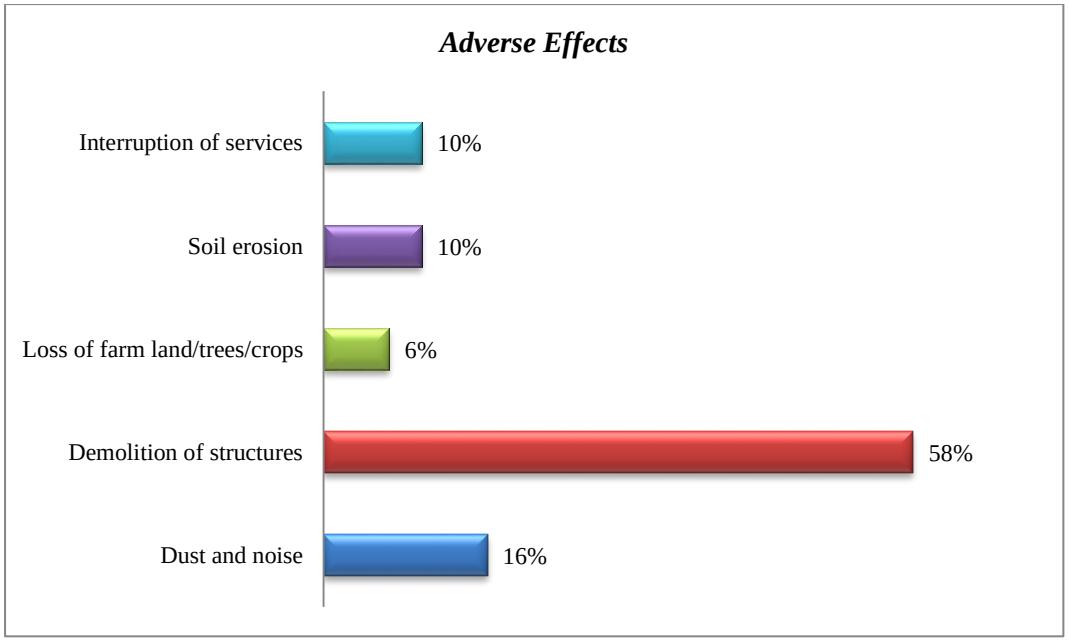

Figure 3-38: Negative Impact of the Proposed Project

Source: Survey data.

To mitigate the negative impacts the respondents feel that there is need to inform the public on any interruption of services, need to educate the public and the construction crew on health and safety, compensate the structure/land/crops/tree owners, avoid night time construction and install storm water drains.

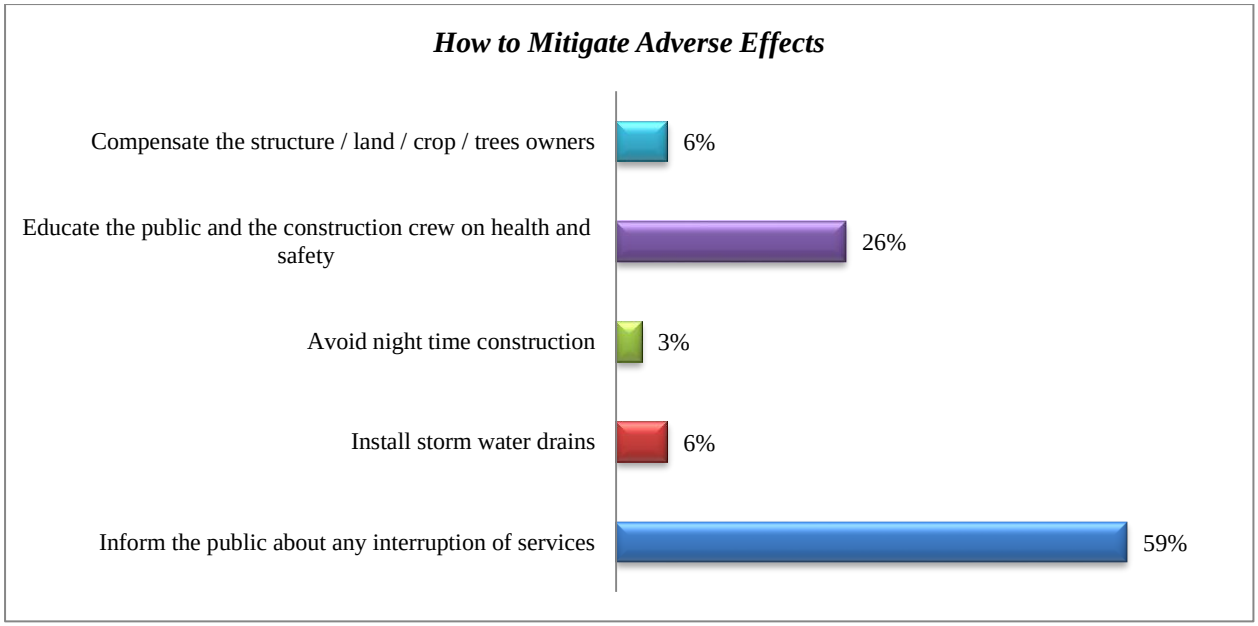

Figure 3-39: Mitigation Measures of Adverse Effects

Source: Survey data.

3.2 PHYSIOGRAPHIC AND ENVIRONMENTAL CONDITIONS

3.2.1 Location

Bura Irrigation and Settlement Domestic Water Supply is located on the western Bura rural centre boundary South of Chewele drain of the Irrigation Scheme and approximately 43Km downstream of the Nanighi Irrigation Water Pumping Station. The Water Supply is in Bura town in Tana North Sub County of Tana River County, Kenya. Bura is about 50 Km North of Hola town and 10 approximately 110 Km by road southwards from Garissa Bridge in Tana River County. Map 2.1 from High Grand Falls project report gives the location of Bura.

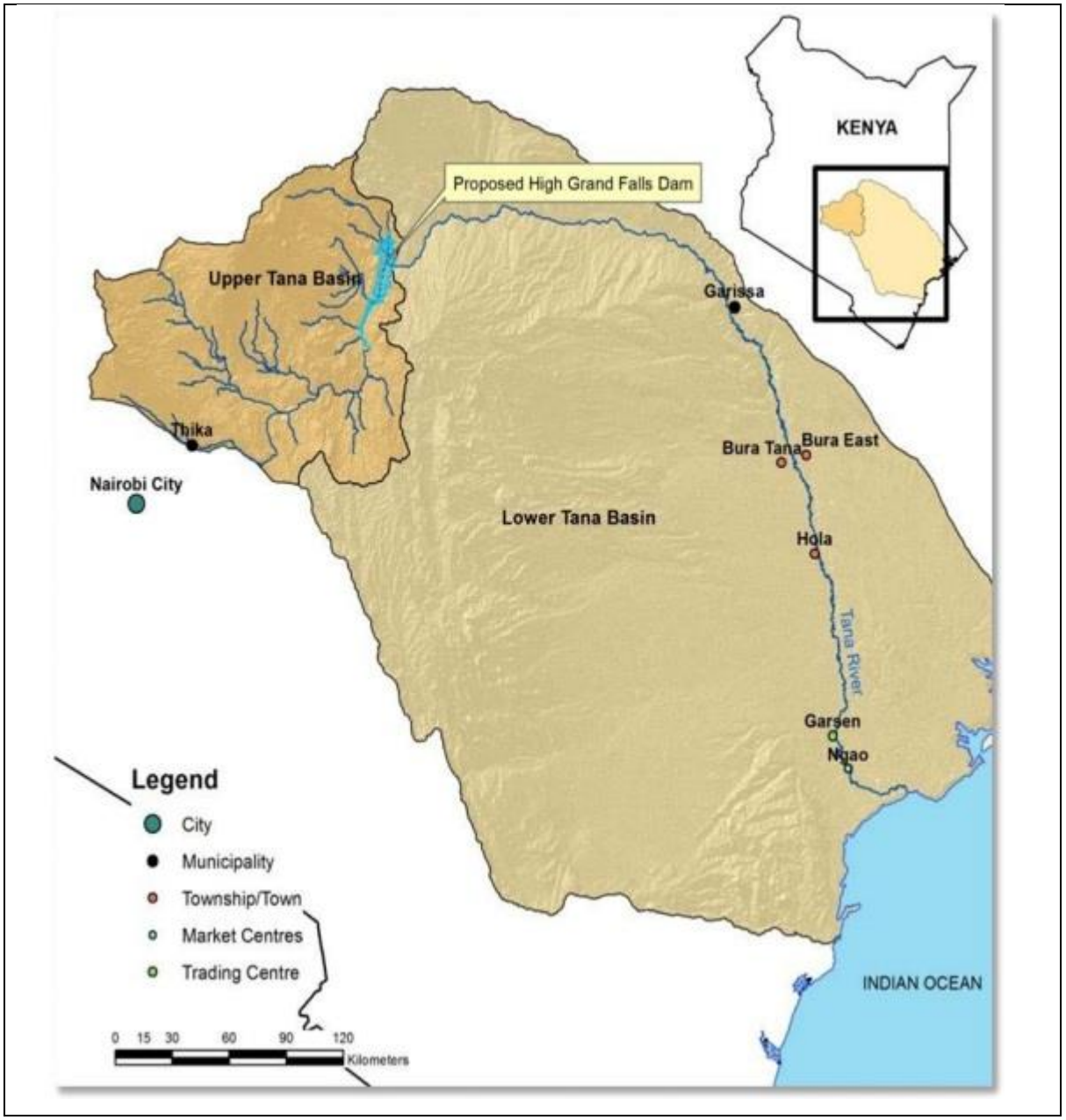

Figure 3-40: Map Location of Bura Tana

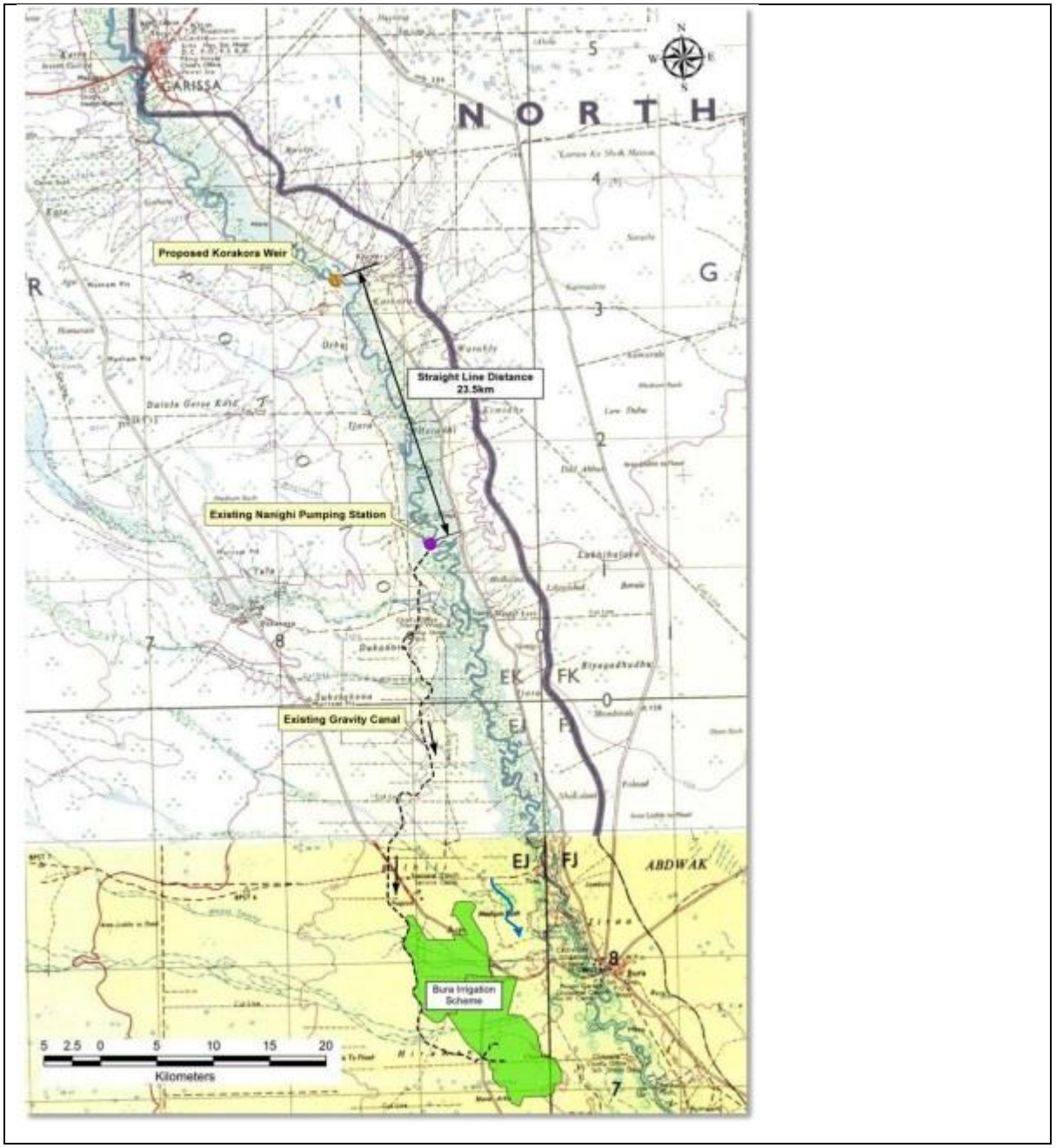

Figure 3-41: Map of Location of Bura Irrigation Scheme Gravity Works

3.2.2 Climate

Bura has an average daily minimum temperature of 31.80C, a maximum of 35.90C with a daily average of 33.80C. The minimum temperature of 20^0C occurs in the month of July.

The Annual rainfall is estimated at 471mm, which is bimodal and erratic. The long rains occur in April and May while the short rains occur in October and November. According to the Ministry of Water Design Manual the area is classified as low potential.

3.2.3 Topography

The land generally slopes southeast with an altitude of 224 to 228 M.A.S.L.

3.2.4 Hydrology and Drainage and Water Resource

In Tana River County most of the boreholes drilled produced saline water except in Mororo and Garsen where potable water has been realized. Garsen and Mororo borehole water supplies are operational serving Garsen and Madogo towns and their environs. Bura location is among the areas where boreholes are either dry or have saline water. Ground water is therefore not a reliable source of Domestic water for Bura Water Supply.

There are also more than 200 shallow wells in Tana River County along the river Tana from Mbalambala in the North to Kipini in the south. All of them have low yields and water is drawn using Hand pumps.

Bura Water supply is more than 13 Km away from river Tana and the design water demand cannot be met by the shallow wells.

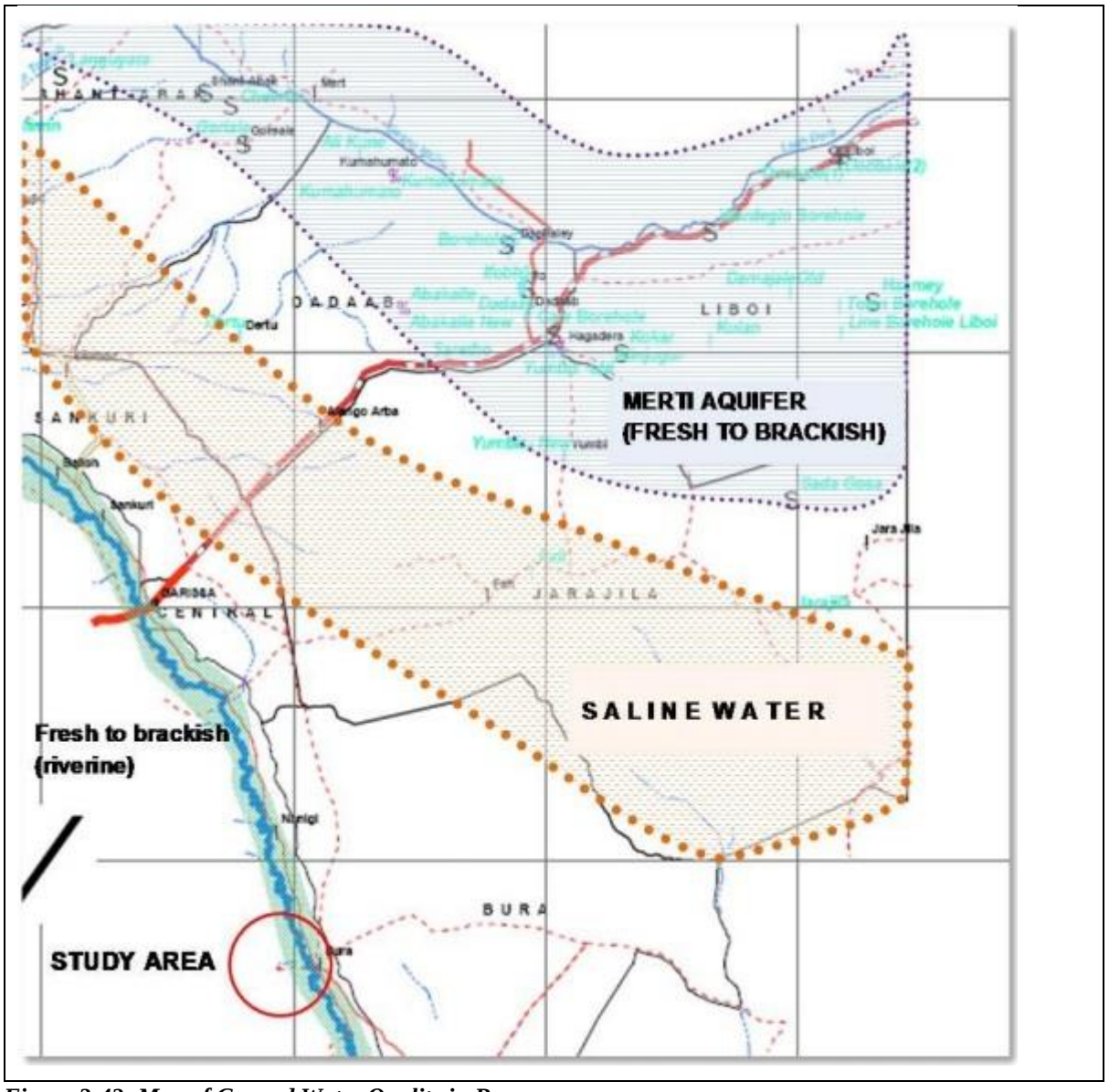

Figure 3-42: Map of Ground Water Quality in Bura.

