REPUBLIC OF KENYA

MINISTRY OF ENVIRONMENT, WATER & NATURAL RESOURCES

NORTHERN WATER SERVICES BOARD (NWSB)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PROJECT REPORT FOR PROPOSED REHABILITATION AND EXTENSION OF KORR WATER SUPPLY UNDER NORTHERN WATER SERVICES BOARD

Works carried out under

Contract No.: CWSB/WaSSIP-AF/C/37/2016

Zamconsult Consulting Engineers Limited

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Disclaimer

This Environmental Impact Assessment report is being submitted in accordance with the terms and conditions of Contract in respect of provision of consultancy services for Environmental Impact Assessment Project Report on the Proposed Rehabilitation and Extension of Korr Water Supply Project. It has been carried out in full observance of the ESIA regulations (Kenya Gazette Notice No. 56 of 13 June 2003) in compliance with the Environmental Management and Coordination (Amended) Act, 2015 and subject to terms and conditions of the National Environment Management Authority (NEMA)

EXECUTIVE SUMMARY

INTRODUCTION

The Government of Kenya in partnership with the International Development Association (IDA) under the titles of Borrower and bank respectively have arranged for credit towards the cost of Water and Sanitation Service Improvement Project – Additional Financing (WaSSIP-AF). This funding is channeled through several water Services Boards of which the Coast Water Services Board and Northern Water Services Boards form part.

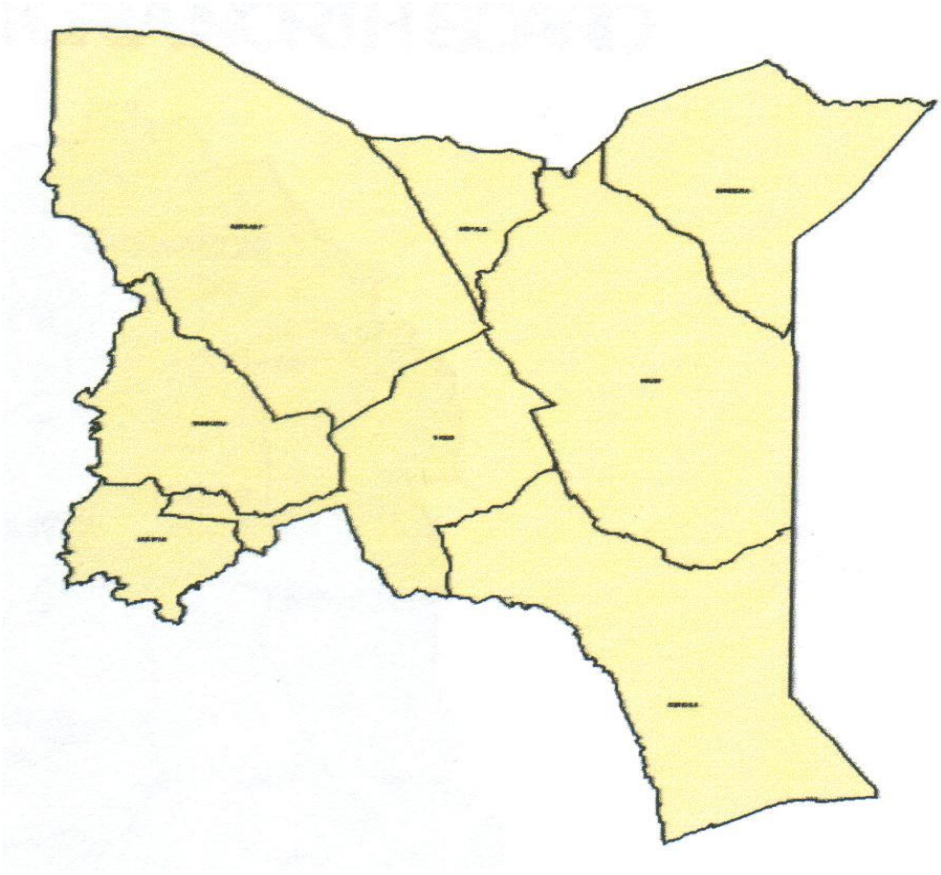
Coast Water Services Board (CWSB) and Northern Water Services Boards are independent Parastatals (Government Owned and Autonomous) created under the Water Act, 2016 but established through separate Gazette Notices. They operate under the Parent Ministry of Water and Irrigation and in accordance with: The provisions and regulations of the Water Act, 2016, The State Corporation Act Cap 446, Other Relevant Provisions of the Laws of Kenya and Rules and Regulations given in form of circulars by the Parent Ministry and Ministry of Finance.

The Northern Water Services Board which is a Parastatal covering seven counties of the Northern Kenya region access this funding through the Coast water services Board which is another agency covering the Coast of Kenya region. This is so because it was decided that the CWSB had the capacity to undertake the project having handled World Bank funded projects before.

The seven counties and sub counties covered by Northern water Serviced Board region are as tabulated in table 1.1 hereunder.

Table 1.1 Counties in the NWSB Region

S/No	County	Sub counties
1	Garissa County	Garissa, Ijara, Daadab, Lagdera and Fafi
2	Wajir County	Wajir South, Habaswein, Wajir East, Wajir North and Wajir West.
3	Mandera County	Mandera East, Mandera South, Mandera North, Mandera West, Lafey and Banissa
4	Marsabit County	Moyale, Marsabit central, Laisamis, Loyangalani,
5	Isiolo	Isiolo, Garbatula and Merti
6	Samburu	Samburu East, Samburu Central and Samburu North
7	Laikipia	Laikipia East, Laikipia West, Laikipia North



Map 1.1 Counties in the NWSB Region

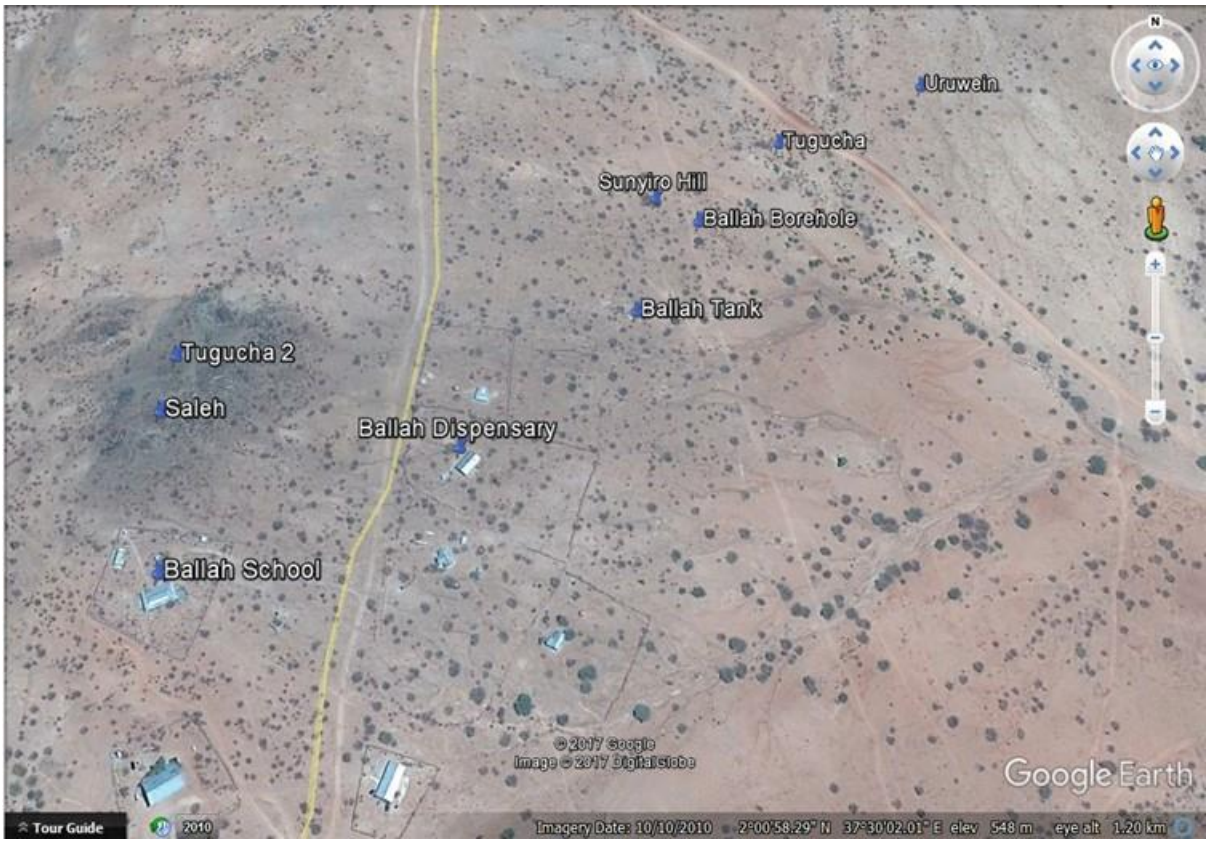


Figure 1-1 Google Maps Image of Project Area

The main overall objective of this project is aimed at improving the social economic and health status of the beneficiary community through sustainable supply of potable water for domestic, institutional, commercial and livestock use. This project will provide water for a human population of over 23,000 people at the ultimate time. Once the project is complete and the areas' water demand will be met, the Board intends to form a water company to enhance water governance and operation-maintenance responsibilities and ensure sustainability of the project. For this to be realized, there will be the Construction of Rising Main Pipe line to Sunyiru Proposed 225m^3 Masonry Tank-1.5Kms, Construction of 100m3 Elevated steel Tank at Borehole site, Construction of Rising Main Pipe line to Ballah 50m3 Masonry Tank – 1.1km, Construction of Distribution Network system – 11Kms, Construction of 4No. Water kiosks and installation of 10m^3 Plastic Tanks on top of their roof slabs at Tugucha 1 and 2, Salah and Ballah villages and also the Installation of solar system and Metering. The Proposed Korr Water Supply Project is estimated to cost Kshs 49,943,606.

Korr experiences perennial drought and hence the need for a sustainable solution to this chronic problem of lack of sufficient safe water. The consulting services will therefore cover the supply of water from Ballah Borehole to Korr Township, Ballah Primary school and Hospital, Manyatta sallah, Tugucha and Manyatta Uraweine. The area of supply is approximately 20 km^2. The project area is in Ballah Sub-Location, Korr Location, Korr Division in Laisamis Sub- County of Marsabit County. In order to address the challenges of inadequate water supply experienced in the Korr area, NWSB through CWSB engaged ZamConsult Consulting Engineers to undertake an Environmental and Social Impact Assessment in order to acquire a NEMA license before the commencement of the projects. The report is to capture all guidelines that have been provided by the World Bank.