3.2.5 Surface Water Sources

Tana River is the only permanent water source in the area, other surface water sources flow for only a very short time after rains and then dry up. These are commonly called laggas. The Bura

Main Irrigation canal from the pumping station at the river Tana in Nanighi is the source of Water for the Domestic Water Supply at Bura. Any failures in the pumping station interrupts Domestic Water Supply services since this results to lack of water in the Main Canal. The Construction of the Gravity system which is currently ongoing will ensure that there is a constant supply of water for Irrigation and Domestic Water Supply. The Map below shows location of the gravity works as revealed in the High Grand falls project report.

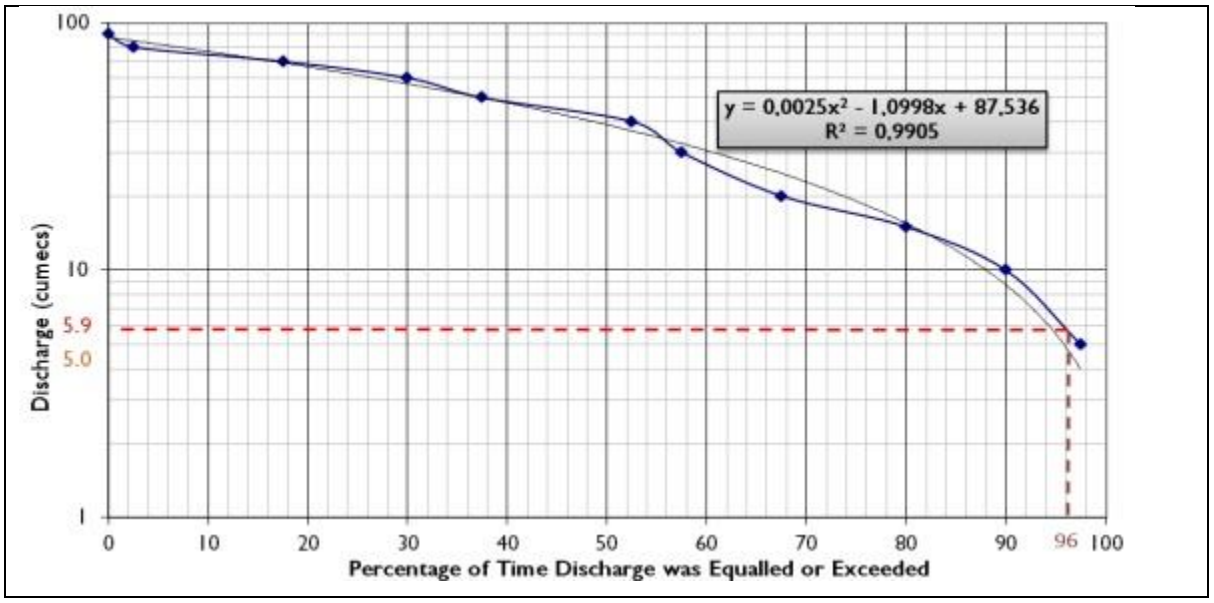

Figure 3-433:R.Tana flow chart

The river Tana is highly turbid during the rainy seasons and much Alum is used. The Water quality as tested in TARDA project in the lower Tana had the results shown in Table 3-1and Table 3-2.The river Tana water quality is generally acceptable for domestic water supply. Under the Environmental Impact Assessment Study for the Proposed Tana Integrated Sugar Project in Tana River and Lamu Districts, water samples were taken at different locations downstream of Bura and tested for water quality.

Except for consistently higher Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) values at all sampling sites the rest of the parameters are within acceptable range set by NEMA. Escherichia coli (E. coli) values are higher for Sailoni and Matomba Junction.

The high BOD and COD values can be attributed to livestock pollution and the biological degradation of natural flora and fauna (Source: High Grand Falls project report).

Table 3-1Results of river Tana Water quality as tested in TARDA Project.

SAMPLING POINT	UNIT	NEMA STANDARD	SAILONI	MATOMBA JUNCTION	NGAO	SAMICHA	ARITHI
PH		6.5-8.5	7.1	6.8	7	7	7
Arsenic	Mg/L	0.1	0.01	O	0	0	0.06
Cadmium	Mg/L	0.5	NIL	NIL	NIL	NIL	0.003
Copper	Mg/L	0.05	NIL	0.06	NIL	0.08	0.14
E. Coli	NIL/100	NIL/100	5	3	NIL	NIL	NIL
Fluoride	Mg/L	1	0.8	0.72	0.98	0.46	0.8

Source: Mumias Sugar Company & TARDA. 2007. Environmental Impact Assessment Study Report for the Proposed Tana Integrated Sugar Project in Tana River and Lamu Districts, Coast Province, Kenya, prepared by HVA International and M.A Consulting, Nairobi, Kenya.

Table 3-2 Water Quality of river Tana as reported in TARDA Project EIA study.

SAMPLING POINT	UNIT	NEMA STANDARD	SAILONI	MATOMBA JUNCTION	NGAO	SAMICH A	ARITH I
Lead (mg/L)	mg/L	5	0.04	0.09	Nil	Nil	0.07
Selenium (mg/L)	mg/L	0.19	Nil	Nil	Nil	Nil	Nil
TDS (mg/L)	mg/L	1200	70	80	80	120	80
Zinc (mg/L)	mg/L	2	0.63	1.05	1.7	1.4	1.62
SS	mg/L	30	15	11	16	18	18
Nitrate (mg/L)	mg/L	10	1.9	1.2	1.5	1.53	0.82
Nitrite (mg/L)	mg/L	3	Nil	Nil	Nil	Nil	Nil
Ammonia (mg/L)	mg/L	0.5	Nil	Nil	Nil	Nil	Nil
Phenols (mg/L)		Nil	Nil	Nil	Nil	Nil	Nil
BOD	mg/L	30	40	32	46	80	80
COD	mg/L	50	120	90	168	280	280

Source: Environmental Impact Assessment Study Report for the Proposed Tana Integrated Sugar Project in Tana River District and Lamu

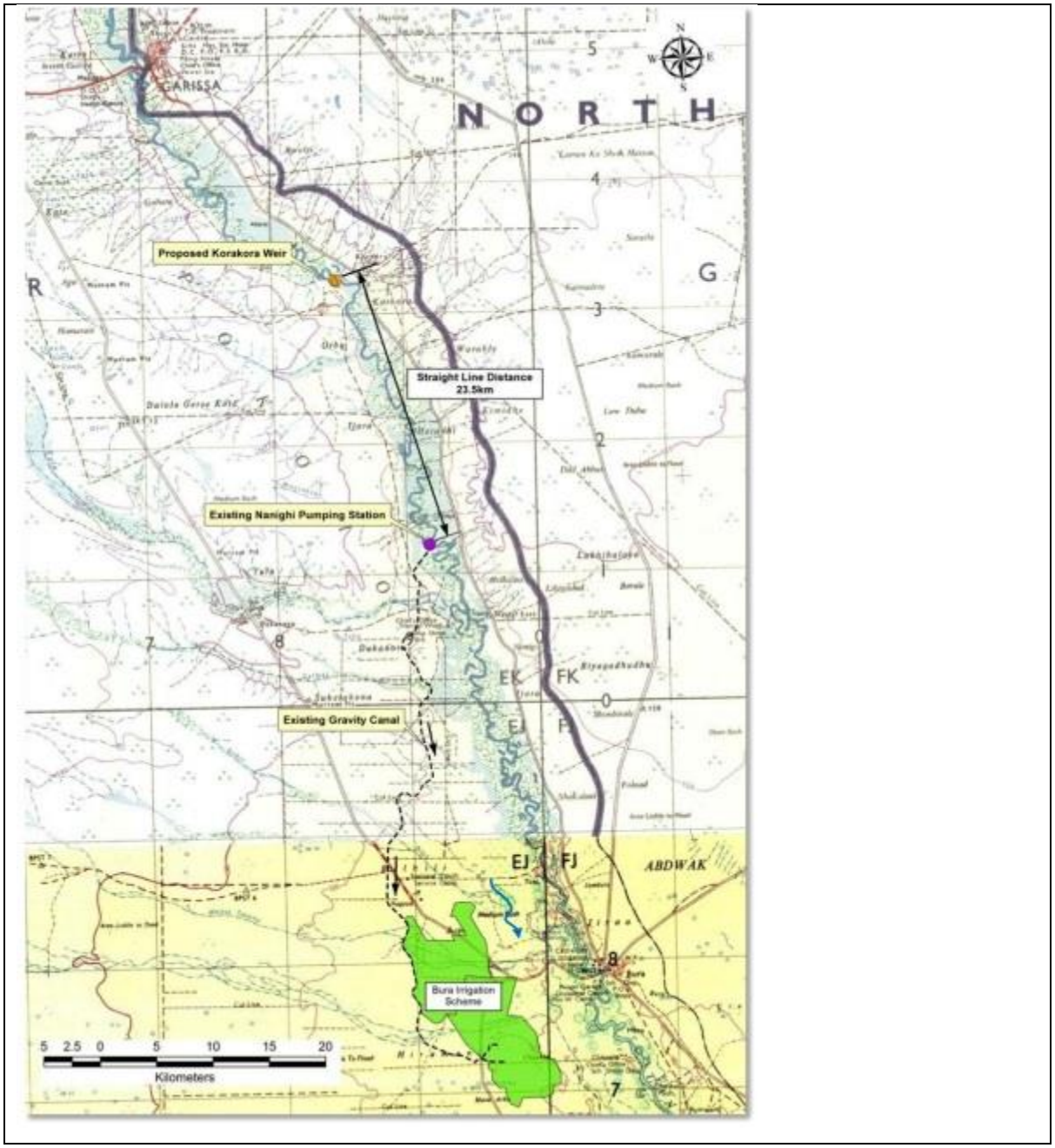

Figure 3-44 Map Showing Location of Bura Irrigation Scheme Gravity Works.

Other possible sources are rain catchment in form of roof catchment, mainly constructed in institutions, and water pans. However, due to the erratic nature of the rainfall and high evaporation due to high temperatures, these are unreliable.

Other possible sources are rain catchment in form of roof catchment, mainly constructed in institutions, and water pans. However, due to the erratic nature of the rainfall and high evaporation due to high temperatures, these are unreliable.

It is strongly recommended to obtain water from the Main Irrigation Canal emanating from River Tana, as is the case currently. The design of Bura Domestic Water Supply as undertaken initially also recommended the Main Irrigation canal as the best option.

3.2.6 Flora and Fauna

The project area is located in arid and semi-arid area of the country, characterized by brush and thicket characteristic of a lowland dry forest. The major natural vegetation includes acacia and mathenge tree species. However since majority of the project area is within the irrigation scheme, majority of the land is covered by farm land, as shown in the figure below:

Figure 3-45: Natural Vegetation in project area

Figure 3-46: Human Vegetation in the project area

The project area is home to various wild animals including baboons, snakes and hyenas.

Figure 3-47: Some of the animal species in the project area

Due to the agricultural activities in the project area, there is sometimes conflict between human and wildlife when the baboons eat the crops.

3.3 SOCIO ECONOMIC INFRASTRUCTURE

3.3.1 Administration

Bura is the Headquarter of Tana North Sub County of Tana River County. The County has 3 Sub Counties, namely Tana Delta, Tana River and Tana North. Politically Bura is located in Hirimani Ward of Bura Constituency which is among the 3 Constituencies that form Tana River County. The other 2 Constituencies of Tana River County are Galole and Garsen. Under the new system of governance, a Sub County Administrator and a Ward Administrator are responsible for administration at the two respective levels, a County Administrator being in charge of administration of the County.

3.3.2 Education

Tables 3.3 and 3.4 give schools in the supply area and their enrolment.

Table 3-3 Primary and ECD schools and enrolment

S/NO	SCHOOL	Primary sch. Enrolment	ECD Enrolment	Total
1	Huruma	1002	255	1257
2	Bularig	172	172	344
3	Fahari	258	67	325
4	Makini	135	23	158

5	Singwaya	185	54	239
6	Godia	332	159	491
7	Amani	362	102	464
8	Hirimani	266	92	358
GRAND TOTAL		**2712**	**924**	**3636**

Source: District Education Office, Bura, 2014

Table 3-4 Secondary schools and enrolment

S/No	Secondary School	Enrolment
1	Hirimani	647
2	Huruma	130

3.3.3 Health facilities

The Health facilities in the supply area are Bura Hospital and Marynoll Dispensary.

3.3.4 Transport

Bura largely relies on Motor bikes (Bodaboda) for internal and external movements. Public transport to areas outside Bura, including Hola, Mombasa, Garissa and Nairobi comprises of Buses, Matatus and at times Taxi. These are very few and are only available either in the morning hours by 12 9.00 A.m (for Garissa, Nairobi and Mombasa) and between 1.00 Pm and 2.30 P.m (for Garissa), the Buses being only two for the given stations and competing for customers within the given times only.

3.3.5 Commerce & Industry

1) Hotels

The most outstanding Hotel and lodging premise is Bura County Club. There are about 5 other Hotels of permanent structure which do not offer lodging and almost 10 others preferably called kiosks due to their temporary structures and small sizes. Other Lodgings, about 4 in number, do exist but the most outstanding is Magiri Complex.

2) Shops

There are about 50 shops scattered in Manyatta area, the villages and the urban centre but most of them are small and temporary in nature. Only about 5 shops and 2 Hardware operate in a somewhat permanent nature.

3) Butcheries

There are about 5 butcheries in Manyatta area which serve almost the entire Bura Irrigation and settlement scheme area and its environs.

3.3.6 Land Use and Economic Activities

1) Maize Production only

The Domestic Water Supply mainly serves Bura Irrigation Scheme Tenants and NIB staff attached to the Irrigation farms. Currently an area of 3,500 hectares (8649 acres) is reported to be used for Irrigation. It is also reported that after the gravity intake construction has been completed a total area of 10,000 hectares (24,711 acres) will be available for Irrigated farming.

From information gathered from the field, each farmer is allocated 3 acres of farm land out of which 1.5 acres are used for growing Maize and the remaining half is left to lie fallow. Maize is currently grown but it is expected that on completion of on-going gravity project cotton will also be grown.

The 1.5 acres of land is anticipated to produce 3000Kg of Maize per single harvest. For the 8649 acres of land there will be 2883 No. of 1.5 acres of farming land (excluding fallow land) each producing 3000kg of maize. Maize is grown a maximum of 3 times a year; therefore the total Maize production in the scheme per year is equal to 2883 x 3000kg x 3 = 25,947,000Kg.

The cost of 1 Kg of Maize is Kshs 68.00; the annual income from maize sales is therefore Kshs 1,764,396,000. Assuming that only 1/3 of the income remains for utilization by the farmer after expenditure and that 2-3 % of this is to be set aside for payment of water services, only Kshs 17.644 Million will be annually available for water. This amount is insufficient compared to the Kshs 32.619 Million required annually for operation and maintenance of the Water Supply.

After completion of the on-going gravity project, considering the available land (24,711acres), the amount available for payment of water will be triple (Kshs 52.932 Million) which will be quite sufficient to cater for the annual operation and Maintenance cost of Kshs 32.619 M. The farmers can therefore solely pay for water with income from the farm produce after the Gravity Project is complete. In this case it is assumed that maize is the only crop grown.

2) Cotton and Maize Production

Bura irrigation scheme was designed mainly for the growth of cotton as cash crop. It has been the practice of the Irrigation scheme to grow cotton once per year and maize once the same year.

The 1.5 acres of land is anticipated to produce from 1800 to 3500 Kg of Cotton per single harvest. For the 8649 acres of land there will be 2883 No. of 1.5 acres of farming land (excluding fallow land) each producing a minimum of 1800kg of cotton. Cotton is grown once per year; therefore the total cotton production in the scheme per year is equal to 2883 x 1800kg x 1 = 5,189,400Kg.