In compliance with the Environmental Management and Coordination Act, the Consultant carried out the Environmental Impact Assessment of the Proposed Project Works in order to develop an ESIA report for submission to NEMA. NEMA would thereafter issue a license in order for the works to proceed

METHODOLOGY

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. Desktop studies
2. Field investigations

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.

LEGAL FRAME WORK

There are several laws and regulations that exist that govern issues of environmental concern in Kenya. Some of those relevant to water and sanitation issues include the Environmental Management Co-ordination Act, the Water Act 2016 and the Public Health Act, among others. However, the most significant act that specifically addresses the issues of environmental impacts of development projects, including those on housing development, roads, water and sanitation, is the Environmental Management and Coordination Act (EMCA), 2015.

The Kenya Government's Environmental Policy aims at integrating Environmental Aspects into National Development Plans. The broad Objectives of the National Environmental Policy include:

Optimal use of natural land and water resources in improving the quality of Human Environment; Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;

Integration of Environmental Conservation and Economic Activities into the process of sustainable development;

Meeting national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

Kenya has approximately 77 statutes which relate to Environmental concerns. Most of these statutes are sector specific, covering issues such as public health, soil erosion, protected areas, endangered species, water rights and water quality, air quality, noise and vibration, cultural, historical, scientific and archaeological site, land use, resettlement, etc. Previously, Environmental Management Activities were implemented through a variety of instruments such as policy statements and sectorial laws and also through permits and licenses. For example, the Physical Planning Act of 1996 empowers local authorities to request existing facilities to conduct environmental assessments, while under the Local Government Act of 1998, it is an offence to emit smoke, fumes or dust which may be a source of danger, discomfort or annoyance. With the enactment of the Environmental Management and Co-ordination Bill in December 1999, the institutional framework for environmental management was strengthened.

In addition to the local legislation, the Consultant identified the various World Bank operational policies relevant to the project. Some of these policies include Operational Policy (OP) 4.01, OP 4.04, OP 4.11, as well as the World Bank Policy on Access to Information, 2010

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

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 minimal range of environmental and social implications will surely arise from the Korr water supply project, notably along the pipeline routes and also at the borehole site. 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 pipeline and associated works such as construction of the valve chambers, washouts 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.

Nevertheless, environmental impact assessments (ESIA) are now recognized as an essential component in any development project and as an important decision-making tool, and the appropriate procedures were followed.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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**	**Responsibility**
Loss of flora and fauna	Site clearance should be limited to the minimum area required for the execution of the works. The records of the number and tree species cut to be kept. Replanting of the trees after the completion of the project. Top soil should be stockpiled separately from the subsoil. After completion of works, the subsoil should be backfilled first then top soil	Contractor Supervisor – project Engineer to consult KFS on appropriate replanting seedlings

Environmental / Social Impact	Mitigation Action Plan	Responsibility
	should be restored on top to facilitate natural regeneration of those areas.	Sub-County Environmental officer
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 labor for carrying out construction activities.	Contractor Supervising Engineer
Loss of structures, Loss of livelihoods, Loss of housing	Follow recommendations of the RAP screening report. However, the pipelines are located along within unsettled community land and road reserves with no encroachment of businesses in the pipeline routes as such there will be no loss of housing, livelihoods and land and therefore no need for RAP.	NWSB/County government/National Land Commission
Noise and Dust	Use protective clothing like helmets and dust masks on construction crew. Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 22:00 to 6:00 near residential areas; No discretionary use of noisy machinery within 50m of residential areas; Good maintenance and proper operation of construction machinery to minimize noise generation;	Contractor Supervising Engineer

Environmental / Social Impact	Mitigation Action Plan	Responsibility
	Installation of temporary sound barriers if necessary; and Construction sites and transportation routes will be water-sprayed on dry and windy days up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions.	
Impacts on Cultural Heritage	Use of "chance find" procedures provided in the appendices	Contractor Supervising Engineer County Officer-Water Energy and Natural Resources NWSB Community Leaders Local Administration
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 river from pollution. Pit latrines can be used in areas where the other services are not available or feasible	Contractor Supervising Engineer WSP

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
Pollution of water resources	Ensure proper solid and liquid wastes disposal mainly from the construction camps and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Contractor, Supervising Engineer County Water Officer
Health and safety	Provision of Personal Protective Equipment (ear muffs, gloves, dust masks and helmets) for the construction crew Employ a safety and health officer on site. Provide First aid kit and appropriate procedures and safety measures Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards. Provide workers training on safety procedures and emergency response such as fire, oil and chemical spills, pipe bursts and other serious water loss risks. 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. Provide condom dispensers at appropriate locations coupled with awareness campaigns to workers and surrounding communities on HIV/AIDS throughout the construction period	Contractor Supervising Engineer NWSB

Environmental / Social Impact	Mitigation Action Plan	Responsibility
	Provide enough toilets within the camp Work to minimize or altogether eliminate mosquito breeding sites. Provide appropriate human and solid waste disposal facilities In general comply with operating occupational health and safety law requirements	
Unaccounted For Water (UFW)	Ensure proper and accurate records on production and consumption are kept through metering to detect any UFW in the system. Have a leak detection program to identify aging pipes for replacement to control UFW. Any leakages and bursts to be repaired promptly. If these standards are met the tariffs are likely to be within affordable range.	WSP beneficiaries
Gender balance	Ensure equitable distribution of employment opportunities between men and women Provide toilets and bathrooms for both male and female workers on site	The contractor The Supervising Engineer
Service Delivery	Provide appropriate signage to warn motorists and other road users of the construction activities, diversion routes to ward off traffic accidents. 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.	The Contractor

Environmental / Social Impact	Mitigation Action Plan	Responsibility
	In the event that delivery trucks damage parts of the road, repair the spots in consultation with the local authorities. Provide adequate water storage facilities to ensure adequate supplies to meet the new demand. Ensure proper maintenance of the water works Use pipes of good quality materials	

PUBLIC PARTICIPATION

Public participation is a very important component of ESIA studies. For this project, public consultation was conducted at two levels namely:

- Direct interviews with individuals in the project area were done on the 2nd June 2017.
- Interviews with key informants in the project area were done on the 2nd June 2017.

MONITORING, REVIEW AND EVALUATION

This consists of measures to be used to monitor the effects on a long term basis, including the collection of data, the analysis of data, and the enforcement procedures which are available to ensure implementation of the project as per the ESMP. Appropriate monitoring indicators have also been outlined. . These include but not limited to:

- Parameters of ambient air quality (particulates, NO and CO),
- Number of complaints by local people on dust and additional traffic, etc.
- Incidence rates of dust induced lung diseases.
- Levels of air pollution.
- Parameters of EMCA Noise and excessive vibrations Regulations
- Number of complaints by local people on noise and vibrations
- Parameters of EMCA Water Quality Regulations 2006 and others such as WHO Guidelines for Drinking-water Quality.
- Parameters of EMCA Waste Management Regulations 2006 and others such as OSHA.
- Number of occupational related accidents or fatalities over a period of time including police records on injuries and fatality rates.
- Prevalence rates for STI's and HIV.
- Availability of condoms, and contraceptive supply.

Overall, it is recommended that a monitoring team be established to ensure regular monitoring, review and evaluation throughout all the phases of the project.

CONCLUSIONS AND RECOMMENDATIONS

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 pipelines will be laid along the road reserves and no structures will be affected and therefore no need for the resettlement action plan. 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. There are incremental costs required to achieve these.

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LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
CBD	Central Business District
CBO	Community Based Organization
EMCA	Environment Management Coordination ACT
ESMMP	Environmental and Social Mitigation and Management Plan
ESMP	Environmental and Social Monitoring Plan
TOR-	Terms of reference
OHS-	Occupation health and safety
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
G.O.K	Government of Kenya
HIV	Human Immunodeficiency Virus
ID No.	Identity Card Number
Kshs.	Kenya Shillings
KFS	Kenya Forestry Service
KWS	Kenya Wildlife Service
NWSB	Northern Water Services Board
CWSB	Coast Water Services Board
GHG's	Green House Gases
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
PAP	Project Affected Person
PPE	Personal Protective Equipment
STD	Sexually Transmitted Diseases

WRMA	Water Resources Management Authority
WSB	Water Services Board
WSP	Water Services Provider
WSS	Water Supply and Sanitation Services
m^3	cubic metres
M	Meters
Km-	kilometers
P.a-	per annum
Mm-	millimeters

1 INTRODUCTION

1.1 NEED FOR THE PROJECT

Korr depends on ground water for its water needs. The ground water is provided by the borehole and the shallow wells dug through the funding from GOK and CDF respectively. While most wells yield adequate water for human need only 4 are said to yield enough water for livestock need throughout the year. These are Isim Matacho, Saleh, Rengumo and Urweyu. The method used to draw water from the boreholes is crude whereby people line up in the hole and convey water up in cans. So far one person has been reported dead after falling down the hole.The method also contaminates the water in the wells.

In order to stimulate economic growth and end perennial water problem in Korr, the Northern water services board assisted with the World Bank intends to Rehabilitate and Extend Korr Water Supply. Further support through capacity building and institutional strengthening will consolidate the gains in the water provision sector thereby bringing about improvement and sustainable infrastructure development.

The proposed Korr water supply project is targeted at investments on its rehabilitation and the extension. The rehabilitation and extension activities will encompass:

- ✓ Mobilization of equipment and staff
- ✓ Construction of Rising Main Pipe line to Sunyiru Proposed 225m3 Masonry Tank- 1.5Kms
- ✓ Construction of 100m3 elevated steel Tank at Borehole site
- ✓ Construction of Rising Main Pipe line to Ballah 50m3 Masonry Tank – 1.1km
- ✓ Construction of Distribution Network system – 11Kms
- ✓ Construction of 4No. Water kiosks and installation of 10m3 Plastic Tanks on top of their roof slabs at Tugucha 1 and 2, Salah and Ballah villages
- ✓ Installation of solar system and Metering

1.2 TERMS OF REFERENCE

The TOR requires that an ESIA Study of proposed water supply system be carried out. The ESIA study will therefore be a study of potential environmental impacts of the project. An Environmental and Social Management Plan (ESMP) with comprehensive mitigation measures and environmental monitoring plan will be drawn and the proponent advised accordingly. The analysis includes, but not limited to the following:

- Evaluation on the project impacts on flora, fauna, soils, air, water and identification of other impacts likely to be generated by the proposed project
- A description of actions taking place during the main phases of the project (construction, operation, and maintenance) which could lead to environmental damage;
- Preparation of plan drawings which show the location of the facility relative to the local bio-physical and socio-cultural environmental features;

- Identification of the potential impacts of the facility relative to surrounding land use
- Preparation of an action plan for the repair of the damage done and for the prevention of any negative effects resulting from the new work.
- Formulation of a plan to prevent anticipated undesirable impacts from being actualized.
- Evaluation of the relationship of the proposed project to existing policies, legislation and institutional framework;

1.3 ESIA OBJECTIVES

The overall objective of the ESIA is to ensure that all environmental consequences due to the construction and operation of the proposed Korr water supply system are evaluated and addressed as part of the mitigation measures incorporated into the proposed Korr water supply system. The specific objectives of the assignment are:

- Analyzing the physical, biological, and socio-economic environment of the project area with respect to results of the proposed project's preliminary design.
- Screening of potential issues, concerns and impacts relative to siting, construction and operation of various designed components to distinguish those that are likely to be significant for a particular subcomponent and warranting further study.
- Recommending measures to mitigate adverse issues, concerns and impacts, to aid the detailed design process.
- Preparing a preliminary Environmental and social Management Plan indicating impact areas, recommended mitigation measures, and method of monitoring impacts, particularly during construction and operation phases.
- Proposing an Environmental Monitoring Plan (ESMP) and the Institutional Set Up For Implementation of the above Environmental Management Plan.
- To fulfil the legal requirements as outlined in section 58 to 69 of the Act and Regulation 7 of the EIA Regulations.
- To obtain background biophysical information of the site, legal and regulatory issues associated with the project;
- To assess the legal and regulatory framework governing the project;
- To allow for public participation;
- To lower project cost in the long term;
- To compile an ESIA Project Report for submission to NEMA.

Generally, ESIA also aims to ensure that development projects are implemented in a sustainable manner. Sustainable development is increasingly becoming a common synonym to environmental management in infrastructure development. It refers to a pattern of resource use that is aimed at meeting present day human needs while preserving the environment so that these needs can be met in future generations. Sustainable development ties together concern for the carrying capacity of natural systems with the social challenges facing humanity.

1.4 PROJECT LOCATION

The project area is in Ballah Sub-Location, Korr Location, Korr Division in Laisamis Sub-County of Marsabit County. Korr was formally a location of Laisamis division but was promoted to a divisional level with Korr and Ballah location on 1st July of 2006. Korr location which this report covers, currently host the divisional headquarters while its former Hafare sub-location now called Ballah equally been promoted to locational level.

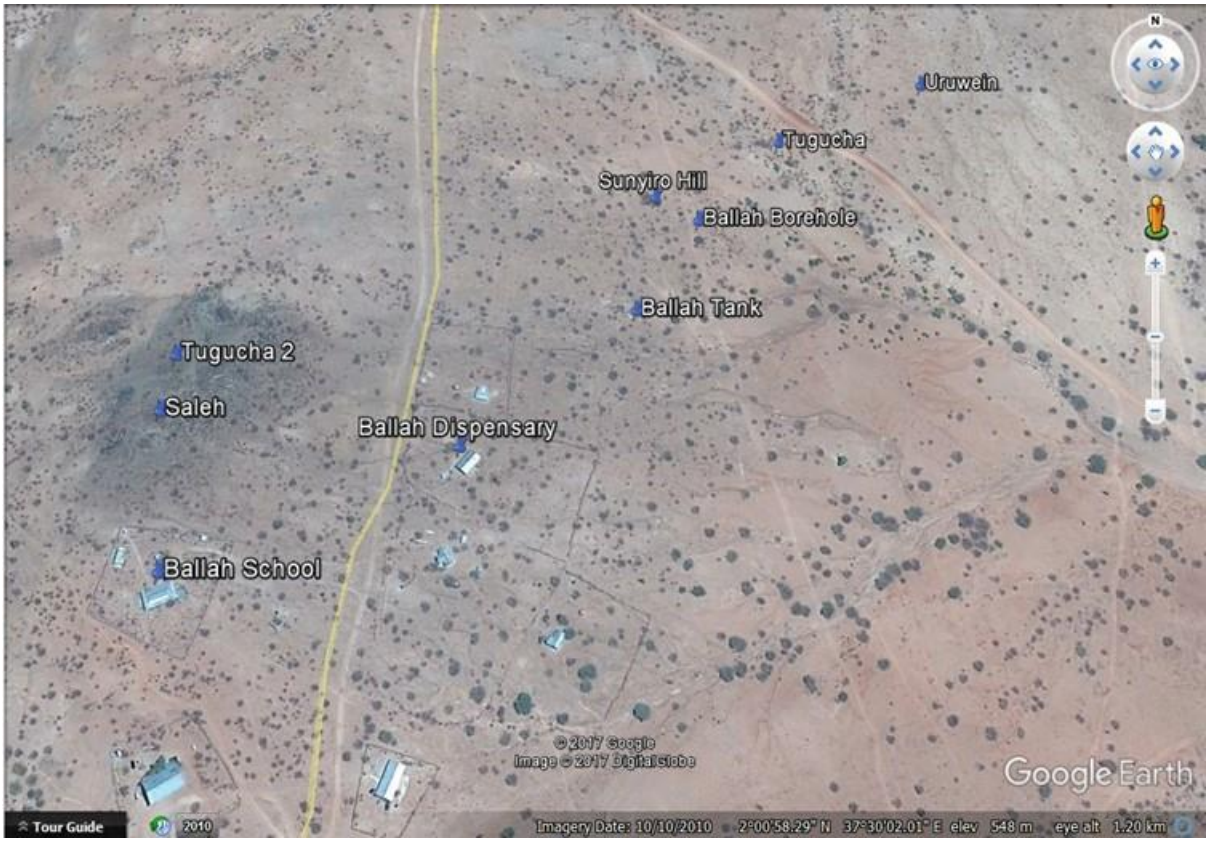


Figure 1-1 google image of the project location

1.5 METHODOLOGY

The ESIA was undertaken at a level that was considered to be commensurate with the scale, complexity and sensitivity of the project. The key stages in the process included proposal definition, screening which included key informant & household consultations, impact assessment, mitigation, review, decision-making and monitoring, as part of the preparation of this project report. For this ESIA to be good, recommendations have been integrated into the project development process. This should not be seen as a barrier to development or as an unnecessary cost. As well as being a stepping-stone to consent from environmental regulators and financial backers, it is a management tool for use during project planning and execution and will help avoid unnecessary impacts, delays and unexpected costs.

The consultant used a holistic approach to obtain the necessary baseline data and information on the below-listed aspects of the ESIA. An in-depth desk study, field observation, and wide consultation with stakeholders, key informant interviews and structured socio-economic

interviews were carried out so as to obtain the requisite data and information on the following themes:

- Human Environment including; Socio-economic, Socio-cultural and Socio-legal
- Natural Environment including; Flora, Fauna, Soil, Water, Air, Climate and Landscape
- Built environment including; Material Assets, Historical /Archaeological Sites and Monuments and
- Aesthetic Environment

The consultant used the available information to derive or predict or assess impacts and classify them under human, natural and built environment at pre-construction stage, Construction Stage and Operation stage of each project sub-component.

Any negative impact was widely assessed and the most suitable mitigation measure apportioned as a solution to the problem. Positive impacts were noted as such and further reinforced by statements of actions that enhance their productivity and sustainability in the development process during and after the implementation of the project.

ESIA was done for all the stages of the project including planning, construction, and operation and decommissioning.

2 PROPOSED PROJECT DESCRIPTION AND ALTERNATIVES

The project area is in Ballah Sub-Location, Korr Location, Korr Division in Laisamis Sub-County of Marsabit County. Korr location is bordered by Ngurunit location to the West, Logologo location to East, Laisamis location to South and Kargi to the North.

The project intends to improve the water supply in the region through the Rehabilitation and Extension of Korr (Ballah BH) water Supply. This will be done through;

- ✓ Mobilization of equipment and staff
- ✓ Construction of Rising Main Pipe line to Sunyiru Proposed 225m3 Masonry Tank-1.5Kms
- ✓ Construction of 100m3 elevated steel Tank at Borehole site
- ✓ Construction of Rising Main Pipe line to Ballah 50m3 Masonry Tank – 1.1km
- ✓ Construction of Distribution Network system – 11Kms
- ✓ Construction of 4No. Water kiosks and installation of 10m3 Plastic Tanks on top of their roof slabs at Tugucha 1 and 2, Salah and Ballah villages
- ✓ Installation of solar system and Metering

2.1 THE BACKGROUND OF THE PROPOSED PROJECT

At present, the location is currently served by six (6) boreholes which are managed by the public namely Buur haramia, Halisirwa, Goborre, Korr town, Rengumo and Ballah (New). Six (6) water pans at Torrgeydahar, Buur haramia, Buur urwein, Ballah (Nahagan) Sunyiro (Urwein) and Hingiya respectively. There are nearly 500 shallow wells located along the main natural drainages (300 of shallow wells located near Korr town).

Ballah Borehole was drilled this year and has the highest yield at 30m3/hr. the borehole is sited at Ballah area, 6km to the north of Korr Town. This is the source intended to serve the several villages nearby.

All shallow wells were dug by the community through funding from CDF. While most wells yield adequate water for human need only 4 are said to yield enough water for livestock need throughout the year. These are Isim Matacho, Saleh, Rengumo and Urweyu. The method used to draw water from the boreholes is crude whereby people line up in the hole and convey water up in cans. So far one person has been reported dead after falling down the hole. The method also contaminates the water in the wells.

The Water Supply is being run by the community through a Water User association (i.e, Korr water users association). This self-help group has limited capacity to deliver services due to the following:-

- ✓ Have limited revenue base,
- ✓ Have unsatisfactory leadership,
- ✓ Lack O&M and scheme management knowledge and skills on the part of their leaders,

- ✓ Have limited accountability and transparency in operations,
- ✓ Lack of skilled staff,
- ✓ Have not signed an SPA with NWSB.

With increased availability and coverage in water supply, more individual connections can be attracted creating more revenues for these potential WSPs. Efforts to establish project offices, cluster the schemes O&M responsibilities, develop management and administrative systems, train and sign an SPA with the WSPs need to be undertaken.