The cost of 1 Kg of cotton is Kshs 55.00; the annual income from cotton sales is therefore Kshs 285.417M. The total Maize production per year for a single harvest from information given in 7.1.1 under maize production is 2883 x 3000Kg = 8,649,000Kg. The annual income from a single harvest per year of maize is therefore 8,649,000Kg x 68/= which is equal to 588.132M. The total income from maize and cotton per year is 285.417 + 588.132 = 873.549M. Assuming that only 1/2 of the income reverts to the farmer after expenditure and that 2-3 % of this is to be set aside for payment of water services only Kshs 13.1 Million will be annually available for water. This amount is insufficient compared to the Kshs 32.619 Million required annually for operation and maintenance of the Water Supply. After completion of the on-going gravity project, considering the available land (24,711acres), the amount available for payment of water will be triple (Kshs 39.3 Million) which will be again sufficient to cater for the annual operation and Maintenance cost of Kshs 32.619 M. Assumptions were made in the

computations based on International standards that 2 to 3% of the total income can be used to pay for water.

3) Other sources of income

Apart from farm produce the Tenants depend on the following as their means of livelihood:

- Sale of grass and remains of harvested maize plantations to Pastoralists.
- Sale of Charcoal derived from 'Mathenge' trees.
- Casual labor in the irrigation farms.
- Sale of foodstuff
- Motor Bike transport (Bodaboda) business.
- Employment with NIB, Ngos, central and County Government
- Hotel and shop businesses
- Livestock keeping and sale of Livestock and Livestock products.
- Support from employed family members.

3.3.7 Water and Sanitation

As mentioned in chapter 2.2.1, water for the treatment works is sourced from the main canal which in turn sources its water from River Tana at Nanighi 43Km from Bura and is run by NIB. In order to get water into the canal NIB charges the farmers to operate the pumping system at Nanighi. The water then flows to the farms via the main canal. Along the canal, local communities make use of the water to water their livestock, use the water for domestic supply. Some residents of Manyatta make use of water directly from the canal for use, instead of paying for the treated water.

Due to the breakdown of the distribution network, local vendors fetch water directly from the treatment works and then sell to local residents in Manyatta, the NIB water bowsers provide water to the villages.

The project area is currently lacking in sewerage facilities with majority of the households within the villages make use of pit latrines and some of the households within Manyatta make use of septic tanks.

1) Water Tariffs

Of great importance in this project's case is the fact that the project has been under the jurisdiction of NIB. The farmers in the villages ensure water in the canal by making payments to NIB to pump water into the canal from the river. The farmers pay K.Shs. 5000 per planting season.

Some local communities make use of the water from the canal instead of relying on water from the treatment works. They do not pay for the water if fetched directly from canal, these costs are borne by the farmers and NIB.

As such there is a complication with regards to proposed billing when CWSB takes over the water supply, the farmers will continue to make payments to NIB for water getting into the canal. However if CWSB and the WSP will begin to charge residents for the treated water, the farmers will be forced to make double payments. The Consultant carried out consultation with the farmers who have formed a Water Users Association (WUA), and recommendations are provided in chapters 5.3 and 10 of this report.

However it should be noted that the water tariffs incorporate WASREB tariff policy for providing sustainable and affordable water supply and sanitation services to the poor to cover basic human need while at the same time ensuring financial viability of the services provider.

4 RELEVANT LEGISLATIVE/ REGULATORY FRAMEWORK

There are many laws and regulations governing issues of environmental concern in Kenya. The principal National legislation is the Environmental Management & Coordination (Amended) Act of 2015. The Act empowers stakeholders to participate in sustainable management of the natural resources. It calls for Environmental and Social Impact assessment (ESIA) to guide the implementation of environmentally sound decisions. Other local laws and regulations looked into include but are not limited to, the Constitution, the Water Act of 2016 among others.

In addition to the local legislation, the Consultant has identified some World Bank Policies of relevance to the project.

The following is an outline of the legislative, policy and regulatory framework for which the Proponent shall observe and implement in an effort to comply with Environmental Sustainability.

4.1 THE ENVIRONMENTAL MANAGEMENT AND COORDINATION (AMENDED) ACT OF 2015

This Act is an amendment of the Environmental Management and Co-ordination Act of 1999. The amended Act covers virtually all diverse environmental issues which require a holistic and coordinated approach towards its protection and preservation for the present generation without compromising the interests of the future generation to enjoy the same. Consequently, the amended act provides for the legal regime to regulate, manage, protect and conserve biological diversity resources and access to genetic resources, wetlands, forests, marine and freshwater resources and the ozone layer to name a few.

The Environmental Management and Coordination (Amended) Act, 2015 harmonizes the various requirements of the other existing laws and regulations by stipulating that where the provisions of any existing law conflicts with itself, then the provisions of the Environmental Management and Coordination (Amended) Act, 2015 shall prevail. This way, the act is able to minimize any conflicts in enforcement of the various environmental laws and regulations as applied to the relevant sectors. The Environmental Management and Coordination (Amended) Act, 2015 represents the culmination of a series of initiatives and activities coordinated by Government and stakeholders. It accentuates the right of every person in Kenya to live in a clean and healthy environment and obliges each and every one to safeguard and enhance the environment. It is the master plan for the environment in Kenya and contains a National Environment Policy, Framework Environmental Legislation and Environmental Strategy.

The Act gives power to the National Environment Management Authority (NEMA) which is a semi-autonomous government agency mandated to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the Government of Kenya in the implementation of all policies relating to the environment. NEMA is the body in charge of ensuring developments adhere to the policies and frameworks set out by the Authority.

The amended act highlights the need for an ESIA which is presented in this report.

4.2 THE ENVIRONMENT MANAGEMENT AND COORDINATION AMENDED ACT 2015 AND ITS TOOLS

The Act has several regulations that aid in its implementation the relevant regulations are highlighted in the sections below:

4.2.1 Environmental (Impact Assessment and Audit) Regulations 2003

These Regulations stipulate the importance of conducting an ESIA as well as the procedure necessary. The Regulations highlight the various reports and their contents to be submitted to NEMA for licensing. The regulations highlight the ESIA process which includes:

- Submission of a ESIA project report to NEMA for review or licensing
- In some cases the Authority will request for a full study report for some projects for which the applicant will be required to prepare a Terms of Reference and submit a study report.

The project and study reports will be conducted before the implementation of the development in question, the reports will be subject to approval by NEMA.

The regulations also calls for Environmental auditing and monitoring that will be carried out during the construction or operation of the enterprise, the regulations provide the format of the audit report which will be provided to NEMA.

In 2017, NEMA, via press release, announced the scrapping of the 0.1% NEMA license fee for review of EIA report.

4.2.2 Water Quality Regulations (2006)

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources.

The water from the canal whose properties are summarized in Table 3-1and Table 3-2, will be treated in order to meet the water quality standards set in Table 4-1 below.

Table 4-1: Water Quality Standards

Parameter	**Guide Value (Max Available)**
pH	6.5 – 8.5
Suspended solids	30 (mg/L)
Nitrate-NO_3	10 (mg/L)
Ammonia –NH_3	0.5 (mg/L)
Nitrite –NO_2	3 (mg/L)
Total Dissolved Solids	1200 (mg/L)
Scientific name (E.coli)	Nil/100 ml
Fluoride	1.5 (mg/L)
Phenols	Nil (mg/L)
Arsenic	0.01 (mg/L)
Cadmium	0.01 (mg/L)
Lead	0.05 (mg/L)
Selenium	0.01 (mg/L)
Copper	0.05 (mg/L)

Parameter	Guide Value (Max Available)
Zinc	1.5 (mg/L)
Alkyl benzyl sulphonates	0.5 (mg/L)
Permanganate value (PV)	1.0 (mg/L)

4.2.3 The Environmental Management and Coordination (waste management) Regulation, 2006

The Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

These regulations will be of great importance particularly during the construction phase of the project. During the Construction, the Contractor will have to meet the requirements of the regulations, by providing solid and liquid waste sorting, disposal and transportation using a licensed transporter who will dispose of the solid waste to the designated receptacle.

4.2.4 EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009

These Regulations determine the level of noise that will permissible in particular during the rehabilitation of the treatment works, tank sites and the pipelines, the following factors will be considered:

- Time of the day;
- Proximity to a residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

The Contractor will have to meet the requirements of these regulations particularly during the construction process, where some of the construction activities are bound to make some level of noise. These regulations are summarised in the table below:

Table 4-2: Table showing Permissible Noise Level for a Construction Site

Facility		Local Maximum Noise Level Permitted in Decibels	
		Day	Night
1.	Health facilities, educational institutions, homes for disabled etc.	60	35
2.	Residential areas	60	35
3.	Areas other than 1 and 2 above	75	65

In addition the IFC regulations for permissible noise levels are summarized in the table below:

Facility		**Maximum Noise Level Permitted in Decibels**	
		Day	**Night**
1.	Residential; institutional; educational	55	45
2.	Industrial; commercial	70	70

Comparatively both regulations are relatively similar, as such the local regulations will be used.

4.2.5 Draft Environmental Management and Coordination (Air Quality) Regulations, 2009

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources such as the improvements made to the storm water outlets. The Contractor will have to ensure all his machinery do not exceed the emissions made in the regulations (presented in the first schedule of the regulations). The Contractor's plant must meet the requirements of these regulations.

4.3 WATER ACT 2016

This Act is an update of the Water Act of 2002. It makes provision for the provision of clean and safe water in adequate quantities and to reasonable standards of sanitation for all citizens.

The Act gives power to Water Works Development Agencies which are charged with:

a) Undertaking the development, maintenance and management of the national public water works within its area of jurisdiction.
b) Operating the waterworks and providing water services as a water service provider, until such time as responsibility for the operation and management of the waterworks are handed over to a county government, joint committee, authority of county governments or water services provider within whose area of jurisdiction or supply the waterworks is located.
c) Providing a reserve capacity for purposes of providing water services where pursuant to section 103, the Regulatory Board orders the transfer of water services functions from a defaulting water services provider to another licensee.
d) Providing technical services and capacity building to such county governments and water services providers within its area as may be requested; and
e) Providing to the cabinet secretary technical support in the discharge of his/her functions under the constitution of this Act.

In accordance to Article 152 of the Act, CWSB under whose jurisdiction the project falls, will transition into a Water Works Development Agency. However this transition has not yet occurred, as such the Consultant will still report to the CWSB.

4.4 THE IRRIGATION ACT 2012

This Act gives the mandate to the National Irrigation Board to:

a) To conduct research and investigation into the establishment of national irrigation schemes
b) In conjunction with the Water Resources Authority established under the Water Act, to formulate, and be responsible for the execution of, policy in relation to national irrigation schemes
c) In consultation with the Cabinet Secretary and the Cabinet Secretary for the time being responsible for finance, to raise funds for the development of national irrigation schemes
d) To co-ordinate and plan settlement on national irrigation schemes
e) To design, construct, supervise and administer national irrigation schemes
f) To determine the number of settlers to be accommodated in a national irrigation scheme
g) To provide land in national irrigation schemes for public purposes
h) To promote the marketing of crops and produce grown or produced on national irrigation schemes and to liaise with organizations responsible for the marketing of agricultural produce
i) To provide, either by itself or by agreement with other persons, for the processing of agricultural produce grown or produced on national irrigation schemes
j) To award scholarships and bursaries for the study of irrigation (both in Kenya and elsewhere) or any other subject which the Board considers to be of benefit to the Board.

As part of its mandate, the NIB constructed and planned the Bura Irrigation Scheme beginning in 1978 and ending in 1982. This included the construction and operation of a water supply for the scheme. Thus the current water supply has been under the jurisdiction of the Board. In addition the water for the water supply system is diverted from the NIB main canal, which is funded by NIB and the scheme farmers who have formed a water users association.

4.5 THE PUBLIC HEALTH ACT (CAP. 242)

Part IX Section 8 & 9 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waste water flowing or discharged into a water course is deemed as a nuisance. Part Xll Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances The Act addresses matters of sanitation, hygiene and general environmental health and safety.

The Act will therefore govern the activities of the contractor on site which includes ensuring that the health and safety of employees including provision of health services in the cases of venereal diseases. Additionally, the law provides justification of the project for the provision of clean domestic water as currently the water used by the locals is directly drawn from the canals of which is untreated. With the realization of the project, water will be treated and be provided to the locals for domestic use.

4.6 THE CONSTITUTION OF KENYA 2010

Article 42 states that every person has the right to a clean and healthy environment. The constitution provides guidance on steps that may be taken in case any of any infringement on these rights. In addition, the constitution provides for the establishment systems for carrying out environmental impact assessment, environmental audit and monitoring of the environment.

In addition to the protection of the environment, the constitution states that the land in Kenya belongs to the people of Kenya collectively as a nation. The constitution classifies the land in Kenya into different categories. These categories will dictate whether compensation will be

required for the any acquisition. The categories include: public (including the irrigation scheme).

The Constitution is critical in ensuring the project is carried out without infringing on the rights of the people, by carrying out an EIA which is provided in this report.

4.7 OCCUPATIONAL HEALTH AND SAFETY ACT

This legislation provides for protection of workers during construction and operation phases. This act will provide some of the mitigation measures for any negative impacts in particular those concerning the workers along the pipeline routes.

4.8 THE HIV AND AIDS PREVENTION AND CONTROL ACT

This is an Act of Parliament to provide measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection, and for connected purposes.

This Act will ensure that the Contractor makes provision for VCT services for employees and locals, as well as promotes public awareness. This will go a long way in ensuring stigmatization of HIV and AIDS is reduced as well as managed during the construction period.

4.9 NATIONAL GENDER AND DEVELOPMENT POLICY

The National Gender and Development Policy provide a framework for advancement of women and an approach that would lead to greater efficiency in resource allocation and utilisation to ensure empowerment of women.

The National Policy on Gender and Development is consistent with the Government's efforts of spurring economic growth and thereby reducing poverty and unemployment, by considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines. The policy is also consistent with the Government's commitment to implementing the National Plan of Action based on the Beijing Platform for Action (PFA).

The overall objective of the Gender and Development Policy is to facilitate the mainstreaming of the needs and concerns of men and women in all areas in the development process in the country. This law will be of relevance to the contractor in ensuring that all genders are given an equal opportunity during recruitment during the construction phase and operation phase of the project. The employers will also provide adequate facilities for all genders within the project site.

4.10 THE SEXUAL OFFENCES ACT, 2006

This Act protects people and employees from any unwanted sexual attention or advances by staff members. This act ensures the safety of women, children and men from any sexual offences which include: rape, defilement, indecent acts. This law will govern the code of conduct of the Contractor's staff and provide repercussions of any wrong doing.

4.11 THE CHILDREN ACT, 2001

This Act protects the welfare of children within the Country. The Act identifies Children as a person below the age of 18 years old and protects them from exploitation. Of particular importance to this project, is section 10, which protects the child from:

- Economic exploitation.
- Any work that interferes with his/ her education, or is harmful to the child's health or physical, mental, spiritual, moral or social development.

4.12 THE COUNTY GOVERNMENTS ACT, 2012

The promulgation of the 2010 Constitution brought about County Governments. This Act highlights the role of the County Government. In accordance to the water act 2016, the operation of the water supply will be handed over to the County government or a joint committee. As such the County will be involved in the operation and maintenance of the water supply.

4.13 WORLD BANK SAFEGUARD POLICIES

4.13.1 Operational Policy (OP) 4.01: Environmental Assessment, 2001

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations. The purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The improvements on the domestic water supply systems are considered A Category B, as the project impacts are anticipated to be specific to the project site and reversible with implementation of the proposed mitigation measures.

4.13.2 Operational Policy 4.04: Natural Habitats, 2001

The policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present).Majority of the infrastructure to be rehabilitated is already existing as such there will be minimal interference of any habitats. In addition the pipelines are located within the road reserves of the scheme, as such minimal interference with natural habitats, however the Consultant has provided this policy to mitigate any construction activities that may inadvertently negatively affect any habitat.

4.13.3 The Bank's Operational Policy 4.12: Involuntary Resettlement

This is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects. The proposed project will not warrant any displacement of persons as the treatment works is already existing and the pipes will follow the road reserves within the scheme.

4.13.4 Operational Policy (OP/BP) 4.11: Physical Cultural Resources

The objective of this policy is to assist countries in preserving physical cultural resources and avoiding their destruction or damage. PCR are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance. PCR may be located in urban or rural settings, and may be above ground, underground, or under water. The cultural interest may be at the local, provincial or national level, or within the international community. This policy applies to all projects requiring a category A or B environmental assessment, project located in, or in the vicinity of recognized cultural heritage sites. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. Since the rehabilitation works are being done on already existing infrastructure, and whatever few extensions along road reserves, there will be no physical cultural resources disturbed but in case of "chance find", appropriate procedures have been provided in this report.

4.13.5 World Bank Policy on Access to Information, 2010

The World Bank policy on access to information sets out the policy of the World Bank on public access to information in its possession. This Policy supersedes the World Bank Policy on Disclosure of Information, and took effect on July 1, 2010.

This Policy is based on five principles:

- Maximizing access to information.
- Setting out a clear list of exceptions.
- Safeguarding the deliberative process.
- Providing clear procedures for making information available.
- Recognizing requesters' right to an appeals process.

In disclosing information related to member countries/borrower in the case of documents prepared or commissioned by a member country/borrower (in this instance, safeguards assessments and plans related to environment, resettlement, and indigenous peoples, OP/BP 4.01, Environmental Assessments, OP/BP 4.10, Indigenous Peoples, and OP/BP 4.12 Involuntary Resettlement); the bank takes the approach that the country/borrower provides such documents to the Bank with the understanding that the Bank will make them available to the public.

4.14 INTERNATIONAL FINANCE CORPORATION AND WORLD BANK ENVIRONMENTAL, HEALTH AND SAFETY (EHS) GUIDELINES

These are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These General EHS Guidelines are used in addition to the local

guidelines in order to provide mitigation measures for the various environmental and social impacts that will be identified in this report.

5 CONSULTATIONS - PERSONS, AGENCIES & PUBLIC

5.1 LEGAL REQUIREMENTS

5.1.1 Government Policy on Public Consultation

The overall objective of the Government is to involve communities in policy formulation and implementation at the local level. More specifically, the Community Action Planning Programme objective is to put in place a durable system of intra-community co-operation through collective action, which creates communal discussion forums for the implementation of development activities.

5.2 PERSONS OR AGENCIES CONSULTED

The key issues associated with the rehabilitation of the treatment works will often relate to local institutions, heritage, pollution, disruption of livelihoods, community safety, traffic management, communicable diseases and employment and trade opportunities.

Effort was not spared to contact all with information on the following issues:

- Assessment of the baseline environmental and social conditions
- Consideration of feasible and environmentally &socially preferable alternatives
- Requirements under Kenya country laws and regulations, applicable international treaties and agreements
- Protection of human rights and community health, safety and security (including risks, impacts and management of project's use of security personnel)
- Protection of cultural property and heritage
- Protection and conservation of biodiversity, including endangered species and sensitive ecosystems in modified, natural and critical habitats, and identification of legally protected areas
- Impacts on affected communities, and disadvantaged or vulnerable groups
- Cumulative impacts of existing projects, the proposed project, and anticipated future projects
- Consultation and participation of affected parties in the design, review and implementation of the project

As such a cross-section of persons were consulted in Bura town as indicated by the following consultation registers in tables 5-1.

Figure 5-1: Persons met during the ESIA study in planning the Proposed Project

No.	Name	Office	Designation	Contacts
1	Joyce Mutinda	Coast Waters Service Board Mombasa	Deputy Head of Environment unit CWSB	+254722221683
2	Bw. Isaaih Omara	Bura Division Educational Office	Area Educational Officer	+254713989957

3	Bw. Adhan Musa	Bura Sub-County Hospital	Health Administrative Officer	N/A
3	Bw. Callistus Thoya	Sub-county water officer	Sub-county water officer	+254721148840
4	Felix Shiundu	NIB Scheme Manager	Scheme Manager Manger	+254722984866
5	General Public	Manyatta Sokoni and Village Six	N/A	N/A

5.2.1 Overview from the Deputy Head of the Environmental Unit (CWSB)

The Head of the Environmental Unit CWSB welcomed the team and proceeded to give the team an overview of the project as well as provide a key informant interview on the environmental and social issues affecting the community, what is and can be done to mitigate the issues. She explained the predicaments that the residents in the area face caused by the inaccessibility to clean water. The project area acquires water through pumping from the Tana River. Water that is pumped to the treatment plant is sold to the residents at a fee. Those who are not able to afford the water collect it directly from the canals and consume it directly without treatment. They end up exposing themselves to various diseases since the water is used for all domestic purposes hence the need to rehabilitate the supply system in order to redeem the water situation in the area.

She further highlighted that CWSB was taking over the rehabilitation of the water supply system, from NIB, and after that hand over the water supply to the respective water service provider.

5.2.2 Overview from the Area Educational Officer, Bura Division

The area educational officer together with the sub-county director of education welcomed the consultants and provided the necessary information concerning the water situation in the educational sector within the project region.

Situation on the ground.

The area educational officer gave the statistics on the education facilities within the division as follows;

EDUCATION FACILITY	**NUMBER**
Public Primary Schools	27
Private Primary Schools	5
Secondary Schools	2
Early Childhood Development Centers	101

He explained that most of these schools are in the settlement schemes and mainly use water from water pans. A few schools depended on canal water while there are three schools that collect water directly from the river. Only secondary schools buy clean water from carts. All these schools lack facilities for water collection. He explained that the most prevalent disease

in school-going children is Bilharzia. This has greatly affected their education. One of the contributing factors why this disease mainly affect the schools within the settlement schemes is the inaccessibility of water treatment. Some of the mainly affected areas include;

- Sabukia
- Walesorea
- Hosingo
- Dukanotu
- Wekoye

Some of the measures put in place to mitigate the spread of the disease is a current treatment of worms and bilharzia.

Recommendation

Availability of sufficient clean water would retain students in schools while simultaneously increasing their enrollment. It would also stop school unrest that results from the lack of water.

5.2.3 Overview from the Health Administration Officer

The health administration officer welcomed the consultants stated that all information would be made available to the Consultant.

He stated that the services provide by the facility included;

- Maternity services
- Outpatient services only

He further revealed that the theatre was under construction at the moment. The water would be very instrumental in serving the mentioned services offered by the hospital.

Some of the predicaments that the hospital faces include the lack of piped water direct into the hospital. The hospital has always depended on a water bowser where it pays to the tune of Kshs. 3,000 for filling of each tank. This is however quite expensive since the tank can only be used for approximately three weeks.

Most if the sickness cases within the facility include diarrhea and stomach aches due to the consumption of contaminated water. The hospital has put measures to offer public health education and sensitization so as to mitigate the harmful effects of using contaminated water.

5.2.4 Overview from the Sub County Water Officer

The sub county water officer acknowledged the problem of water shortage. He alluded that the locals fetch water from the canal of which in some places along the canal, people excrete and dump some waste into it. As a result, there is constant outbreak of diseases and therefore an urgent need for the completion of the project.

5.2.5 Overview from the NIB Scheme Manger

The area manager depicted that there was an urgent need for the completion of the project as there is significant shortage of water. He further alluded that the cost of pumping water to Bura area was too high. It cost Kshs 100,000 per day to pump the water through the canal. The cost of pumping the water is met by the farmers in the Bura region and the business community are not involved yet they make use of the same water. The area manager postulated that the farmers

ought to be consulted much more since they are the people involved in the pumping of the water. Without the farmers, there would be no water in Bura.

The area manager further indicated that their needs to be high level meetings with the key stakeholders (County government, CWSB, Ministry of Water and Irrigation, the National Irrigation Board and the farmers represented by the Water Users Association WUA) to proper map out the transition of the Bura Irrigation Scheme water supply from the National Irrigation Board, to CWSB and eventually to the water service provider (who after consultation my wind up being the WUA).

5.3 PUBLIC CONSULTATIONS

The Consultant carried out two public consultation meetings on the 24th of April 2017. The first meeting was held in the main Bura town and the second at village 6. These meetings were attended by local leaders, stakeholders and interested parties. The number of attendees for each meeting is summarised in the table below:

Table 5-1: Number of Attendees

Meeting Venue	**Number of Attendees**
Manyatta	35
Village 6	69

5.3.1 Findings of the meetings

The meetings included a presentation by the Consultant on the proposed works, the various environmental and social impacts that may arise from the project including rehabilitation of the treatment works and water supply network. She highlighted the mitigation measures impacts, adding that resettlement was not foreseen since all the infrastructure was existing and the NIB maintained its reserves.

Being a public consultation meeting, feedback from the stakeholders was obtained with majority of the stakeholders approving of the project. However of importance to the project which was pointed out by the farmers represented by the Water Users Association (WUA) is the fact that; the farmers pay Kshs 5000 for the water to be pumped to their farms from the main river at Nanighi. They indicated that Kshs 5000 is per plot of which is one and half acres per planting season. They raised their concern that this amount included fees for water supply. They also raised a concern that the business community in Bura do not incur any cost regarding the water pumping yet they draw water for free from the canal, with very few residents paying for water directly from the treatment works. Thus they stated that they were reluctant from the county government to take over the operation and maintenance of the system since they would be forced to pay double fees for water from the canal to NIB and domestic water to the County, adding that they lacked faith in the county in meeting their interest. The WUA members proposed that they be allowed to operate and maintain the water treatment and supply as an independent Water Supplier and work with CWSB in order to ensure this.

6 ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROPOSED PROJECT

The general environmental and social impacts which may result from the proposed project is presented in this chapter. The emphasis will be initially on the specific impacts that are likely to result from the nature of works (e.g. trenching, excavation, laying of pipelines and construction of water kiosks) and works category (e.g. water supply).

A vast range of environmental and social implications will surely arise from the rehabilitation of the Bura domestic water supply project, notably along the pipeline routes.

In general, successful implementation of the project will have high socio and economic benefits to the people and will contribute to the health and wellbeing. Overall, expected negative impacts are related to the repair of the treatment works, pipelines and water kiosks. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures. The severity and duration of these impacts can be minimized by ensuring that the excavation and construction works are limited to short working sections, and that works are carried out rapidly and efficiently. Table 6.1 presents a characterization of expected impacts.

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Traffic	Increased traffic along the project route		X	X		X				
Ambient Air Quality	Increased local pollutant emissions and trace constituents such as VOCs Increased GHG emissions such as CH_4 and CO_2		X	X		X			X	
	Increased levels of dust and particle emissions from construction vehicles and equipment		X	X			X		X	
soil/water pollution	Contamination of groundwater from oil spills during construction		X	X			X	X		X
	Surface water pollution from construction wastes		X	X			X	X	X	
Noise and vibrations	Increase of noise and vibration levels due to construction activities and traffic		X	X		X			X	

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Health & Safety (Construction)	General construction related health and safety risks for workers		X	X		X			X	X
	HIV/AIDS and increased disease risks.		X	X	X	X	X	X		X
Socio-economics	Improvement of local and regional socio-economy	X			X			X		
	Employment and job creation during construction and operation phases	X		X		X	X	X		
solid and liquid waste	Generation of both solid and liquid waste at the construction camps and project sites		X	X		X	X	X	X	
Health and safety (Operation and Maintenance)	Improvement in public health and sanitation through improved potable water supply.	X		X		X	X	X		

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Water	Increased clean water supply to the target scheme areas which could reduce incidences of water borne diseases hence significant improvement on public health	X		X		X	X	X		
	Enhanced water quality, quantity and distribution.	X		X		X	X	X		

6.1 IMPACT CATEGORIES

First the likely significance of the potential issues of concerns has been determined and ranked according to the following:

- ❖ Potential environmental impacts which are deemed to be highly significant and need thorough investigation in the ESIA
- ❖ Potential environmental impacts that are deemed to be moderately significant, and will require reasonable investigation in the ESIA
- ❖ Potential environmental impacts that are deemed unlikely to be significant, and will need to be listed, and addressed in some way, but which will not require detailed assessment in the ESIA.

Secondly, the following characteristics have been defined for each impact:

Nature:

- ❖ Positive: applies to impacts that have a beneficial economic, environmental or social result, such as additional economic activity or enhancement of the existing environmental conditions.
- ❖ Negative: applies to impacts that have a harmful or economical aspect associated with them such as economical cost, loss or degradation of environmental resources.

Effect:

- ❖ Direct: applies to impacts which can be clearly and directly attributed to a particular impacting activity.
- ❖ Indirect: applies to impacts which may be associated with or subsequent to a particular impacting activity, but which cannot be directly attributed to it.

Time Range:

- ❖ Short Term: applies to impacts whose effects on the environment will disappear within a 1 year period, or within the construction phase.
- ❖ Medium Term: applies to impacts whose effects on the environment will disappear within a 5 year period following the construction phase.
- ❖ Long Term: applies to impacts whose effects on the environment will disappear in a period greater than 5 years following the construction phase.

Reversibility:

- ❖ Reversible: applies to impacts whose significance will be reduced and disappear over time (either naturally or artificially), once the impacting activity ceases.
- ❖ Irreversible: applies to impacts whose significance will not be reduced nor disappear over time (either naturally or artificially), once the impacting activity ceases.

6.2 IMPACTS EMANATING FROM THE PROPOSED PROJECT

The impacts are identified at three stages:-

- Pre- construction/Planning Phase Impacts
- During construction
- Post-construction/Operation phase and
- Decomissioning

6.2.1 Planning Phase Impacts

These are commonly associated resettlement of people within the project area. Majority of the infrastructure is already existing and its reserves are maintained by the National Irrigation Board which has kept encroachers at bay. Thus there will be no resettlement within the project area, in accordance to the design hence no RAP is anticipated.

6.2.2 Construction Phase Impacts

Most of the potential environmental and social impacts associated with the construction phase will be negative and temporary, and can be mitigated with the use of standard environmental management procedures. The potential social impacts or nuisance will be those typically associated with construction activities involving vehicles, equipment, and workers. The predicted impacts include the following:

1) Traffic Congestion

Traffic congestion is anticipated from site related traffic from Contractor vehicles. This may interfere with socio-economic activities which majorly rely on the transport network affected by the construction activities, as well as potential accidents with other road users. The proposed project would have minor, short term impacts on transportation.

Mitigation measures

- The Contractor should provide temporary road signs or notices to indicate ongoing works;
- The Contractor together with the Resident Engineer should Plan itineraries for site traffic on a daily basis and avoid peak traffic periods;
- The Contractor should effect traffic controls and cleanliness to avoid congestion and truck accidents on roads;
- For the site traffic the Contractor has to ensure that they
  i. Only park in designated parking areas;
  ii. Don't block pedestrian routes;
  iii. Don't block traffic routes;
  iv. Obey the speed limit
  v. The resident Engineer has to ensure that the Contractor:
    - Introduces speed limits;
    - Reduces the need for reversing vehicles, by introducing a one way system;
    - Uses a qualified BANKSMAN to control deliveries and reversing vehicles;
    - Designates loading/unloading areas.

2) Site Related Oil Spills

During construction, oil spills may result from construction site equipment and storage, may make its way into the canal and thus have a negative impact on the natural and human biodiversity downstream

Mitigation Measures

- The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks e.g. using dispersants or adding biological agents to speed up the oil breakdown for the construction machinery though induction and safety training (the contractor will propose a method of cleanup which will be subject to approval);
- In case of spillage the Contractor should isolate the source of oil spill and contain the spillage to the source of leakage before it makes its way into the ground water, using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer;
- The Resident Engineer and the Contractor should ensure that there is always a supply of absorbent material such as saw dust on site during construction, readily available to absorb/breakdown spill from machinery or oil storage, this can be incinerated after use;
- All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications and stored in an area approved by the Resident Engineer;
- The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.

3) Soil-Related Impacts

All construction activities have some minor impacts on the soil. However, these are localized and restricted locally to the excavation of trenches for the water pipes, loosening of soil by continuous traffic within the site. It is expected that these impacts are also short-lived during construction and mitigation measures are recommended. The key impacts will revolve around soil erosion, contamination, disturbance of the natural soil structure, piling of soil along public access routes, improper replacement of soil to its original position, mixing of layers and compaction thus reducing the ecological function of the soil.

Mitigation Measures

- The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use.
- In cases where it is identified that during construction there is a danger of increased run-off or erosion, temporary drainage channels or holding ponds can be employed
- After completion of the construction works, immediate restoration spreading piled top soil and by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible.
- Plan emergency response measures in case of accidental oil spills.

4) Impact on Water Resources

Potential environmental impacts associated with water resources include sedimentation, foreign material spills, pollution slumping, disturbance to drainage and removal of vegetation. Vegetation and solid waste, if allowed to accumulate in water ways, may cause localized pooling and flooding.

Improper handling of construction wastes and increased waste water production may cause pollution of the local canals and river. This may affect flora and fauna along the routes.

Mitigation Measures
Ensure proper solid and liquid wastes disposal mainly from the contractor's camps, sites and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.

5) Social - Economic Impacts

Enhancement

During construction the project will have clear benefits with regard to local employment opportunities. The project will additionally require various skills and services which may be available on the local level, e.g. masonry workers, plumbers, etc. for which appropriate personnel will be contracted.

The increase in employment will temporarily lead to an overall increase of income directly and indirectly (through increased demand of other local services). Consequently, farmers will also benefit from higher income levels as they sell their products. New businesses will grow such as food vending to construction workers.

Negative

In migration of people from different regions may lead to behavioural influences and this may increase the spread of diseases such as HIV/AIDS.

Mitigation Measures
Unskilled construction and skilled (if available) labor to be hired from the local population as far as possible to minimize on influx of foreigners into the community. Use of manual labor during trenching works where possible to ensure more employment of locals and hence ensure project support throughout the construction process. Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community Barazas. Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members The Contractor should enforce and maintain a code of conduct for his employees

6) Air Quality

Construction activities of bush clearing, materials delivery, trench excavation, rehabilitation of the treatment works and construction traffic will generate a lot of noise and dust especially during the dry seasons. The area is predominantly dry thus dust is already a pre-existing problem.

Vehicular traffic to the proposed sites is expected to increase especially during delivery of raw materials. Vehicular traffic emissions will bring about air pollution by increasing the fossil fuel

emissions into the atmosphere. The access roads are earth roads. Trucks with heavy loads will further damage these earth roads.