Figure 2-1 Borehole at Ballah

Figure 2-2 Raised plastic storage tank at the borehole at Ballah

Figure 2-3 Taps at the Ballah borehole where locals fetch water

2.2 DESIGN COMPONENT

This chapter illustrates the criteria in which the raising mains will be laid together with the distribution mains networks of the water. It also illustrates the places where the tanks are located together with the borehole sites.

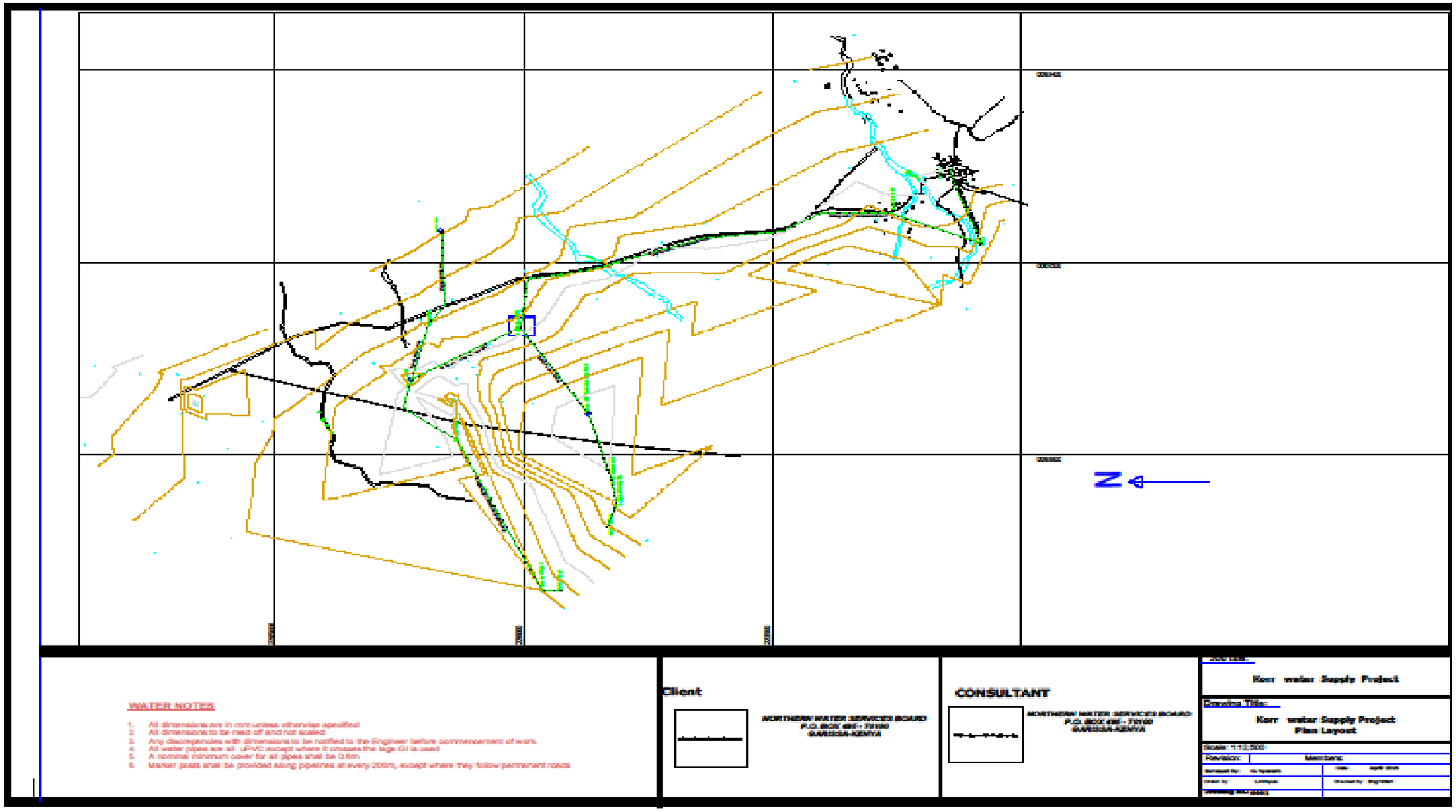


Figure 2-4: Design Layout

2.3 PROJECT COST

The Proposed Korr Water Supply Project is estimated to cost Kshs 46,790,299.84. Table 8 below has the details.

Table 2-1 Cost Estimates

Korr (Ballah BH) Water Supply					
GRAND SUMMARY					
BOQ NO.	**DESCRIPTION**				**AMOUNT (KSHS)**
1	Preliminaries and General Items				6,359,500
2	BH - Sunyiru Hill Rising Main				4,711,325
3	BH- Ballah Hill Rising Main				4,560,650
4	BH 100M^3 Steel Elevated Tank				4,129,300
5	Sunyiru 225M^3 Masonry Tank				4,085,057
6	Ballah 50M^3 Masonry Tank				1,721,057
7.1	Distribution Line- Sunyiru - Eruwein DL 1				2,774,050
7.2	Distribution Line- Sunyiru - Tugucha-DL2				4,409,920
7.3	Distribution Line- Ballah - Pr, Disp -DL3				2,265,830
8	4No Water Kiosks				2,118,469.60
9	Cost of ESMP				**2,005,600.00**
	SUB-TOTAL CARRIED TO GRAND SUMMARY				**39,140,759**
	Add 5% Contingencies				**1,957,037**
	Add 5% Supervision Costs				**1,957,037**
	Add 16% VAT				6,888,773
	Grand Total	Kshs			**49,943,606**

3 ALTERNATIVES TO THE PROJECT

This chapter highlights all the alternatives considered during the design of the improvements, these included looking at different locations as well as technology employed in the design. The following alternatives were considered.

3.1 ALTERNATIVE SITES FOR SETTING UP THE IMPROVEMENTS

This alternative considered the setting up of the rising main pipelines with the construction of the distribution network systems. The mains together with the distribution network will be laid along the road reserves. The masonry tanks will be constructed on communal lands and therefore there is no land acquisition. An alternative of constructing individual boreholes for each Manyatta was also considered but it was proven to be costly as the NWSB has limited funds to spend.

3.2 ANALYSIS OF ALTERNATIVE DESIGNS

The design arrived at took into consideration the available land. The pipelines will be laid along the road reserves and as such, there is no need for land acquisition. Land acquisition will upscale the cost of the project as compensation will need to be done and thereby also a crises of resettlement will arise. As such there is no design alternative that is foreseen as it will be a cost effective option in the longer term and environmentally sustainable.

3.3 NO ACTION ALTERNATIVE

The No Action Alternative is the future without the planned Project. The alternative entails not constructing the masonry tanks, rising mains and the distribution network. This therefore postulates a situation of continued suffering for the people of Korr as they will continue to experience the perennial water scarcity. The immediate and surrounding environment will continue to be negatively impacted thus negatively influencing the biodiversity of Korr in the long run.

4 DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 GEOGRAPHIC LOCATION

Korr was formally a location of Laisamis division but was promoted to a divisional level with Korr and Ballah location on 1st July of 2006. Korr location which this report covers, currently host the divisional headquarters while its former Hafare sub-location now called Ballah equally been promoted to locational level.

However this report covers the supply of water from Ballah Borehole to Korr Township, Ballah Primary school and Hospital, Manyatta sallah, Tugucha and Manyatta Uraweine.The area of supply is approximately 20 km^2.

Korr location is bordered by Ngurunit location to the West, Logologo location to East, Laisamis location to South and Kargi to the North.

Figure 4-1 Korr Area

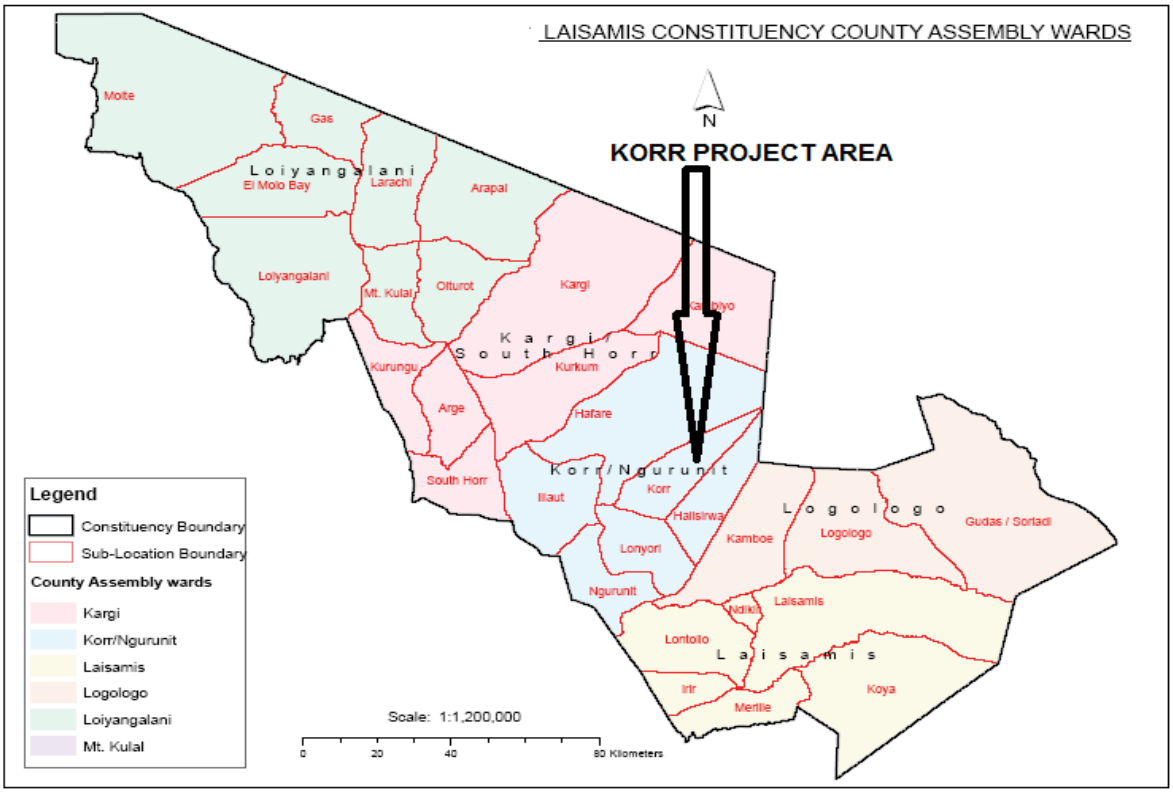


Figure 4-2 Laisamis Constituency

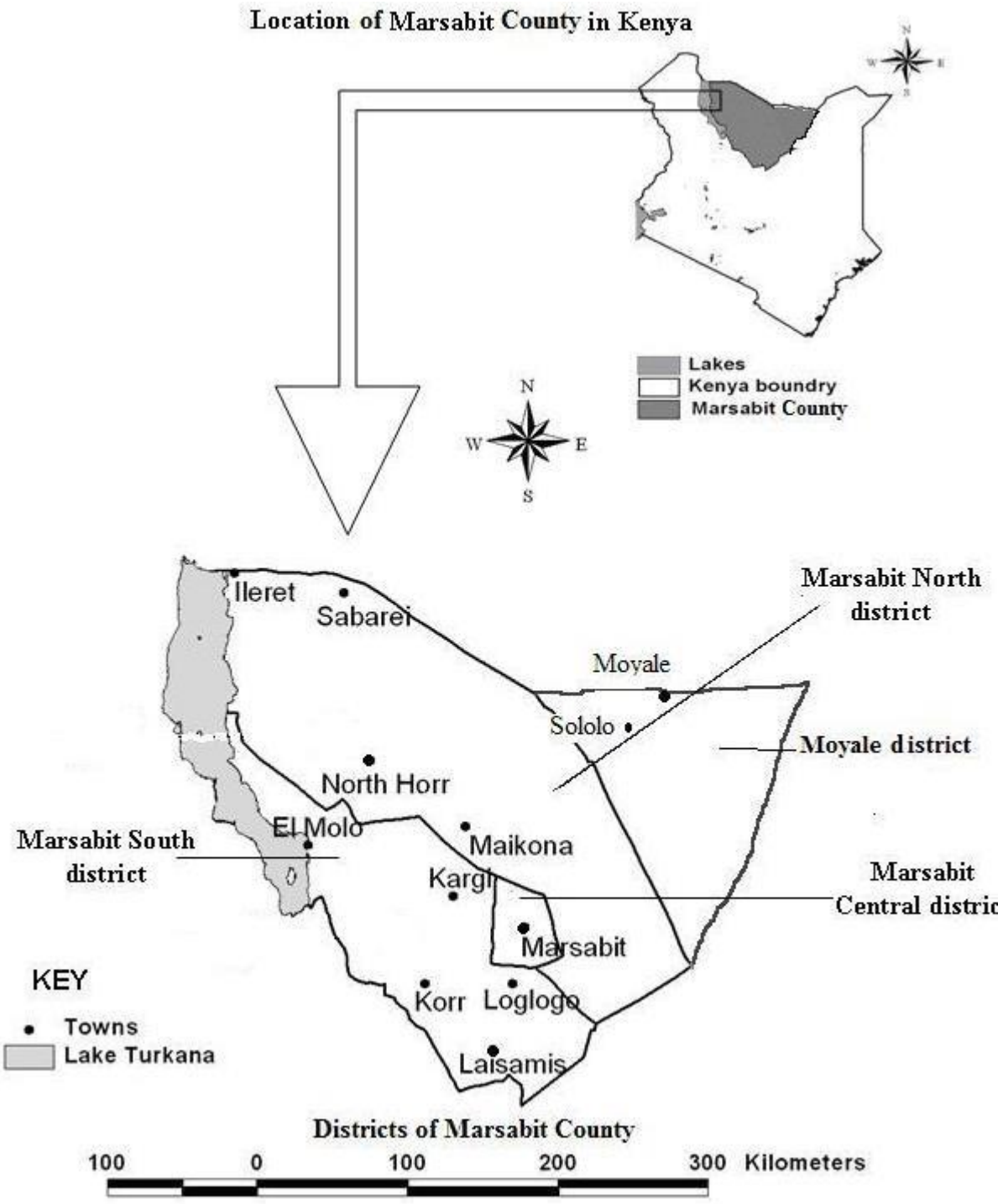
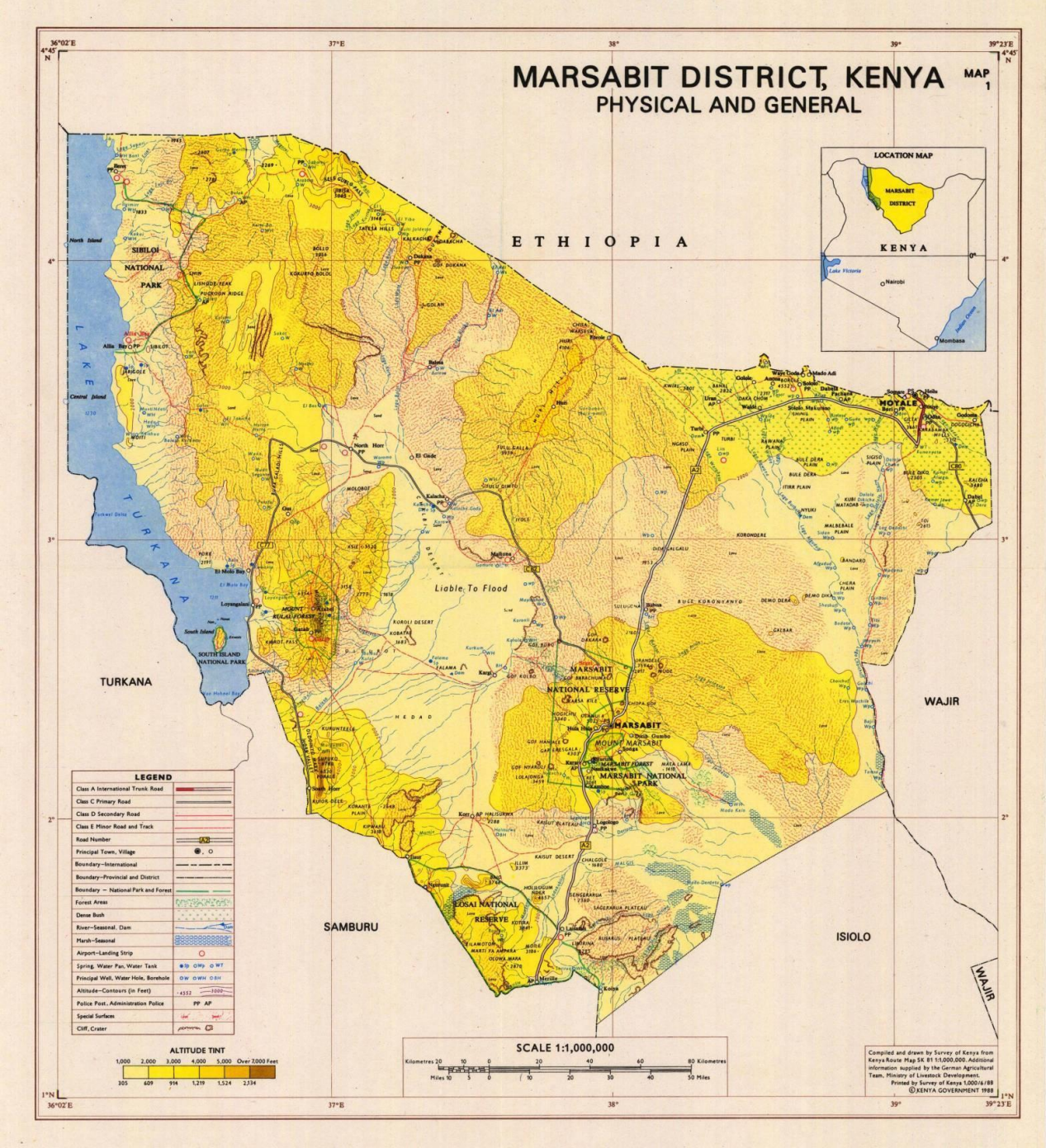


Figure 4-3 Location of Marsabit County in Kenya



4.2 CLIMATE

The area falls within the arid eco zone and semi desert where the low altitude (less than 200 m.a.s.l) influences high day temperatures and low precipitations of rains. The cardinal range of temperatures are 29-39^{o}C while annual precipitation range from 200-300mm in normal year but increasing frequency of drought recurrence have reduced rain expectation to less than 100-200mm. In that regard communal livelihood remains purely livestock rearing and camel is lately the most preferred due to its great resistance. The long and short rains come March-May and October-December respectively.

4.3 TOPOGRAPHY

The area is flat located on plain grassland with stone outcrops lagga. The mean annual temperatures range between 29-39ºC

	
Relatively flat area with vegetation in Korr	Vegetation in Korr

Figure 4-4: Korr's Topography

4.4 GEOLOGY AND SOILS

The location is doted by black lava hills sandy and quartz covered plains, alluvial (silt) flood plains, numerous mineral deposits e.g. Rubi, Iron ore, Asbestos, tulca graphite and Gold traces. The subterranean rock formations are mainly indigenous and sedimentary rocks which are the main parent rocks. The soil types are thus weathered quartzite sand and sandy loam. Soil depths are limited to 0.5m around Korr centre.

4.5 DRAINAGE

There are 2 main drainage called Duur and Urr that empty run off into Halisurwa flood plains and Melgis.

4.6 VEGETATION

The dominant vegetation is the lowland thorn spp of Acacia's which comprises of Acacia tortilis, Acacia Senegal, Acacia seyal, Acacia reficience, Acacia melifera. Others are the shrubbery spp that prefer the sandy plains, pasture field and hillsides e.g. the duosperma, indegofera and commiphora ssp's. While many of the aforementioned three spp are not area specific, expansive thickets of acacial seyal grown in the saline silt disposals of Halisirwa flood basin. The grasses are mainly annual types which wither at the end of wet season. Common pasture spp include grass and foliage plants.

Figure 4-5 Acacia Spp at Korrr area

4.7 BOREHOLES WATER QUALITY AND QUANTITY

The chemical analysis of the Korr Borehole at Tugucha and its tested yield is highlighted at the Appendix 12.2. The water consumption rates guidelines are also provided in the Appendix 12.3. The Quality and quantity of water, status of water source, relative walking distances to water points and views of source users about quality and quantity of water is as tabulated here below.