Mitigation Measures
Use of protective clothing like helmets and dust masks by construction crew. Construction sites and transportation routes which are of murram and earth standards will be water-sprayed on regularly up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions (hospitals, etc.) All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and manufacturer's specification to minimize air pollution. Digging of trenches should be done manually so as to avoid too many trucks and machines in the area. The use of manual labor will also benefit the community socio-economically.

7) Construction Noise and vibration

Noise and vibration generated during construction by heavy construction machinery, such as excavators, bulldozers, concrete mixers, and transportation vehicles.

Generally, construction noise exceeding a noise level of 70 decibels (dB) has significant impacts on surrounding sensitive receptors within 50m of the construction site including mosques, schools, and the hospital.

Mitigation Measures
Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 2200 to 0600hrs near residential areas. No discretionary use of noisy machinery within 50 m of residential areas and near institutions such as schools Good maintenance and proper operation of construction machinery to minimize noise generation. Where possible, ensure non mechanized construction to reduce the use of machinery

8) Biodiversity and Conservation Impacts

Water contamination from the construction sites may increase its toxicity and negatively impact plants living in watercourses and animals drinking the water from them.

Mitigation Measures
Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction. The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks e.g. using dispersants or adding biological agents to speed up the oil breakdown for the construction machinery though induction and safety

training (the contractor will propose a method of cleanup which will be subject to approval); - Provision of dustbin and sanitation facilities within the Contractor's camp to prevent seepage into the natural environment.

9) Public Health and Safety

Construction staff and the general public will be exposed to safety hazards arising from construction activities. The rehabilitation of the treatment works, water distribution network (including tanks, pipelines and water kiosks), will lead to an increase in vehicular traffic, thus may have a negative interaction with the pedestrians, other vehicles and animals, and increase the risk of accidents.

The project works will expose workers to occupational risks due to handling of heavy machinery, construction noise, electromechanical works etc.

Construction activities of bush clearing, materials delivery, trench excavation and concrete mixing and construction traffic will generate a lot of dust and this may affect the respiratory system.

The high temperatures in the area will expose the workers to difficult working conditions.

Construction sites may be a source of both liquid and solid wastes. If these wastes are not well disposed these sites may become a breeding ground for disease causing pests such as mosquitoes and rodents.

At the concrete mixing plant the exposure of human skin to cement may lead to damage of the skin.

Immigration of people from different regions may lead to behavioral influences which may increase the spread of diseases such as HIV/AIDS. Improper handling of solid wastes produced during and civil works such as spoil from excavations, scrap metal, mortar, paper, masonry chips and left over food stuff present a public nuisance due to littering or smells from rotting. Open trenches during the project duration pose a risk to the general public as they access the different sides of the trenches.

Mitigation Measures
- Ensure that all construction machines and equipment are in good working conditions and to manufacturer's specifications to prevent occupational hazards. - Establish a Health and Safety Plan (HASP) for both civil and plumbing work. - Appoint a trained health and safety team for the duration of the construction work. - Provide workers with adequate and appropriate personal protective equipment (PPE). - Provide workers with adequate drinking water and breaks. - Provide workers training on safety procedures and emergency response such as fire, oil and chemical spills, pipe bursts and other risks. - Roads passing through population centers will be water sprayed to reduce dust. - Provide appropriate human and solid waste disposal facilities e.g. Toilets and dustbins at strategic points

- Cordon off the trenches being worked on to prevent potential injuries, in addition provide crossing points for locals across trenches to avoid accidents.
- Provide clean toilets for workers, these toilets will be to World Health Organisation standards.

10) HIV & AIDS Impacts

In migration of people from different regions may lead to behavioural influences which may increase the spread of diseases such as HIV/AIDS.

Mitigation:

- Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas. Provide information, education and communication about safe uses of drinking water.
- Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members

11) Service Delivery Impacts

The construction activities will cause disruption of services such as water supply and transportation within the project area. Where the water pipes cross the roads, excavation of trenches and repair of the pipes at these points may cause disruption of transport within the project area. Trucks with heavy loads of construction materials may damage the murram and earth roads within the scheme during the construction process. The trucks may get stuck on bad road sections and these may cause disruption of transport.

Mitigation Measures

- Provide appropriate signage to warn motorists and other road users of the construction activities, diversion routes to ward off traffic accidents, upon consultation with NIB staff on the best routes.
- The contractor should phase the rehabilitation of the treatment works, to prevent any disruption, if the interruption is unavoidable, the Contractor should communicate any intended disruption of the services to enable the people to prepare e.g. by having emergency water storage and provision facilities.
- Areas being trenched to be temporarily cordoned off to avoid people and animals accidentally falling into open trenches.
- In the event that delivery trucks damage parts of the road, repair the spots in consultation with the local authorities.

12) Gender Empowerment Impacts

There is need to promote gender equality in all aspects of economic development and more so in construction. Women roles in construction are mainly confined to supply of unskilled labour and vending of foodstuffs to the construction workers. Where available skilled women will be used.

Mitigation Measures
Ensure equitable distribution of employment opportunities between men and women Provide toilets and bathrooms for both male and female workers on site

13) Impacts on Cultural Heritage

Although the ESIA or RAP did not identify any cultural sites, being a rural area, there may be some sites cultural sites that are underground or unknown, which may uncover unknown cultural resources. These sites may be of importance to the local community. These sites may include and not limited to, archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction.

Mitigation:
Use of "chance find" procedures by the contractor See 11.3 for "Chance Find" procedures

14) Child Labour and Protection

The Children Act of Kenya prohibits contractors from "employing children in a manner that is economically exploitative, hazardous, and detrimental to the child's education, harmful to the child's health or physical, mental, spiritual, moral, or social development. It is also important to be vigilant towards potential sexual exploitation of children, especially young girls. The contractor should adopt a 'Child Protection Code of Conduct'; that all staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour.

Mitigation:
Ensure no children are employed on site in accordance with national labor laws Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police

15) Gender Equity, Sexual Harassment

Construction workers are predominantly younger males. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labour may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work

Mitigation:
The works contractor should be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law where applicable.

- The contractor should prepare and implement a gender action plan, to include at minimum:
  - Gender mainstreaming in employment at the worksite with opportunities provided for females to work, in consonance with local laws and customs
  - Gender sensitization of workers (this could be done by the HIV/AIDS services provider; see above)
  - Provision of gender disaggregated bathing, changing, sanitation facilities
  - Grievance redress mechanisms including non-retaliation.

16) Liability for loss of life, injury or damage to private property

Some of the Construction activities may lead to accidents that may be mild or fatal depending on various factors. During the implementation of the proposed project, accidents could be due to negligence on part of the workers, machine failure or breakdown or accidental falls into the trenches. These incidents can be reduced through proper work safety procedures.

In addition, during Construction, there may be damage to private property that may not be foreseen by the RAP.

Mitigation:

- Provision of PPE.
- The workers should receive requisite training especially on the operation of the machinery and equipment
- There should be adequate warning and directional signs.
- Ensuring that the prepared code of conduct for staff is followed to prevent accidents.
- Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restriction on site, frequency and personnel responsible for safety inspections and controls.
- Cordon off unsafe areas
- Provide first Aid kit within the construction site.
- Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate.
- Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and union agreements.
- The Contractor to repair any damage done to private property.

6.2.3 Impacts during Operation & Maintenance

During the operation of the constructed water supply project no substantial negative environmental and social impacts and risks are anticipated.

1) Socio - economic potential positive or beneficial impacts

Numerous socio-economic potential positive or beneficial impacts from successful implementation of the project will include:

- Better access to safe drinking water leading to improved standard of living; and changes in exposure to both communicable and non-communicable diseases;
- Improvements in domestic hygiene and a reduction in health risks that were associated with poor water quality or inadequate access to services, as a result of improvements in drinking water quality and its availability;
- The program will contribute to increase in local development and employment as the local population are likely to be employed during the construction phase and after construction due to water related investments;
- Sanitation will also be promoted with its attendant improvement in the health of the people such as reduced incidence of water borne diseases.
- Improvements in metering and administrative billing procedures;
- The program is expected to contribute to poor communities well-being associated with improved services, stability, and health.
- Employment creation will be the key positive environment impact as operation and maintenance personnel will be required for the rest of the project life. The availability of water and easy access will trigger other developments and businesses.

Other potential impacts typically associated with operation and maintenance activities are such as:

2) Generation of both solid and liquid waste

The establishment of an adequate water distribution system will be mostly beneficial to the local community, however with the provision of water comes the increase in the generation of solid and liquid waste. Bura irrigation scheme and its environs currently has few sewerage or sanitation facilities. Majority of the stakeholders within the project area, use septic tanks and pit latrines.

Water supply will lead to an increase in the generation of solid and liquid waste.

Mitigation Measures
Provide adequate waste disposal facilities. Ensure collection of all solid waste from generation points, safe transportation to a central point where they are sorted out and safely disposed according to type to protect the environmental resources. Put in place adequate and efficient sanitary facilities for handling liquid waste especially waste water to protect the Tana River from eventual pollution. In the long term the respective WSPs and CWSB should invest in a waste water collection and treatment system for the scheme and the surrounding areas to ensure proper handling of waste water. This would also help in protecting local environment from possible contamination with direct sewage.

3) Introduction of Billing

The water supply will be under the jurisdiction of the county which is a separate entity from the NIB. Thus there will be the introduction of bills for the operation and maintenance of the

works. Thus the farmers who already pay for the water in the canal will be charged double for the water. In addition, the locals may be reluctant to pay for the water, since the one in the canal is readily available.

Mitigation Measures
Use of tariffs that incorporate WASREB tariff policy for providing sustainable and affordable water supply and sanitation services to the poor to cover basic human need while at the same time ensuring financial viability of the services provider Discussion between NIB, CWSB, the county and the WUA on duties and responsibilities in the operation and maintenance of the water supply

4) Noise

Noise nuisance from the water pumps, vehicles, and repair equipment. During O&M activities the pumps within the system can cause a nuisance if not properly maintained. In addition vehicles are required for inspection of the water supply network to detect any leakage and repair equipment is required in case need arises and in the process of these activities undesirable noise will be generated.

Mitigation Measures
All the vehicles and machinery should be operated in compliance with relevant vehicle emission standards and manufacturer's specification to minimize noise and air pollution. During normal operations the noise generated from vehicles has insignificant impact. However during major repairs the equipment used can generate unacceptable levels of noise and mitigation measures similar to those applied during construction to be used.

5) Impact on Water Resources

As mentioned earlier the generated solid and liquid waste from the project area will make itself through its natural water courses, including ground water, back to the Tana River. Thus the entire water system and as a result the ecological system will be negatively affected.

Mitigation Measures
Wastewater will be channeled to the sewerage system if available or constructed septic tanks. Pit latrines can be used where sewerage system is not available or where construction of septic tank is not feasible. All solid waste will be collected from generation points, safely transported to the central place where it is sorted out by type and then safely disposed according to type.

6.2.4 Impacts during De-commissioning

De-commissioning of the Project is not envisaged. Project components however will be rehabilitated over time having served their useful life.

The Contractor's site and camp will be housed within existing infrastructure which is in need of rehabilitation as such there will be no need for decommissioning, the site and camp will be used as the treatment works and staff houses respectively.

7 ENVIRONMENTAL AND SOCIAL MITIGATION AND MANAGEMENT PLAN (ESMMP)

By design, the potential positive impacts of the project can readily be optimized while the potential negative environmental and social impacts are mostly restricted to the planning and construction period. These are assessed and considered as minor to medium, being reversible and short-term and can be managed through well-defined mitigation and monitoring measures.

7.1 POSSIBLE ENHANCEMENT MEASURES

Possible enhancement measures of beneficial impacts would include the following:

- Construction should adhere to recommended best construction practices that make effective and economical use of locally available resources including materials, expertise and labor.
- Ensure that the poor and other vulnerable groups within the project area will be catered for by the project to safely satisfy their basic water needs in future.
- Ensure that social services provide education on appropriate hygienic conditions and water conservation, taking into consideration gender particular roles and responsibilities.
- Carrying out periodic assessment of different components of the water treatment, transmission and distribution system to initiate immediate rehabilitation whenever problems are identified to reduce system leakage and bursts losses.

7.2 MITIGATION MEASURES

Mitigation measures for negative environmental impacts include the following:

- Construction site environmental and social management plans, prepared by the contractor, will be required for all works. This plan will include a waste management plan for all activities during the construction period.
- Maintenance of construction and operation equipment.
- Air pollution due to dust when excavated material is stockpiled, should be limited by working in small sections so that the working sites are rehabilitated to their original state.
- Avoid hampering drainage of surface water and plan for restoration measures after construction.
- Construction activities should be scheduled appropriately to reduce high noise levels particularly at night from noisy activities.
- Avoid areas sensitive to erosion.
- Avoid establishing temporary access roads along steep slopes.
- At the end of construction works, level off the soils and facilitate vegetation regeneration.
- Minimize land clearing areas by employing mechanization only when necessary. Most of the work should be done by hand.
- Prevention of work place injuries during construction is taken care of by the contractors, e.g. by means of signs, signals, fencing, etc.

- Carry out specific Environmental Assessment and preparation of a hazardous material management plan for handling such materials that will be identified during the construction stage of the Project.
- Employ occupational Safety and Health measures as required by law.

Mitigation measures have already been discussed in Chapter 6. However, a brief summary is included in the Environmental and Social Mitigation and Management Plan (ESMMP) in **Error! Reference source not found.**: The Proposed Environmental and Social Mitigation and Management Plan (ESMMP). Also considered in this management and monitoring plan are the persons responsible for implementation.

Table 7-1: The Proposed Environmental and Social Mitigation and Management Plan (ESMMP)

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
Resettlement	No resettlement is foreseen, as the project is located within the NIB's irrigation scheme and the board has maintained no encroachment to any of the project sites. However CWSB should initiate a meeting with NIB, the County government and WUA to map out a way forward and official hand over	Design/preparation	CWSB
Traffic Congestion	The Contractor should provide temporary road signs or notices to indicate ongoing works; The Contractor together with the Resident Engineer should Plan itineraries for site traffic on a daily basis and avoid peak traffic periods; The Contractor should effect traffic controls and cleanliness to avoid congestion and truck accidents on roads; Control of onsite traffic.	Construction	Contractor Supervising Engineer
Site Related Oil Spills	The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks In case of spillage the Contractor should isolate the source of oil spill and contain the spillage to the source of leakage Ensure that there is always a supply of absorbent material such as saw dust on site during construction, readily available to absorb/breakdown spill from machinery or oil storage, this can be incinerated after use;	Construction	Contractor Supervising Engineer

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.		
Soil Related Impacts	The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use. In cases where it is identified that during construction there is a danger of increased run-off or erosion, temporary drainage channels or holding ponds can be employed After completion of the construction works, immediate restoration spreading piled top soil and by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible. Plan emergency response measures in case of accidental oil spills.	Construction	Contractor Supervising Engineer
Impact on water resources	Ensure proper solid and liquid wastes disposal mainly from the contractor's camps, sites and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Construction	Contractor, Supervising Engineer NIB Sub-County Water Officer
Socio – Economic Impacts	Unskilled construction and skilled (if available) labor to be hired from the local population. Use of manual labor during trenching works where possible. Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns,	Construction	Contractor, Supervising Engineer Local Chief

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	multimedia, and workshops or during community Barazas. Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members The Contractor should enforce and maintain a code of conduct for his employees		
Air pollution	Vehicles and other equipment emissions would be kept to a minimum by servicing and maintaining the equipment to manufacturer's specification. In, addition the contractor to be encouraged to use unleaded and low sulphur content petrol and diesel respectively for all equipment and vehicles The Contractor should also make use of the readily available labour for carrying out construction activities.	Construction	Contractor Supervising Engineer
Noise and Dust	Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 2200 to 0600hrs near residential areas. No discretionary use of noisy machinery within 50 m of residential areas and near institutions such as schools Good maintenance and proper operation of construction machinery to minimize noise generation. Where possible, ensure non mechanized construction to reduce the use of machinery	Construction	Contractor Supervising Engineer CWSB
Loss of flora and fauna	Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction. The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks e.g. using dispersants or adding biological agents to speed up the oil breakdown for	Construction	Contractor Supervisor – project Engineer to consult CWSB NIB

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	the construction machinery though induction and safety training (the contractor will propose a method of cleanup which will be subject to approval); Provision of dustbin and sanitation facilities within the Contractor's camp to prevent seepage into the natural environment.		
Public Health and Safety	Ensure that all construction machines and equipment are in good working conditions and to manufacturer's specifications. Establish a Health and Safety Plan (HASP) for both civil and plumbing work. Appoint a trained health and safety team for the duration of the construction work. Provide workers with appropriate personal protective equipment (PPE). Provide workers with adequate drinking water and breaks. Provide workers training on safety procedures and emergency. Roads passing through population centers will be water sprayed to reduce dust. Provide appropriate human and solid waste disposal facilities e.g. Toilets and dustbins at strategic points Cordon off the trenches being worked on to prevent potential injuries, in addition provide crossing points for locals across trenches to avoid accidents. Provide clean toilets for workers, these toilets will be to World Health Organisation standards.	Construction	Contractor Supervising Engineer CWSB
HIV and AIDS impacts	Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS. Use of existing clinics to provide VCT services to construction crew and	Construction	Contractor Local Administration