Table 4-1 Summary of Existing Water Sources and their yields

TYPE	NAME/LOCALITY	SITE	DISTANCE FROM TOWN	NO.	STATUS AND YIELD
Cased borehole with submersible pump	Halisirwa	Kuuya	12km	1	Functional high H_2O potential =7M^3/Hr
	Goborre	Gobborre	5km	1	Functional and high H_2O = 6.5M^3/Hr.
	Rengumo	Rengumo	7km	1	Functional= 5M^3/Hr.
	Korr Town borehole	Town	0.5km	1	New functional =3m^3/Hr
	Don Bosco	Town	-	1	Private and functional
	Ballah New Borehole	Ballah	6Km	1	Functional =30m^3/Hr
Cased borehole with Kijito pump	BTL	Town	0.5km	1	Functional = 3M^3/Hr
	Nick (AIC)	Town	0.5km	1	Functional = 2M^3/Hr
	Halisirwa	Kuuya	12km	1	Non functional

Borehole with hand pump	Kortimadhare and Ballah	Hafare/Ballah	10km		Functional = 5m^3/Hr
Hand dug open shallow wells	Korr laga cluster	Korr laga	0.5km	300	¾ protected by CDTF and functional@ 0.5M^3/Hr= 18.5M3/Hr
	Buuri haramia cluster	Burr haramia	5km	50	20 protected by CDTF &functional @ 0.2= 4m^3/Hr
	Ballah cluster	Ballah	12km	50	20 protected by CDTF &functional@ 0.2 = 4M^3/Hr
	Kalmo	Kalmo	40km	50	10 protected and functional= 2M^3/Hr
Surface water pans	Halisirwa, Buur haramia Urein, Matarba, Saleh, Torgydahar Ballah	Halisirwa near Korr urwein Mabargah Saleh Torigeydahar & Ballah	12km 2km 13km 12km 12km 30km 12km	1 1 1 1 1 1 1	Out of the 7 pans in the location, Torigeydaher, matarbah and urwein pans are rated the best with a capacity of 10,000m3 = 14m^3/Hr
Total Yield from the existing water Facilities					**104M^3/Hr.**

The current water supply is inadequate to meet the areas demand. The sources have a low yield coupled with other challenges such as;

- ✓ The storage is inadequate with only a 30m^3 tank at the borehole site.
- ✓ The reticulation system is not piped.
- ✓ The management committee lacks the necessary capacity to run the system sustainably.

The other sources (Pans) are unreliable and contaminated and they normally dry up within a short time especially during dry spells.

Table 4-2 Present Domestic Water Demands (m3/day)

	Consumption rate	**Present (2016)**	**Initial (2017)**	**Future (2027)**	**Ultimate (2037)**
Population		6,116	6,520	12,354	23,410
Daily Domestic Water Demand (m^3/day)	30l/capita/day	183.48	195.6	370.62	*702.3*

Table 4-3 Institutional Water Demands (m3/day)

Name of Institution	Consumption rate	Water Demand m^3/day							
		Present (2016)		Initial (2017)		Future (2027)		Ultimate (2037)	
		Pop	Demand	Pop	Demand	Pop	Demand	Pop	Demand
Ballah Boarding Scholars	50l/h/d	226	11.3	241	12.04	457	22.85	866	43.3
Day Scholars	5 l/h/d	225	1.125	240	1.2	455	2.275	860	4.3
Health Centre	200l/bed or 5000 Lts Minimum	1	5	1	5	2	10	4	20
Administration offices	25 l/h/d	2	0.05	3	0.075	4	0.1	8	0.2
TOTAL	M^3/Day		**17.475**		**18.315**		**35.225**		**67.8**

Table 4-4 Present, Initial, Future and Ultimate Daily Commercial Water Demands (m3/day)

Category	Rate	Water Demand m^3/day							
		Present 2016		Initial 2017		Future 2027		Ultimate 2037	
		Pop	Demand	Pop	Demand	Pop	Demand	Pop	Demand
Shops	50 l/d	**10**	**0.5**	**11**	**0.55**	**17**	**0.85**	**30**	**1.5**
Butcheries	100 l/d	**3**	**0.3**	**3**	**0.3**	**5**	**0.5**	**8**	**0.8**
Hotels /Tea shops	150 l/d	**4**	**0.6**	**4**	**0.6**	**6**	**0.9**	**9**	**1.35**
Mosque	300 l/d	**2**	**0.6**	**2**	**0.6**	**4**	**1.2**	**6**	**1.8**
Church	200l/d	**2**	**0.4**	**2**	**0.4**	**4**	**0.8**	**6**	**1.2**
Total	-		**2.4**		**2.45**		**4.25**		**6.65**

Livestock Water Demands

It has been established that about 40% of the total population own Camels with each household having about 5No. Every household also owns an average of 10 goats and 5 Livestock. They also have at least 2 donkeys mostly for carrying water.

The table below is a computation of domestic and livestock water requirements based on the data collected in the field. It is assumed that half of the location will rely on this water supply.

Camels – 24,220

Shoats – 48,440

Cattle – 24,220

Donkeys - 2422

For the purpose of estimating the water demand for livestock the following conversion factors apply and are expected grow at a rate of 2 % per year.

1No.Grade cow	equivalent to	1 Livestock Unit (LU)
3No. Indigenous cow	,,	1 Livestock Unit (LU)
15 No. Sheep or goats	,,	1 Livestock Unit (LU)
5No. Donkeys	,,	1 Livestock Unit (LU)
2No. Camels	,,	1 Livestock Unit (LU)

Category	**Rate**	**Water Demand m^3/day**							
		Present 2016		**Initial 2017**		**Future 2027**		**Ultimate 2037**	
		Pop	**Demand**	**Pop**	**Demand**	**Pop**	**Demand**	**Pop**	**Demand**
Livestock Units	50	23,897	1,194.85	24,375	1,218.75	29,131	1,456.55	36,220	1,811

Table 4-5 Present, Initial, Future and Ultimate Demand for livestock (m3/day)

But it's worthy to note that only a Quarter of the livestock is expected to benefit from this source. Other livestock units will benefit from other sources like water pans and laggas. Therefore the table will be as follows:

Category	**Rate**	**Water Demand m^3/day**							
		Present 2016		**Initial 2017**		**Future 2027**		**Ultimate 2037**	
		Pop	**Demand**	**Pop**	**Demand**	**Pop**	**Demand**	**Pop**	**Demand**
Livestock	50	5,974.25	298.713	6,093.75	304.69	7,282.75	364.14	9,055	452.75

Total water Demand

The total water demand for Ballah area is currently estimated at 502.068 m3/day and is estimated to rise to 521.055, 774.235 and 1229.5 m3/day by the years 2017, 2027 and 2037 respectively (For details refer table 3-4 below

Consumer Category	**Water Demand m^3/day**			
	Present 2016	**Initial 2017**	**Future 2027**	**Ultimate 2037**
Domestic demand	183.48	195.6	370.62	*702.3*
Institutional demand	17.475	18.315	35.225	67.80
Commercial demand	2.4	2.45	4.25	6.65
Livestock Demand	298.713	304.69	364.14	452.75

TOTAL WATER DEMAND(TWD)	**502.068**	**521.055**	**774.235**	**1,229.5**

Table 4-6 Summary of water demand (m3/day)

	Water Demand m^3/day			
	Present 2016	**Initial 2017**	**Future 2027**	**Ultimate 2037**
Overall demand	**502.068**	**521.055**	**774.235**	**1229.5**
Present production	576	576	576	576

Table 4-7 Comparison of water production against Overall water Demand m3/day

From the table 6 above, it is evident that the borehole can meet the water demand for the area up to the future year of 2027, assuming that other sources will supplement the deficit in the future year. One more Borehole will have to be drilled to meet the demand at the ultimate stage.

4.8 ECONOMIC RESOURCE ACTIVITIES

4.8.1 Main livelihood:

The community is purely nomadic pastoralist who rear camels, shoats and cattle in order of importance and number respectively. A minority number of the population depends on salaried income and jua kali type artisans commonly referred to as tumaal or black smiths.

4.8.2 Transport and communication

Korr town is served by Logologo-Korr road about 108km off Marsabit-Isiolo road highway. This same road connects Korr to Illaut and Ngurunit. Korr is also served (but minimal) by Marsabit via Kargi-Korr (120km) road.

There area has no electricity. Communication means is now available through mobile phones services provided by Safaricom and airtel service providers. In addition there are no postal services

4.8.3 Institutions

Institutions found in the project area are as follows:-

(a) Nursery Schools

- ✓ Ballah Nursery school
- ✓ Ballah preprimary school
- ✓ Uruwein Nursery School

(c) Primary Schools

- ✓ Ballah
- ✓ Uruwein

(d) Churches

- ✓ Catholic and youth centre

(e) Health Institutions

- ✓ Ballah dispensary

4.8.4 Industry

There is no major notable industry in the project area.

A minority number of the population depend practice jua kali type artisans commonly referred to as tumaal or black smiths.

5 RELEVANT LEGISLATIVE/REGULATORY FRAME WORK

There are several laws and regulations that exist that govern issues of environmental concern in Kenya. Some of those relevant to water and sanitation issues include the Environmental Management Co-ordination Act, the Water Act 2016 and the Public Health Act, among others. However, the most significant act that specifically addresses the issues of environmental impacts of development projects, including those on housing development, roads, water and sanitation, is the Environmental Management and Coordination Act (EMCA), 2015.

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.

5.1 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.

5.2 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:

5.2.1 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, which will provide a license after the its review.

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.

5.2.2 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.

These regulations provide the standards for domestic water usage, which will be important for this project as the water will be used domestically by the people of Korr. Of particular importance is the suspended solids concentration requirements which is a maximum of 30 mg/L. The IFC standards provide a maximum suspended solids quantity of 50mg/l, this is higher than the local standards, and as such the local standards will take precedence.

The water from the boreholes will have to meet the above regulations during its operation. The design has been carried out to meet these standards.

5.2.3 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 phases of the project. During the Construction, the Contractor will have to meet the requirements of the regulations, by providing solid waste sorting and transportation using a licensed transporter who will dispose of the solid waste to the designated receptacle.

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

These Regulations determine the level of noise that will permissible in particular during the construction of the improvements, the following factors will be considered:

- ✓ Time of the day;
- ✓ Proximity to 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 5-1 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:

Table 5-2 IFC regulations for permissible noise levels

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.

5.2.5 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 rehabilitation of the borehole pumps and generators. 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). In addition, the operation of the improvement works will not exceed the requirements set in the third schedule of the regulations

5.2.6 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, NWSB 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 NWSB.

5.2.7 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. This Act will govern the Contractor's activities on site including ensuring the health and safety of employees including providing health services when it comes to venereal diseases. In addition, this law justifies the need for the improvements needed on the boreholes that is currently occurring. The improvements made will aid in the provision of clean water.

5.2.8 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 acquisition of a way leave. The categories include: public (including oceans, land between high and low water marks, all roads and thoroughfares).

The Constitution is critical in identifying the need for this project, since it intends to improve the general environment of the people of Korr and it will govern the means to ensuring the method in which the project is carried out, by providing an EIA which is provided in this report.

5.2.9 The Land Act, 2012

This Act applies to all land declared as public land in Article 62 of the Constitution and all private land as declared by Article 64 of the Constitution.

The Act identifies all public land, of importance to this project will be on the way leave where the rehabilitation of the pipelines will be laid. The enactment of the Land Act, Sec 157(2), criminalized encroachments on public land as follows:

i) Unlawful occupation of public land is an offence which attracts fines of up to KES 500,000 and if a continuous offence, a sum not exceeding KES 10,000 for every day the offence is continued;
ii) Wrongful obstruction of a public right of way is an offence and attracts a fine of up to KES 10,000,000 and if a continuous offence, a sum of up to KES 100,000 for every day the offence is continued; and
iii) In addition to these criminal sanctions, any rights over land that were obtained by virtue or on account of an offence may be cancelled or revoked.

5.2.10 Physical Planning Act (Cap 286)

The act state that while giving due considerations to the rights and obligations of landowners, there shall be compensation whenever a materials site, diversion or realignment results into relocation of settlement or any change of user whatsoever of privately owned land parcels.

Under the physical planning act, physical development activities are supposed to be carried out according to the physical plans. Accordingly, the processes of physical planning involve two stages; the plan making stage and the development control stage. The former involves drawing up the actual plan to indicate the various activities and zones whereas the later involves the process of determining applications by developers to carry out specific development activities. This ESIA covers the proposed borehole and distribution network rehabilitation.

5.2.11 Occupational Health and Safety Act

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

5.2.12 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

5.2.13 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.

5.2.14 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.

5.2.15 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 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.

5.2.16 The County Governments Act, 2012

The promulgation of the 2010 Constitution brought about County Governments. This Act highlights the role of the County Government. The County Government will oversee all development activities within the County, as such will be a major stakeholder for the proposed project.

5.2.17 World Bank Operational Policies

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

This policy helps ensure the environmental and social soundness and sustainability of investment

projects so as to ensure it doesn't negatively affect the environment. It also supports integration of environmental and social aspects of projects in the decision-making process. The policy requires public consultation and disclosure for Category "A" and B projects which include Sewerage systems. In our case the case project is a category B project as the project impacts are anticipated to be specific to the project site and reversible with implementation of the proposed mitigation measures.

According to the policy, objectives of disclosure & consultation include:

- ✓ To enable affected groups and interested parties (emphasis on NGOs) to understand likely implications of project;
- ✓ To enable affected groups and interested parties have input into project design.
- ✓ Public consultations in this case were done in form of structured questionnaires which were taken from door to door by enumerators and results analyzed by the consultant.

5.2.17.2 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 Promotes environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. The operation of the water supply project will enhance the habitat for trees and other creatures as there will be provision of water in the long run.

5.2.17.3 Operational Policy (OP/BP) 4.11: Physical Cultural Resources, 2006

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

5.2.17.4 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 borehole and the distribution networks are located in public land and along the road reserves and therefore there is no resettlement that will occur.

5.2.17.5 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.

5.3 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[1] 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.

[1] WBG – Environmental, Health and Safety Guidelines: http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

6 PUBLIC CONSULTATION

6.1 LEGAL REQUIREMENT

6.1.1 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.

6.2 PERSONS OR AGENCIENCIES CONSULTED

The key issues which are associated with an establishment of the Korr water supply project will often relate to pollution, biodiversity, pollution, community safety, communicable diseases and employment and trade opportunities.

Efforts were made to contact all with the 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 and conservation of biodiversity
- ✓ Sustainable management and use of renewable natural resources (including sustainable resource management through appropriate independent certification systems)
- ✓ Use and management of dangerous substances and major hazards assessment
- ✓ Labour issues (including the four core labour standards), and occupational health and safety
- ✓ Socio-economic impacts & fire prevention and life safety
- ✓ 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
- ✓ Efficient production, delivery and use of energy
- ✓ Pollution prevention and waste minimization, pollution controls (liquid effluents and air emissions) and solid and chemical waste management.

With that, a cross section of persons were consulted in Korr on the 2nd June 2017 as indicated below.

No	Name	Office	Designation	Contacts
1	Mr. Joseph Laboyo Lepsulery	Sub-County Water Officer	Sub-County Water Officer	+254727556628
3	Solomon Murangiri	Ballah Dispensary	Health Officer	+254720090211

6.2.1 Overview from the Sub-County Water Officer

The Sub-County Water Officer pointed out that the sources of water are not adequate even though there are five boreholes and five water pans. He also pointed out that there is conflict of water sources between livestock and humans. The children and women suffer the most. He also indicated that water exploration in the Korr region is a tricky due to the type of soil formation. The water available in the region is saline. Also, he pointed out that three attempts have been made to drill borehole in which it is only one that yielded the water. He further articulated that the solution to the water problem in the region is the drilling of borehole and the construction of sand dams.

6.2.2 Overview from the Health Officer

The health Officer indicated the dire need for the water in the korr and Ballah region. He indicated that there is constant recurring outbreaks of waterborne diseases in the region. He mostly receives cases of upper respiratory tract infection, diarrhea and joint pains. He articulated that for the health center to function efficiently, water must be provided. He also pointed out that at times, the patients lack water to take with medication. The health Officer indicated that with the provision of clean and safe drinking water, cases of water borne diseases will reduce.

6.3 PUBLIC CONSULTATION

The Consultant carried out public consultation in the form of a consultative meeting where, the Consultant presented the project to the local community, comprised of stakeholders, including representatives of the current residents of the project areas among others. The Consultant held two meeting on 2nd June 2017 at the Sallah area and another one at Tugucha at the borehole site, minutes, photos and an attendance sheet of the meeting are presented in appendix 12.2. The meeting was attended by 30 and 21 participants' respectively from all the affected project locations. The participants were made up of village elders, youth representatives, a NWSB representative and the local administration.

6.3.1 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. The consultant however pointed out that the Designers had tried their very best to minimize project impacts and that the proposed improvements would be located within along the road reserve. She highlighted the mitigation measures for all the impacts in accordance to the EMP.

Being a public consultation meeting, feedback from the stakeholders was obtained with majority of the stakeholders approving of the project with the idea that the needs of the residents in the projects area be looked into and their opinions be incorporated. The residents proposed

that new boreholes be drilled to serve other Manyatta's to avoid clashes which may arise due to the scramble for the inadequate resource (Water). The meeting was successful, with the public accepting the project.

7 ENVIRONMENTAL AND SOCIAL ECONOMIC SURVEY

The socio-economic situation of the area was captured based on findings of a household survey carried out using a structured questionnaire. The survey focused on various environmental and socio-economic features as presented in the preceding sub-sections.

7.1 POPULATION DYNAMICS AND HOUSEHOLD CHARACTERISTICS

The general trend shows 61% of the people fall in the 5-18 age group as shown in figure 7-1

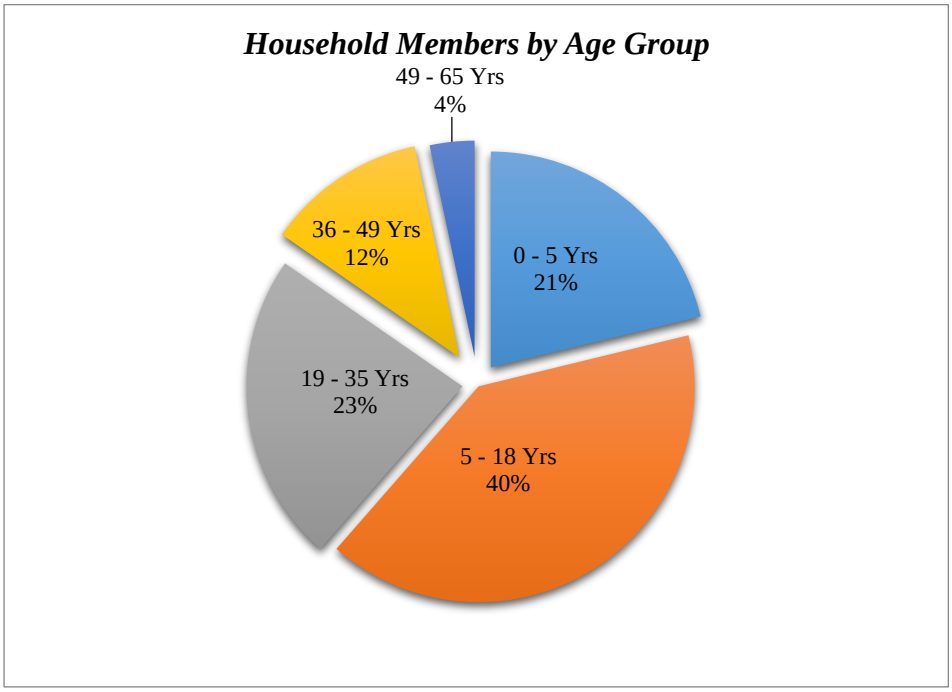


Figure 7-1: Household members by age group

The study established that 36% of the residents had attained basic and supplementary education levels as shown in Figure 7-2, hence only they, could read and write and thus they could concur with the information that was disclosed to them. A massive 64% of the residents had not attained any educational level indicating a high prevalence of the residents not being educated, and the need for the residents to be informed more about the project.

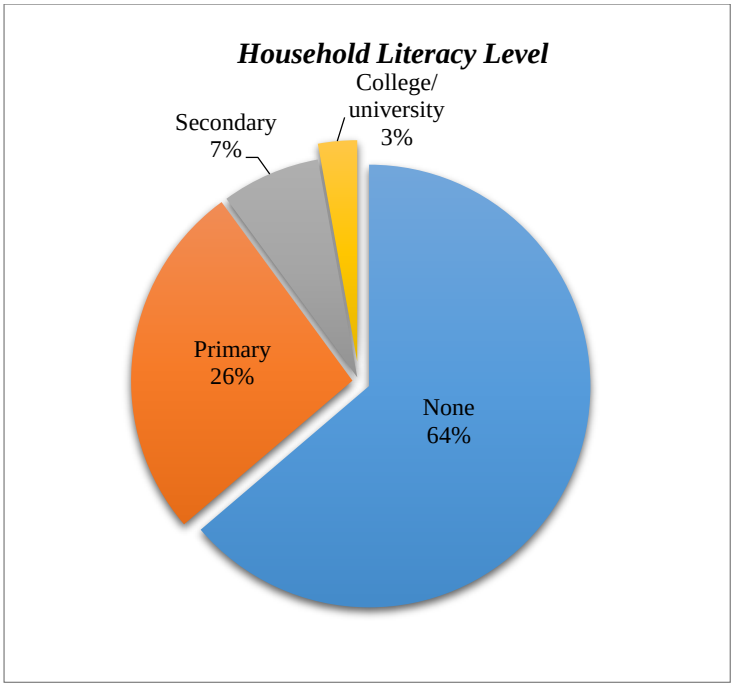


Figure 7-2: Education level of Korr residents

7.2 SOCIO-ECONOMIC ACTIVITIES AND LAND USE PATTERNS

Formal employment stands at (4%) within Korr. Livestock farming is the most prevalent economic activity accounting for half of all economic activities in the area. It is closely followed by pastoralism which accounts for 37% of the region's economy. Business makes only 9% of the economy. There is need to create sustenance of the major socio-economic activity and innovating new ideas and activities in order not to pressure the major socio-economic activity. Figure7-3 shows the economic activities in the area.