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
	provision of ARVs for vulnerable community members		Public Health Officer
Service Delivery Impacts	Provide appropriate signage to warn motorists and other road users of the construction activities, diversion routes to ward off traffic accidents. The contractor should phase the rehabilitation of the treatment works, to prevent any disruption The contractor should communicate any intended disruption of the services to enable the people to prepare. Areas being trenched to be temporarily cordoned off to avoid people and animals accidentally falling into open trenches. In the event that delivery trucks damage parts of the road, repair the spots in consultation with the NIB.	Construction	The Contractor
Gender empowerment impacts	Ensure equitable distribution of employment opportunities between men and women Provide toilets and bathrooms for both male and female workers on site	Construction	The contractor The Supervising Engineer CWSB
Cultural Heritage	Use of "chance find" procedures by the contractor _ See Appendix 11.3 for "Chance Find" procedures	Construction	The Contractor County Government
Child Labour and Protection	Ensure no children are employed on site in accordance with the law Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police	Construction	Contractor Supervising Engineer Local Administration
Gender Equity, Sexual Harassment	The works contractor should be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law where applicable. The contractor should prepare and implement a gender action plan,	Construction	Contractor Supervising Engineer Local Administration

Environmental / Social Impact	**Mitigation Action Plan**	**Project stage**	**Responsibility**
Liability for loss of life, injury or damage to private property	Provision of PPE. The workers should receive requisite training especially on the operation of the machinery and equipment There should be adequate warning and directional signs. Ensuring that the prepared code of conduct for staff is followed to prevent accidents. Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restriction on site, frequency and personnel responsible for safety inspections and controls. Cordon off unsafe areas Provide first Aid kit within the construction site. Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate. Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and union agreements. The Contractor to repair any damage done to private property.	Construction	Contractor Supervising Engineer
Generation of solid and liquid waste	Provide adequate waste disposal facilities. Ensure collection of all solid waste from generation points, safe transportation to a central point where they are sorted out and safely disposed according to type to protect the environmental resources. Put in place adequate and efficient sanitary facilities for handling liquid waste especially waste water to protect the Tana River from eventual pollution. In the long term the respective WSPs and CWSB should invest in a waste water collection and treatment system for the scheme and the surrounding areas to	Operation and Maintenance	Approved WSP

Environmental / Social Impact	Mitigation Action Plan	Project stage	Responsibility
	ensure proper handling of waste water. This would also help in protecting local environment from possible contamination with direct sewage.		
Introduction of Billing	Use of tariffs that incorporate WASREB tariff policy for providing sustainable and affordable water supply and sanitation services to the poor to cover basic human need while at the same time ensuring financial viability of the services provider Discussion between NIB, CWSB, the county and the WUA on duties and responsibilities in the operation and maintenance of	Operation and Maintenance	Approved WSP CWSB NIB County Government
Noise	All the vehicles and machinery should be operated in compliance with relevant vehicle emission standards and manufacturer's specification to minimize noise and air pollution. During normal operations the noise generated from vehicles has insignificant impact. However during major repairs the equipment used can generate unacceptable levels of noise and mitigation measures similar to those applied during construction to be used.	Operation and Maintenance	Approved WSP
Impact on Water Resources	Wastewater will be channeled to the sewerage system if available or constructed septic tanks. Pit latrines can be used where sewerage system is not available or where construction of septic tank is not feasible. All solid waste will be collected from generation points, safely transported to the central place where it is sorted out by type and then safely disposed according to type.	Operation and Maintenance	Approved WSP County Government

7.3 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The purpose of the Environmental and Social Monitoring Plan (ESMP) for the proposed project is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts and monitor the efficiency of these mitigation measures based on

relevant environmental indicators. The Environmental and Social Mitigation and Management Plan in Chapter 7.2 above identified certain roles and responsibilities for different stakeholders for implementation, supervision and monitoring. The objectives of the ESMP therefore are:

- To ensure that the recommendations in the approved ESIA report are adhered to by the various institutions
- To ensure that the environmental and social mitigation and their enhancement actions are well understood and communicated to all involved stakeholders.
- To ensure that the proposed environmental and social remedial measures are implemented during the project execution stage
- To evaluate the effectiveness of environmental and social remedial measures
- To evaluate the effectiveness of various evaluation techniques and procedures
- To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations.

Conversely, environmental monitoring provides feedback about the actual environmental impacts of the project. Monitoring results help judge the success of mitigation measures in protecting the environment.

They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes. A monitoring program, backed up by powers to ensure corrective action when the monitoring results show it necessary, is a proven way to ensure effective implementation of mitigation measures. By tracking the project's actual impacts, monitoring reduces the environmental risks associated with the project, and allows for project modifications to be made where required.

Error! Reference source not found. presents the indicators that will be used to monitor the implementation of the pipeline project. The indicators are selected based on the project and major anticipated impacts.

A quarterly monitoring report will be prepared in compliance with NEMA standards and regulations, based on the monitoring carried out as specified in **Error! Reference source not found.** below:

Table 7-2: Proposed Environmental and Social Monitoring Plan

Area	**Environmental /Social Component**	**Performance Indicators**	**Monitoring Requirements**	**Responsibility**	**Frequency of Monitoring**
Contractor's camp site	Noise	Number of complaints Distance from human settlements Limit of acceptable noise standard issued by NEMA	Liaise with other stakeholders. Documentation on complaints about noise	Environmental Supervisor Contractor	Monthly
	Air pollution	Number of complaints on dust nuisance Distance from human settlements	Physical inspection Interview residents including workers Liaise with other stakeholders	Environmental Supervisor	Monthly
	Water pollution	Number of complaints on pollution of water by downstream users Pooled water within the site making its way to the canal	Level of complaints Physical inspection	Environmental Supervisor	Monthly
	Occupational Health and Safety	Healthy and safety awareness among staff Number of accidents and fatalities Number of HIV awareness campaign meetings held Outpatient attendance register	Documentation Interviews with workers and management Liaise with other stakeholders	Contractor	Weekly

Area	Environmental /Social Component	Performance Indicators	Monitoring Requirements	Responsibility	Frequency of Monitoring
		First aid facilities in place Compliance with Occupational Health and Safety Act (OSHA)			
	Solid and liquid wastes	Presence or absence of scattered litter. Flow of wastewater on the ground surface Level of complaints on hygienic conditions and pollution of water sources.	Physical inspection of site and sanitation facilities Documentation in grievance register	Environmental Supervisor Contractor	Monthly
	Child Labour and Protection	Presence of Minors on Site Complaints raised in this regard	Physical inspection of campsite Interviews with local administration and schools on any attendance discrepancies as a result of site visits	Environmental Supervisor Contractor	Monthly
	Gender Equity, Sexual Harassment	Complaints logs on with regards to any harassment Police/chief reports on any sexual harassment cases	Interview residents including workers Review of any cases of sexual harassment	Environmental Supervisor Contractor	Monthly
Contractor's Camp	Public health and safety	Prevalence rates of common diseases.	Physical inspection Documentation Number of complaints, on accumulation of solid and liquid waste.	Environmental Supervisor	Monthly

Area	Environmental /Social Component	Performance Indicators	Monitoring Requirements	Responsibility	Frequency of Monitoring
		Provision of condoms, contraceptives and mosquito nets. Conduction of campaign meetings on transmission of diseases like HIV/AIDS and other STDs. Availability of adequate solid waste bins. System of safe disposal of both solid and liquid waste in place. Availability of first aid facilities. Outpatient attendance registers. Compliance with the Health and Safety Act. Log of Accidents on site	Interview with residents		
	Solid and liquid wastes	Presence of scattered litter. Signs of obstruction of water courses.	Physical inspection Number of complaints.	Environmental Supervisor Contractor	Monthly

Area	Environmental /Social Component	Performance Indicators	Monitoring Requirements	Responsibility	Frequency of Monitoring
	Child Labour and Protection	Presence of Minors on Site Complaints raised in this regard	Physical inspection of campsite Interviews with local administration and schools on any attendance discrepancies as a result of site visits	Environmental Supervisor Contractor	Monthly
	Gender Equity, Sexual Harassment	Complaints logs on with regards to any harassment Police/chief reports on any sexual harassment cases	Interview residents including workers Review of any cases of sexual harassment	Environmental Supervisor Contractor	Monthly
Project sites	Solid and liquid wastes	Scattered litter Signs of obstruction of water ways. Flow of wastewater on the ground surface. Provision of sanitary facilities to the construction crews.	Physical inspection Number of complaints	Environmental Supervisor Contractor	Monthly
	Land, Population growth, Migration and settlements	Changes in the value of land. Changes in type of housing. Population growth and ethnic composition.	Physical inspection Liaise with other stakeholders	CWSB	Quarterly

Area	Environmental /Social Component	Performance Indicators	Monitoring Requirements	Responsibility	Frequency of Monitoring
		New settlements established and migration closer to the pipelines.			
	Noise	Level of noise generated. Provision of PPE. Compliance with existing noise standard issued by NEMA.	Liaise with other stakeholders. Documentation on complaints about noise	Contractor Environmental Supervisor	Monthly
	Air pollution	Level of dust generated. Provision of PPE.	Physical inspection Interview residents including workers Liaise with other stakeholders	Environmental Supervisor	Monthly
All	Social and Economy	School dropout rate. Employment created directly and indirectly for men and women. New businesses established. Prevalence of unplanned new developments Increased income leading to better living standards.	Physical inspection Records from the ministry of Education Employment records	Environmental Supervisor	Monthly

Area	Environmental /Social Component	Performance Indicators	Monitoring Requirements	Responsibility	Frequency of Monitoring
		Improved health due to access to potable water. Reduction of water borne diseases. Increase in school enrolment of school going age children. Improved school attendance by pupils and student			

7.4 GRIEVANCE REDRESS MECHANISMS

Error! Reference source not found. above, shows the performance indicators as part of the monitoring plan. Some of these indicators will be as a result of grievances raised by stakeholders. This section identifies the procedures in which stakeholders can present their grievances for redress.

The Consultant proposes that the Supervising Engineer's office be in charge of collecting and forwarding the grievances to the relevant authority of redress.

The filing of grievances for accurate record keeping is important. If the complainant is not able to express his/her complaint in writing, he/she can be assisted by a local leader (Area Chief) to file the complaint at the complaints desk in the project office. To ease follow-up, each complaint will be registered and assigned a unique reference number. The office will then evaluate the application and determine what implementing agency will resolve the issue. The figure below shows a sample of a complaint form:

Table 7-3: Table Showing a Sample Grievance Form

Grievance Form					
Ref. No.	**PAP Name**	**Date**	**Description of Grievance**	**Proposed Redress Measure**	**Issue Resolved (Y/N)**

These records will be reviewed by the environmental supervisor who will ensure grievances have been redressed.

8 ENVIRONMENTAL MITIGATION COST ESTIMATES

The cost of some of the proposed mitigation measures will have been included in the main engineering Bills of Quantities and therefore need not be included in the Environmental mitigation costs. These costs will also include cost of supervision for implementation of mitigation measures.

Table Table 8-1 shows cost estimates for environmental mitigation. The brief description of the items is for identification purposes and does not supersede or modify the detailed descriptions of works in other sections of this report.

Table 8-1: Cost Estimates for Environmental Mitigation

S/No.	Item description	Unit	Quantity	Unit Price (KES)	Item Cost (KES)
1	Emergency measures in case of accidental oil spill	LS	1	100,000.00	100,000.00
2	Emergency measures in case of accidental water contamination	LS	1	100,000.00	100,000.00
3	Provide waste collection bins at strategic points and ensure that all solid wastes are transported to a place of safe disposal	No.	20	2,000.00	40,000.00
4	Provide Personal Protective Equipment (PPE) to the construction crew – helmets, overalls, gum boots, earplugs and dust masks.	set	100	5,000.00	500,000.00
5	Sensitize workers and the surrounding community on awareness, prevention and management of HIV/AIDS and other STDs through staff training, awareness campaign, media, and sign boards in local languages, workshops and during public Barazas.	Item	1	500,000.00	500,000.00
6	In collaboration with the Ministry of Health fund existing VCT centres located nearby	No.	1	300,000.00	300,000.00
7	Provide condom dispensers at appropriate locations	LS	1	100,000.00	100,000.00
8	Provide both male and female toilets at strategic points within the site	No.	6	100,000.00	600,000.00
9	Spraying Mosquito breeding sites	LS	1	50,000.00	50,000.00
10	Provide signage at construction sites to control traffic to avoid accidents	LS	1	100,000.00	100,000.00
11	Formulate a Healthy and Safety Management Plan, train workers on health and safety procedures and emergency response in case of a fire outbreak, and other risks	LS	1	500,000.00	500,000.00

S/No.	Item description	Unit	Quantity	Unit Price (KES)	Item Cost (KES)
12	Environmental supervision, monitoring, and evaluation over a period of 9 calendar months	Months	9	300,000.00	3,000,000.00
13	Provisional sum to be spent as directed by the Engineer on miscellaneous environmental issues like sampling and testing	LS	1	1,500,000.00	1,000,000.00
	TOTAL				**6,940,000.00**

These costs should be included to the Bill of Quantities of the project and should be made available to the Contractor for implementation of the mitigation measures. In order to ensure the ESMMP is implemented, provision has been made for this supervision. The Client can either carry out the works in house or engage the services of an Environmental Auditor to monitor the works.

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9 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSION

As has been alluded in this report, the following can be said in summary.

The implementation of the proposed rehabilitation works of the Bura Water Supply Project has the following benefits:

There will be an increased supply of clean water to Bura irrigation scheme. This will in turn lead to an improvement in the public health of the population due to the reduction of water related ailments.

There is inadequacy of water experienced all over Bura irrigation scheme hence the improvement of the supply will cater for this inadequacy. It will also reduce the overall time residents take to fetch water hence may lead to an improvement in economic activities carried out in the area. It will also boost school enrollment and retention in the area. On the smaller scale, it will improve the standards of living of residents in the area as diseases and fatigue will reduce.

Employment and skills transfer opportunities will be created for the local population; this will improve the general socio-economic wellbeing of the community

The negative environmental impacts identified are mostly confined to the construction phase of the project. Mitigation measures proposed are adequate and will be monitored and evaluated during project implementation and operation.

9.2 RECOMMENDATIONS

The Consultant recommends that the proposals provided by the NIB regional manager and the local WUA, be carried out with the most immediate being a meeting between NIB, CWSB, the County Government and the local WUA on the current operations, the handover of the water supply, as well as agree on the responsibility of the operations of the water supply due to the various concerns raised.

The ESIA concludes that the project will have substantial positive environmental benefits. It will supply sufficient potable water to meet projected future demands of domestic and other uses in the project area.

The adverse impacts on the physical and natural environment will be “in sum total,” not significant, and can be handled through the recommended mitigation measures.

10 REFERENCES

The Design Report

Republic of Kenya (2004), State of Environment Report, NEMA, Nairobi

Republic of Kenya (2004), District Environment Profile, NEMA, Nairobi

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Republic of Kenya, Water Supply Design Manual (MWI, 2005), Government Printer, Nairobi

Republic of Kenya, Public Health Act, Cap 242, Government Printer, Nairobi.

Republic of Kenya, Environmental Impact Assessment/Audit Regulations 2003, (Legal Notice No.101) Government Printer, Nairobi

The Irrigation Act 2012

The Public Health Act

The Constitution of Kenya 2010

The Occupational Health and Safety Act

The HIV and AIDS Prevention and Control Act

National Gender and Development Policy

The Sexual Offences Act

The Children Act

The County Governments Act

World Bank Operational Policies

IFC EHS Guidlines

11 APPENDICES

11.1 ESIA HOUSEHOLD QUESTIONNAIRE

Zamconsult Consulting Engineers

PROPOSED WORKS CONTRACTS UNDER COAST WATER SERVICES BOARD

ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT SURVEY QUESTIONNAIRE

An Environmental and Social Impact Assessment Survey is being carried out for the proposed **REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY** on behalf of the Coast Water Services Board (CWSB). The aim of this survey is to form a realistic and up to date picture of the Environmental and Social situation in the area. We need your honest and accurate information during this discussion. Your inputs will assist in the understanding of your needs for improvement. The answers you provide will be kept confidential.

SECTION 1 DETAILS

1.1 Name of the Enumerator: .....

1.2 Signature of the Enumerator: .....

1.3 Name of the Respondent.....

1.4 Telephone number of the respondent..... ID Number of the respondent.....

1.5 Date: ..... Time of Interview: .....

1.4 Respondent place of resident: (1) Village..... (2) Location .....

(3)Sub-County -..... (4) County.....

SECTION 2 BASIC HOUSEHOLD SETUP

2.1 Name of the household head? .....

2.2 ID Number of the household Head..... Telephone Number of the Household Head.....

2.3 How many members do you have in this household.....

2.4 How many members of your household fall under each of the following age groups?

(1) 0 – 5yrs..... (2) 5 – 18yrs..... (3) 19-35yrs..... (4) 36-49yrs.....

(5) 49-65yrs..... (6) Over 65yrs .....

2.5 How many of your household members have attained each of the following education levels?

(1) None ..... (2) Primary ..... (3) Secondary ..... (4) College/university .....

2.6 What is the occupation /economic activity of the household head

(1) Crop farming ..... (2) Livestock farming ..... (3) Formal employment .....

(4)Business ..... (5) Fishing ..... (6) Others (specify) .....

2.7 If crop farming what type of crops? (1) Maize..... (2) Cashew nuts ..... (3) Cassava.....

(4) Mangoes ..... (5) Beans..... (6) Coconut..... (7) Others.....

2.8 If livestock farming how many?

(1) Cow..... (2)Sheep ..... (3)Goats..... (4) Donkeys ..... (5) Others .....

Proposed Works Contracts under Coast Water Services Board Page 1

2.9 If business what kind of business? (tick) (1) Shop ..... (2) Bodaboda (bicycle /motorbike).....
(3) M-Pesa..... (4) Jua kali ..... (5) Grocery ..... (6) Others (specify) .....

2.10 What is the average combined household income per month? (tick) (1)Less than 15,000.....
(2) 15,000-30,000..... (3)30,000-50,000..... (4) Above 50,000 .....

2.11 What's the religion of the Household Head? (tick) (1)Christian..... (2) Muslim.....
(3) Hindu..... (4) Traditionalist ..... (5) Others Specify .....

2.12 Type of fuel mostly used for cooking: (tick)
(1)Firewood ..... (2)Charcoal ..... (3) Kerosene ..... (4) LPG(Gas) .....
(5)Electricity ..... (6) Others (specify) .....

SECTION 3 WATER AND SANITATION

3.1 What is the common source of water in this area?
(1) Private tap ..... (2) Public Tap ..... (3) Bore hole ..... (4) Shallow well .....
(5) Protected spring /river ..... (6) Water pan ..... (7) Others (specify) .....

3.3 What is the general quality of the water? (Tick)
(1) Good ..... (2) Fair ..... (3) Bad .....

3.4 How often do you Fetch water?
(1) Every day ..... (2) Every alternate day of the week ..... (3) Once a week .....

3.5 Is the water Supply source adequate (Tick)
(1) YES..... (2) NO.....

3.6 How far is this water source in km? .....
(1) Less than 0.2km ..... (2) 0.2 -1km..... (3) 1– 2km ..... (4) Above 2km.....

3.7 What is the ownership status of the water source? (Tick)
(1)Public ..... (2) Faith based ..... (3)Private ..... (4) NGO ..... (5) Other (specify) .....

3.8 Do you pay for water (1) Yes..... (2)No.....

3.9 If yes how much per 20 litre jerrican in Ksh.
(1) Ksh. 2..... (2) Ksh. 5 ..... (3) Ksh. 10..... (4) Above Ksh. 10 .....

3.10 What is the common mode of transporting water in this area?
(1) Carrying on the head ..... (2) Hand driven carts/wheelbarrow.....
(3) Bodaboda (bicycle/motorbike)..... (4) Pack animals (Donkeys/Camels) .....
(5) Animal drawn carts ..... (6) Trucks ..... (7)Others (specify) .....

3.11 What challenges do you face in transporting water
(1) Loss of time ..... (2) Physical fatigue due to travelling for long distances .....
(3) Others (specify) .....

Zamconsult Consulting Engineers

3.12 How do you dispose of your household waste? (Tick)

(1)Compost pit/burying ..... (2) Collection by the council ..... (3) Recycling .....

(4) Burning ..... (5) Dumping in open areas ..... (6) Others (specify) .....

3.13 Does the household have a toilet?

(1)Yes ..... (2) No .....

3.14 If yes, type of toilet: (tick)

(1) Flush system connected to the sewer line ..... (2) Flush system with Septic tank .....

(3)Pit latrine ..... (4) Mobile toilet ..... (5)Any other (Specify) .....

(5)Any other (Specify) .....

3.15 Are you aware of the proposed Works under Coast Water Services Board?

(1) YES ..... (2) NO .....

3.16 How will proposed Works under Coast Water Services Board affect the community here? (Tick)

(1) Positively ..... (2) Adversely (negatively).....

3.17 If positively, in what way? (Tick)

(1) Reduced time and cost of travel to look for water.....

(2) Reduced cases of waterborne diseases..... (3) Improved hygiene.....

(4) Improved business ..... (5) Growth of town with water supply .....

(6) Reduced livestock diseases..... (7) Employment for the youth ..... (8)Alleviate water shortages..... (9) Others (please specify) .....

3.18 If negatively, in what ways? (Tick)

(1) Dust and noise ..... (2) Demolition of structures ..... (3) Loss of farm land/trees/crops ..... (4) Soil erosion ..... (5) Interruption of services (water, electricity, transport) ..... (6) Spread of diseases (STD, HIV/AIDS)..... (7) Others (specify) .....

3.19 What do you think should be done to minimize or mitigate these negative impacts?

(1) Inform the public about any interruption of services .....

(2) Install storm water drains ..... (3) Avoid night time construction ..... (4) Educate the public and the construction crew on health and safety..... (5) Compensate the structure/Land /crop/trees owners..... (6)Others (specify).....

SECTION 4 HEALTH,

4.1 Which diseases have members of your household suffered from in the past six months? (Tick)

(1)Malaria ..... (2)Malnutrition ..... (3)Measles ..... (4)HIV/AIDS .....

(5)Eye problems ..... (6)Diarrhea ..... (7) Cholera ..... (8) Intestinal worms .....

(9)Respiratory infections ..... (10)Skin rashes ..... (11)Others (specify) .....

4.2 What do you do when you are sick?

(1)Seek medical attention from a health centre..... (2)Prayed for ..... (3)Take herbs.....

(4) Visit a traditional doctor..... (5)Others (specify) .....

4.3 What is the ownership status of the health facilities attended by your household members? (Tick)

(1)Public ..... (2) Private ..... (3) Faith based ..... (4) NGO ..... (5) Traditional .....

4.4 How far is the health facility visited by your household members in km?

(1) Less than 1km ..... (2) 1 -3km..... (3) 3 – 5km ..... (4) Above 5km.....

SECTION 5 KNOWLEDGE AND ATTITUDE ON HIV/AIDS

5.1 Have you ever heard of HIV/AIDS? (1) Yes ..... (2) No .....

5.2 If yes, what source did you hear it from? (Tick)

(1) Radio/TV ..... (2) Billboards ..... (3) Posters ..... (4) Religious leaders .....

(5) Relative/friend ..... (6) Health worker/Clinic..... (7) NGO/CBOs .....

(8) Newspaper ..... (9) Other (Specify) .....

5.3 Has any of your household members been affected by HIV/AIDS? (1)Yes..... (2)No .....

5.4 Do you think HIV (AIDS) can be prevented? (1)Yes ..... (2) No ..... (3) Do Not Know .....

5.5 Do you know where to go for voluntary counseling and testing for HIV/AIDS?

(1)Yes ..... (2) No .....

SECTION 6 ENVIRONMENTAL

6.1 What environmental issues are of concern to the people of this area?

(1) Water shortage ..... (2) Invasive species ..... (3) Overgrazing ..... (4) Extinction of endangered species ..... (5) Mosquitoes and malaria spread ..... (6) Solid waste .....

(7) Deforestation ..... (8) Drought ..... (9) Others (please specify).....

6.2 What are the environmental conservation initiatives in the area?

(1) Tree planting ..... (2) Educating the public ..... (3) Cleaning of mosquito breeding sites .....

(4) Collection of solid wastes..... (5) Others (please specify) .....

6.3 Who are carrying out these activities?

(1) Women groups ..... (2) County council..... (3) Non-governmental organization .....

(4) Community based organizations..... (5) Youth groups..... (6) Others (please specify) .....

6.4 Will the completion of the proposed Works under Coast Water Services Board help in the conservation of the environment in the area? (1) Yes ..... (2) No .....

6.5 If yes in what ways? .....

11.2 PUBLIC CONSULTATION SUMMARY

11.2.1 Public Consultation Minutes

Minutes of the Public Consultation Meeting held at the Manyatta Sokoni on 17th April 2017 at 11.00 am

1) *Present*
   - ❖ Callistus Thoya- Sub-county Water Officer
   - ❖ Marion Orina- Zamconsult Consulting Engineers (Consultant)
   - ❖ Kevin Morang'a- Zamconsult Consulting Engineers (Consultant)
   - ❖ General Public
2) *Introductions*

The meeting started with a word of prayer form the Sheik at 11.00 Am. Callstus Thoya the sub county officer made an introduction there after inviting the consultant to make her presentation

3) *Presentation on the project by the consultant*

The consultant explained in detail the components of the project and its scope with the anticipated impacts both positive and negative to the people and the environment at large in all phases as well as the laws that govern the Environmental and social process. She also alluded the significance of the public consultation meeting. The phases are planning, construction, operation and decommissioning. The planning phase has already been done and at present, the project is at the construction phase as indicated by the consultant.

The significance of the project was explained to the general public by the consultant. The consultant indicated that some existing lines were being replaced and also new ones were being done to cater for the rising water demand.

The consultant indicated that the project will not warrant the displacement of people as the lines will be laid along the road reserves. The consultant further explained the measures to be taken to mitigate the disturbances that will arise as a result of the project and assured the general public that incase the contractor failed to adhere to the set regulations, they could address their concerns to the resident engineer present on the ground for the relevant action to be taken.

4) *Questions, Answers and feedback*

The Consultant then invited the attendees to raise whatever issues they had, in order to have full knowledge on the project.

Q1) Omar Galano, the elderman of Bura Mskiti gave thanks to the consultant for holding the meeting. He acknowledged the problem of water shortage. He asked if the pipelines could be extended to reach Bura Msikiti. He also articulated that there is constant outbreak of diseases due to the usage of dirt water.

The consultant responded that she will articulate the issue to the relevant authorities. The consultant further indicated that with the project realization, the number of outbreaks will reduce due to clean water provision.

In addition the Sub-County Water Officer stated that Bura Msikiti would be served.

Q2) Johnson G Nguru from Pumwali thanked the consultant team for the meeting. He asked if the water system could be refurbished and be returned to the old computerized system. He asked if the tanks could be replaced from plastics to any other better model as the plastic tanks

often do burst. He further asked if the contractor could work faster so as to close the open pits used for pressure testing as they are a health hazard. As a result of the ongoing project, Mr. Johnson postulated that diseases have reduced with the provision of clean water. He also asked if the surrounding schools and the sewerage system could be included in the project. He asked if the water provider could hold more meeting to discuss on water payment so as to enhance the locals understanding. He also proposed that trees be planted, water points be rehabilitated and waste disposal places be built.

The consultant indicated that the concern of the computerized model will be relayed to the appropriate agency mandated with that responsibility. The consultant further indicated that holding more meeting is possible as this could enhance the locals understanding on the need to pay for water. The sub-county water officer indicated that the rehabilitation of water points can be realized and the wastage disposal site issue will be relayed to the appropriate agency. Concerning the open trenches and pits, she stated that she would inform the supervising engineer to ensure any unsafe areas are cordoned off.

Q3) Bashas Abdi Adana from Bura Kalangari requested for faster completion of the project. He asked why some people are served and other are not served with water connections.

The sub county water officer articulated that they will request the contractor to work at a faster rate to ensure project completion. As to why a few people are served by the water, the subcounty officer indicated that they are planning for a future expansion to cater for all people once the project is completed.

Q4) Wama Barisa from Buzadi asked for all the residents to be served with water. He also wanted to know where to report any grievances to.

The sub county officer reiterated that all people will be served once the project is accomplished. Regarding grievances, the Consultant stated that any grievances could be recorded at the Resident Engineer's office located at the treatment works, these grievances would be addressed by the relevant authority and monitored by CWSB.

Q5) Mohamed Bin Nafit the headmen of posta postulated that the water has no benefit as they are unable to meet the cost of constructing the pipelines to bring water to their homes.

The consultant reiterated where the pipelines will be going through with their endpoint. She further articulated the importance of having clean water in the surround areas other than being far way. The consultant indicated that there will be future expansion projects to cover areas not served by the current project.

Q6) Mr Astaf Hassan Fala from Manyatta asked requested improvement of hospitals around the area to cure the disease outbreaks. He postulated that the disease outbreak are as a result of lack of the waste disposal places.

The Consultant indicated that the issue of waste disposal is a menace and she would pass their concern to the relevant authority. She also indicated that the improvement of hospitals concerns will be relayed to the relevant agency.

Q7) Mohamed Wario from Bura Sukere proposed the rehabilitation of the present Kiosks other than the building of new kiosks. He asked about which board will take control of the water and where they will pay the water bills to (NIB or CWSB).

The consultant indicated that rehabilitation will be done. The building of the new kiosks are as a result of catering the rising population. The consultant further stated that then scheme is on a transition mode form the National Irrigations Board to the county government and

once this is done, the locals will be notified on how will be in control and where to pay their bills to.

Q8) John Macharia from Huruma asked if schools like Huruma primary, Gordia secondary and Bura Sukere primary could be served with clean water.

The consultant indicated the need and the importance of the schools to be served with water. The Sub county water officer responded that it will be done once the water starts following through the pipes.

Q9) Kasim Kambiche Wario from Milimani Village asked for the pipeline extension to Milimani Village and the surrounding schools.

The consultant responded that she will articulate the issue to the relevant authority for an appropriate action to be taken.

Q10) Stephene Nyaramba asked all parties not bring political interference to the proposed project.

The consultant together with the sub county water officer pointed out that there will be no political interference from any party whatsoever.

5) Conclusion

The Consultant asked if the people were in support of the project. The locals, by a show of hands approved of the project, stating that their recommendations given in the meeting should be taken into account. The meeting ended at 1.10 pm with a word of prayer.

Minutes of the Public Consultation Meeting held at the Village Six on 17th April 2017 at 3.00 pm

1) Present

- Callistus Thoya- Sub-county Water Officer
- Marion Orina- Zamconsult Consulting Engineers (Consultant)
- Kevin Morang'a- Zamconsult Consulting Engineers (Consultant)
- General Public

2) Introductions

The meeting started with a word of prayer from the village elder at 3.00 pm. He introduced the consultant to the attendees thereby inviting Mr Thoya. Mr Thoya provided an introduction who inturn invited the consultant.

3) Presentation on the project by the consultant

The consultant provided an elaborate explanation of the project, its scope and its anticipated outcomes and the laws which govern the Environmental and social process as well as the significance of the public consultation meeting. She also explained about the projects impacts in all the phases both positive and negative.

The consultant explained the need of the project to the general public. She explained that there was need to replace some existing line and also add extra new lines to cater for rising demand for the fresh water.

The consultant explained the various phases of the projects with their associated impacts both positive and negative. The phases are planning, construction, operation and decommissioning. The consultant indicated that the planning phase has already been accomplished and the project is at the construction phase. The consultant indicated that there would be no displacement of

people as the pipelines will be laid along the road reserves. The consultant further explained the measures to be taken to mitigate the disturbances that will arise as a result of the project and assured the general public that incase the contractor failed to adhere to the set regulations, they could address their concerns to the resident engineer present on the ground for the relevant action to be taken.

4) Questions, Answers and feedback

The attendees were invited by the consultant to raise their concerns relating to the said project inorder to have the full knowledge on the project.

Q1) Fredrich Wachira from village six asked about water payment. Who is to buy and sell the water? Where is the payment for the fresh water to be done and who is to be mandated with the control of the water.

The consultant indicated that the relevant authorities are working on that as the scheme is on transition path from the National Irrigation Board to the County Government. The locals will be notified on how to pay their bills once the transition is done.

Q2) Peter Muhia Kiarie from village six asked about individual water connection and how it can be done.

The consultant indicated that it is possible. The locals need to liaise with the body mandated with the provision of water in case of the need for an individual connection.

Q3) Hassan Maswedi from Village five requested for the provision of shades in places where water is to be sold since the place is hot and people can't manage to stand on the sun for long hours awaiting water. He also proposed for capacity building of their own water groups to carry out the operations of water distribution and billing. He further pointed out that the locals have their own water user's organization called UA which they provide monthly payments of up to kshs 5000 to pump water from river Naghini to irrigate their farms. Kshs 5000 is payment for a plot irrigation of which a plot to them is one and half acres. He further asked for the distribution of the water to the surrounding schools.

The consultant reiterated that she will relay their concerns relevant authorities and find an amicable solution.

Q4) Peter Muchai from village Six requested that the laborers for selling water and meter reading be the locals. He postulated that they have no confidence in the county government and they would like to manage their water with their own Water Association (UA).

The consultant indicated that an understanding will be reached between the locals and the county governments as she will pass their concerns to the relevant authorities after the completion of the project so as to discuss how better that could be handled.

Q5) Mr Magiri from Village six proposed that they be left to set their own tariffs for water payments. He further said that the Kshs 5000 they pay is already too high. He proposed that within the payment of Kshs 5000 that they make for their farms ought also to cater for the cost of provision of fresh water.

The sub-county officer responded by stating that it is possible to supply fresh water and water for irrigation at the kshs 5000 rate but in consultation with the water supply urgency. He further articulated that the setting of water bills is the responsibility of the water provision agency.

5) Conclusion

The Consultant asked if the people were in support of the project. The locals, by a show of hands approved of the project, stating that their recommendations given in the meeting should be taken into account. The meeting ended at 4.20 pm with a word of prayer.

11.2.2 Attendance List

Public Consultation Meeting			
List of Attendance			
Proposed Rehabilitation of Bura Irrigation Scheme Domestic Water Supply			
Venue: Village 6 Date 24/ 4/2017			
Name	ID NO	Village/Insitution	Telephone no.
Islam Akare Mugawa	173425	6	727497001
Fatuma Njeri Mate	3095366	6	704728706
Mohamed Lango	5954911	6	713540112
Joseph Njuri	N/A	6	N/A
James Muchiri	11893237	6	714138035
Mwangi Njoroge	795104	6	N/A
Daniel Kinuthia	24180510	6	703486520
Julius C Machira	21254040	6	704520390
Mwai Gachutha	N/A	6	N/A
Fred Situma	30453553	5	701315165
Francis Mbugua	21930342	6	729756494
Simon Maiyuria	344236	7	711779513
Hassan Shafi Maani	33050448	8	724949040
Peter Muriuki Murage	32276373	9	798256489
Peter Muhia Kiarie	10311208	6	710372219
Mwaniki Kimeu	2914735	6	N/A
Nicholas Mwaura	2024100	6	N/A
John Gitau	1421240	6	717408730
Naomi Malusi	22607114	6	702705912
Peter Mukami	22483498	6	720063041
Esnas Mwajuma	31070097	6	723634240
Peter M Wachira	11893236	6	713554592
Tiyus Syanda	27937782	6	700592893
Michael Kamau	23679969	6	797887618
John Njugua	N/A	6	N/A
Bakari Osman	N/A	6	N/A
Joseph Karieri	11546119	6	N/A
Douglas Waweru	23577421	6	N/A
Stanly Igunza	35385824	6	N/A
Hesbon Kiraho	14700025	6	712740808
Peter Mwangi	1270937	6	716034590

Joseph Wekesa	N/A	6	N/A
Maulid Mohamed	N/A	6	786115855
John Mariga	30808164	6	726130571
John m Mwangi	12730885	6	N/A
Peter Kigumi	N/A	6	N/A
Francis Kiarie	N/A	6	708610167
Simon Mwangi	30995723	6	711814378
Jane Njoki	N/A	6	728363249
Fredrick Wachira Mwangi	3663060	6	705069272
Hassan Masudi	3351588	5	728553833
Edward Sagwe	6544198	5	70220899
Peter Mutinda	5954312	5	713236613
Samwel Ambongo	1053789	6	707900395
Nancy Wangare	11171837	5	710512651
Njoki Ngunyi	60315103	6	715499105
Erusmus Njeri	1883453	6	721496771
Joseph Kangathe	12728494	6	789972790
Joseph W Ritho	1421207	6	713153694
Mary Wanjiru Kangathe	N/A	6	711834467
Lucy Wanjiru	7170052	6	716181033
Ester Nyokabi	N/A	6	N/A
Cecilia Wakabu	N/A	6	N/A
Mary Ntheya	N/A	6	N/A
Purity W Kagayo	3217674	6	705173712
Milka M Samwel	21236373	6	714967493
Stella Mwikali	20278631	6	700581163
Hellen Njeri	N/A	6	N/A
Halima Islam	N/A	6	706580533
Benta A Owiti	20839866	6	713401690
Erastus Kamau	N/A	6	N/A
Stephen Mjaramba	8737680	8	715532654
Magiri Manene	170880	11	735111727
John Macharia	5170619	6	728760218
Joseph K Nsuki	1027213	5	713337195
Buksar Kassim	N/A	6	735639171
Juma Ramadhan	5954108	6	N/A
Stanely Mutange	26887300	6	N/A

Public Consultation Meeting			
List of Attendance			
Proposed Rehabilitation of Bura Irrigation Scheme Domestic Water Supply			
Venue: Manyatta Sokoni Bura Date 24/ 4/2017			
Name	ID NO	Village/Insitution	Telephone no.
Ismail Maka	23613645	11	728614247
Smaze Abdi Malolo	18996	11	704434822
Johnson G Mbugua	29698129	Jumain	713421858
Sahal Mohamed	2967974	Manyatta	727080069
Abdirabimari Jarso Yakub	N/A	Manyatta	718283191
Madina Badole	20193160	Manyatta	723282432
Hussein Abdi	4433214	Bula Nyau	786509298
Omar Galano	746166	Bula Ayan	717414667
Ustadh Hassan Farah	737680	bula Mskiti	720043626
Stephen Njaramba	5442110	Manyatta	715532654
Mohamed Dede Futi	170880	Chraiman W.V.A	n/a
Magini Manene	8297362	Manyatta	735111727
Mohamed Wario	8297362	Manyatta	7033253999
Mohamed Kulisa	11891886	Chairman Riviviugi	724844862
Abduleh Deko Shale	3920650	Bula Nyau	724844562
Basasi Abdi	8297410	Bula Kaka	713209969
Ali Abdulahi Ali	8297410	Bula Kaka	720118656
Goliaha Ibrahim Bankara	23876403	Taip	710961799
Julius Imana	4653231	Godia HEAD MAN	712488950
Mohamed Kafuja Abaloni	4405212	Manyatta	n/a
Omar Gojo Bonaya	5443668	Dakech Dera	n/a
Abdi Yare Golacha	5442619	Village 16	701118626
Hussein Bagaja Jara	173401	Bisik D Damu	708301944
Dende Barija Gamo	5445283	Halo Magente	n/a
Kassim Kambicha Wario	648956	Jilo Tabdo	N/A
Aden Rhino Karayo	171525	Milimani	70617736
Madina Habona Wayamo	13408956	Manyatta	706479271
John Macharia	5170619	Chairman	728760218
Abdi Adan Gure	649021	Duko	705186088
Wama Barisa Suleiman	13408481	Bisadi	703342969
Ismail Adhan Wario	20190161	Bula Salama	7022137706
Issa Barisa Jilo	5447051	Bula Sukule	N/A
Shurick Daudi Dara	13408846	Bula Ibisa	796347136
Ali Mohamed Boru	32325747	Bula Nyau	715994320
Omar Adha	13408574	Area Chief	727073192
Hassan Sharamo Guyo	173353	Bula Nagere	N/a

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Village 6 Date.....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
1	ISLAM ABARE NUGAMA	0173425	6	0727497001	ISLAM
2.	FATUMA NJERI MATE	3095366	6	0704728706	
3.	MOHAMED LANGO	5954911	6	0713540112	
4	JOSEPH NJURI		6		
5.	JAMES NJUCHIRI	11893237	6	0714138035	
6	MWANGI NJOROGE	07795104	6		+ emg
7	DANIEL KINUTHIA	24190510 ~~0703486~~	6	0703486520	
8	JULIUS C. MATHARIA	21254040	6	0704520390	
9	NINA GACANTHA		6		+ MIMEA
10	FRED SITUMA	30453663	6	07013516S	
11	FRANCIS MBEGUA	21930342	6	0729756494	
12	SIMON MAICHURIA	8444236	6	0711779513	
13	HALIMA CHAFI MOHAMED	33050448	6	0724949020	
14	PETER MURIUKI MURAGE	32276373	6	0795154189	
15.	PETER MUTHIA KIARIE	10311208	6	0710372219 ~~0731208~~	

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Village 6 Date.....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
16	NJANIKI KINEU	2914735	6		
17	NICHOLAS MWAURA	22241000	6		
18	John GITAU	1421240	6	0717408730	
19	NAOMI MALUSI	22607114	6	0702705912	
20	PETER MUCHIRI	25838998	6	0720063041	
21	ESNAT NJAJUMA	21070097	6	0723634240	
25	PETER M. WACHIRA	11893286	6	0713554592	
26	TITUS SYANDA	27937782	6	0700592893	
27	MICHAEL KAMAU	2367 9969	6	0797887618	
28	JOHN NJUGUNA		5		
29.	BAKARI OSMAN		6		
30	JOSEPH KARIERI	11546119	6	07	
31	DOUGLAS WAWERU	23577421	6	07	
32	STANLY IGUNZA	35385824	6		
33	HESBON KHIRATO	14700025	6	0712740808	

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue ..Village 6..... Date.....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
34	PETER MWANGI	12730937	6	0716034590	
35	JOSEPH WEKESA		6		WEKESA
36	MAULID MOHAMED		6	0786115855	
37.	John Mariga	30808164	6	0726130571	
38.	JOHN M. MWANGI	12730885	6		
39	PETER KIGUMI		6		
40	FRANCIS KIARIE		6	0708410167	
41	SIMON MWANGI	30995723	6	0711814378	
42	JANE NJOKI		6	0728368249	
43	FREDRICK WAITHAKA MWANGI	3663060	6	0705069272	
44	HASSAN MASUDI	3351588	5	0728553833	
45	Edward Sagwa	6576198	5	0702208 99	
46	PETER MUTINDA	5954312	5	0713236613	
47	SAMUEL AMBONGO	10537 89	6	0707900395	
48	NANCY WANGARI	11171837	6	0710512651	

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue ..Village 6..... Date.....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
48	NJOKI NGUNYI	6037503	6	0715499105	
49	ERASMUS NJERU	1853453	6	0721496771	
50	Joseph Kangéllé	12728494	6	0789992790	
51	Joseph ~W. Ritho	1421207	6	0713153694	
52	MARY WANJIRU KANGETHE		6	0718344677	
53	LUCY WANJIRU	7170052	6	0716181033	
54	ESTHER NTOKARBI		6		
54	CECILIA WAKARBY		6		
55	MARY NTHENYA		6		
56	DURITY W. KAGATO	32176774	6	0705173712	
57	MILKA M. SAMUEL	21236873	6	0714967493	
58	STELLA MWIKALI	20276631	6	0700581163	
59	HELLEN NJERI		6		
60	HALIMA ISLAM		6	0706580533	
61	BENTA A. OWITI	20889866	6	0713401690	

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Village 6 Date.....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
62	ERASTUS KAMAU		6		
63	Stephen Njoroge	8737680	8	0715532654	
64	magiri mwene	0170880	11	0735111727	
65	JOHN MACHARIA	5170619	6	0728760218	
66	Joseph K. Nzuki	10272 13	5	0717337195	
67	BUKSAR KASSIM		6	0735639171	
68	JUMA RAMADHAN	5954108	6		
69	STANLEY MUTANGIRS	26857300	6		

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Manyatta Vokeni - bura Date 24-4-17

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
	~~ISMAIL MAKA~~	~~23613645~~	~~V-11~~	~~0728614247~~	
1	ISMAIL MAKA	23613645	V-11	0728614247	
2	SIMAZA ABDI MADO	0018996	KUMAFIN VILLAGE	0701348220	
3	JOHNSON G MBURU	8246627	Manyatta	0713421858	
4	SATTAR MOHAMED	29695129	Manyatta	0727080069	
5	Abdirahman Jarso YAKUB	29697974	MANYATTA	0718283191	
6	Madina Bodole		Bula NYAU	0723282432	
7	Hussein Abdi	20193760	BULA AYAN	0786509298	
8	Omar Galgalo	44832141	Bula Burji	0717414667	
9	Ustadh Hassan Farah	0746166	Manyatta	0720043626	
10	Stephen Njeramba	~~0715532654~~ 0737682	C/man W.U.A	0715532650	
11	mohamud sede ruti	5442110	manyatta		
12	Magiri Imanene	0170880	manyatta	~~0735~~ 111727	
13	MOHAMED WARIO	8297362	Chairman Revising	0703253999	
14	MOHAMED KUHISA	11891886	BULA NYAY	0724 844862	
15	ABDULEH DEKO SHALE	3920650	BULARIG	0706556992	

PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Manyatta Vokoni - Bura Date 24-4-17

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
16	BASASI ABDI	8297410	BULA KAKA L	0713209969	
17	ALI ABDUCANI ALI	23876403	TAIP G	0720118656	
18	Golicha Ibrahim Daukara	A6532231	Grodia Deputy H/man	0710961799	
19	Julius Imana	4405212	Manyatta	0712488950	Julius
20	MOHAMED KATUJA ABALONI	5443668	DAKACH. DERA	—	
21	OMAR GABO BONAYA	5442619	V. 16	—	
21	ABDI TARE GOLOCHA	0173401	BISIK. D. DAMU	0701118626	ABDI
22	HUSSEIN BAGAJO JARA	5445283	HARO MAGEMIE	0708301944	
23	DENDE BARIJA GAMO	5447431	JILO TARDO	—	
24	KASSIM KANDICHA WARIO	06.48956	MILIMANI	—	
25	ADEN RHINO KARAYO	0171525	NANISI JUV	0706377736	
26	MADINA HABONA WATAMO	13408956	MANYATTA	0706479271	
27	SOHA MACHARIA	5170619	Cimara	0728760218	
28	ABDI ADAN GURE	0649021	DUKO	0705186088	
29	WAMIA BARISA SULEIMAN	13408481	BISADI	0703342969	

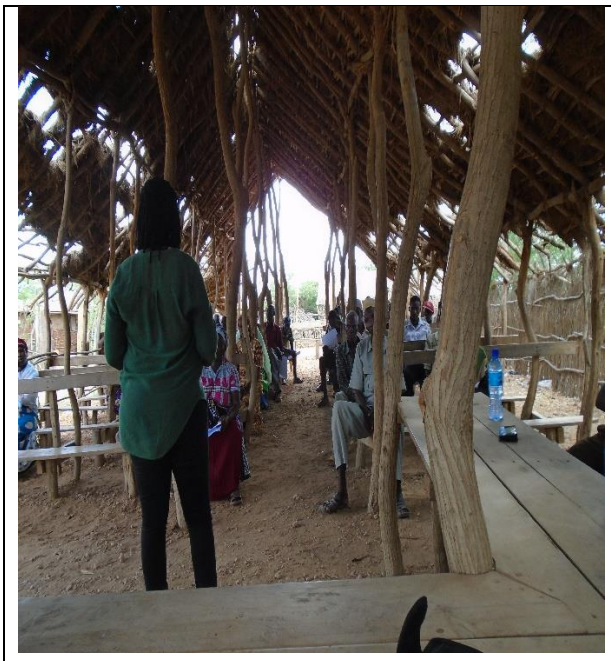
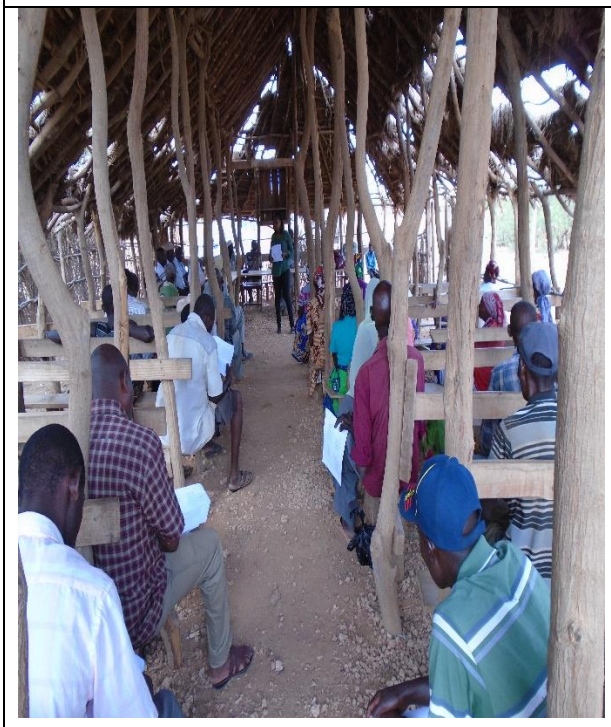
PUBLIC CONSULTATION MEETING
LIST OF ATTENDANCE
PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME DOMESTIC WATER SUPPLY

Venue Mamyatta Vokoni - bura Date 24-4-17

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
30	ISMAIL Adhan wario	20190161	Bula Salama	0702213786	
31	ISSA BARISA JILO	5447051	Bula Sukule		ISSA
32	Shurick DAUDI DARA	13408846	Bula IBISA	0796347136	
33	ALI MOHAMED BORU	32325747	Bula NJAU	0715994320	
34	OMAR Bolle	34085741	AREA CHIEF	722703192	
35	HASAN SHARAMO GUYO	0173353	BURA NAGERAL	N/A	

11.2.3 Photos of Public Consultation Meeting

Village 6

	
Consultant Making a Presentation	Member of the Public Seeking Clarification
	
Members of the Public in attendance	Sub-County water officer answering answering questions from audience

Manyatta Meeting

	
Consultant Explaining about the Project	The Public Listening to the Consultant
	

11.3 CHANCE FIND PROCEDURES

Chance find procedures are an integral part of the project ESMMP and civil works contracts. The following is proposed in this regard:

If the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Ministry of State for National Heritage and Culture take over;
- Notify the supervisor, Project Environmental Officer and Supervising Engineer who in turn will notify the responsible local authorities immediately (within 24 hours or less);

Responsible local authorities would then be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the local administration and county offices. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, namely the aesthetic, historic, scientific or research, social and economic values.

Decisions on how to handle the find shall be taken by the responsible authorities and the Ministry of State for National Heritage and Culture. This could include changes in the layout (such as when finding irremovable remains of cultural or archeological importance) conservation, preservation, restoration and salvage.

Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities.

Construction work may resume only after permission is given from the responsible local authorities concerning safeguard of the heritage.