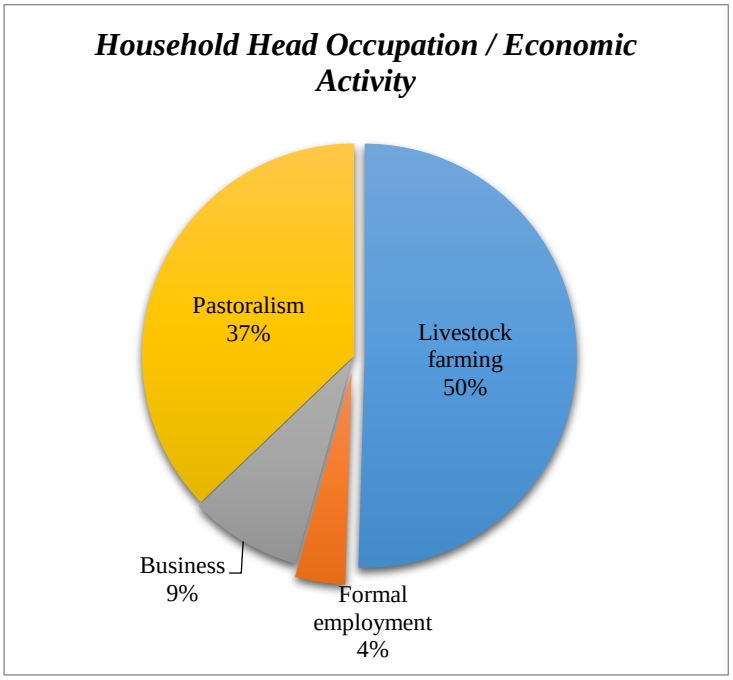


Figure 7-3: Economic activity of the household heads

Sheep are the major livestock kept by Korr residents at 44% as shown in figure 7-4 Priority should also be given to other animals kept so that they may not be extinct from Korr and the major livestock kept should be made a major resource for the area.

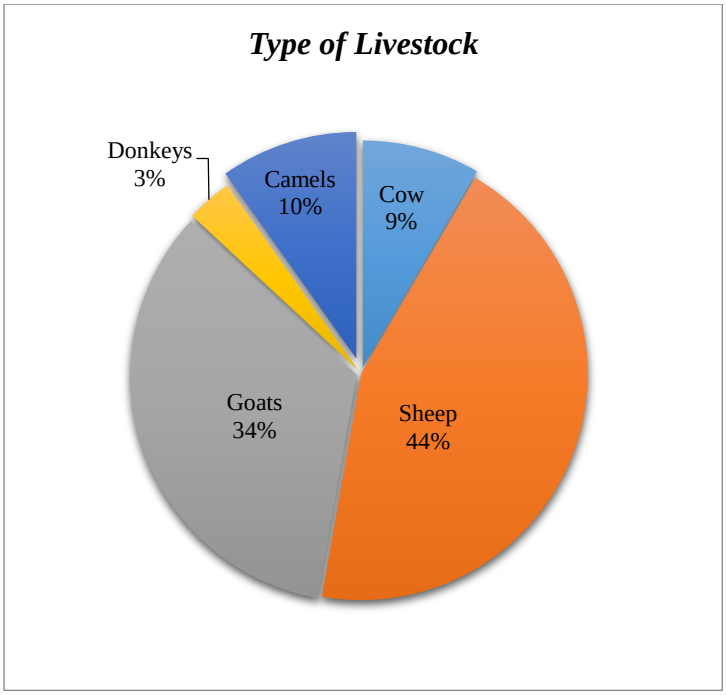


Figure 7-4: Livestock kept in Korr

Of the total population practising business, 33% are into the Jua Kali sector while the rest are onto shops. With this trend, there is need for the diversification of the business opportunities to the local residents.

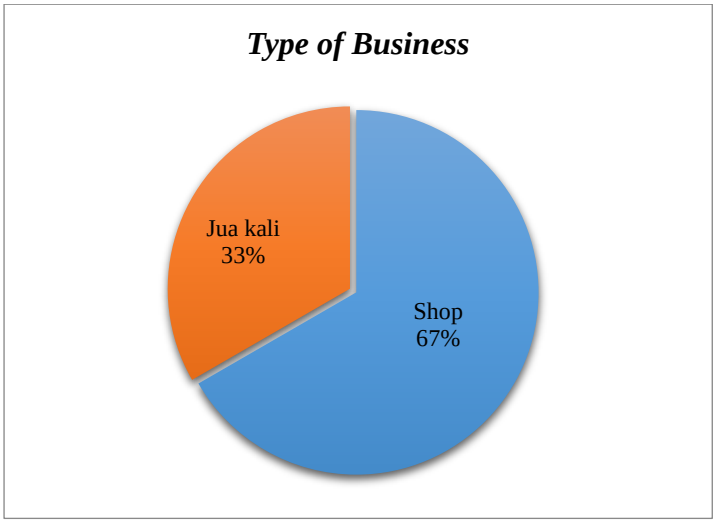


Figure 7-5: Businesses conducted in Korr

Most Korr residents (87%) earn less than Kshs 15,000 while 13% earn above Kshs 15,000 as shown in figure. New income generating methods should be practised in order to increase the per capita income of the households and the region in general. This indicates that the income generating methods isn't sufficient enough.

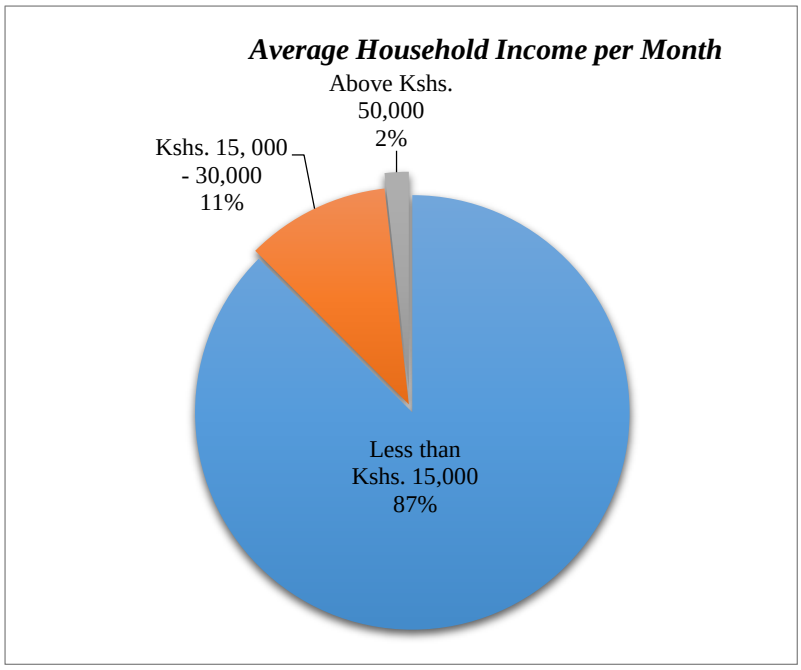


Figure 7-6: Average household income per month

The residents of Korr region are generally traditionalists. Christianity is the second most practised religion at 25% and Muslims form 12% of the area's religion shown in figure 7-7.

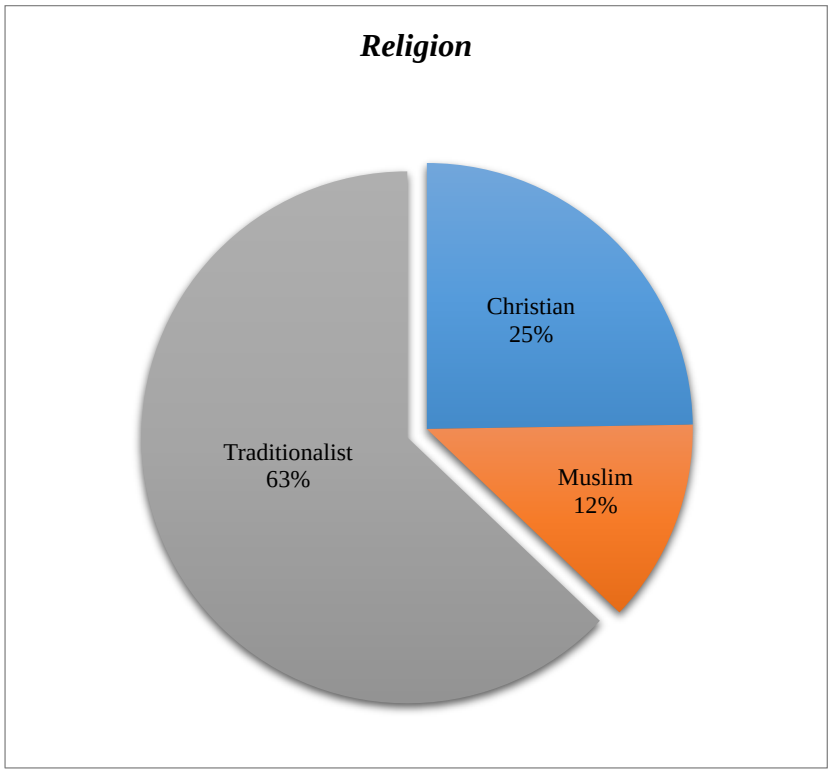


Figure 7-7: Religions practiced in Korr

Firewood (93%) is the main source of energy for the community. There is need to revise the sources of energy by the community in order to avoid deforestation. The common sources of fuel do not sustain the environmental system hence may lead to expansion of the desert, other

economic and environmental friendly fuel are the least used as shown in figure. Korr residents should be educated and trained on eco-friendly systems to avoid creating a future environment catastrophe

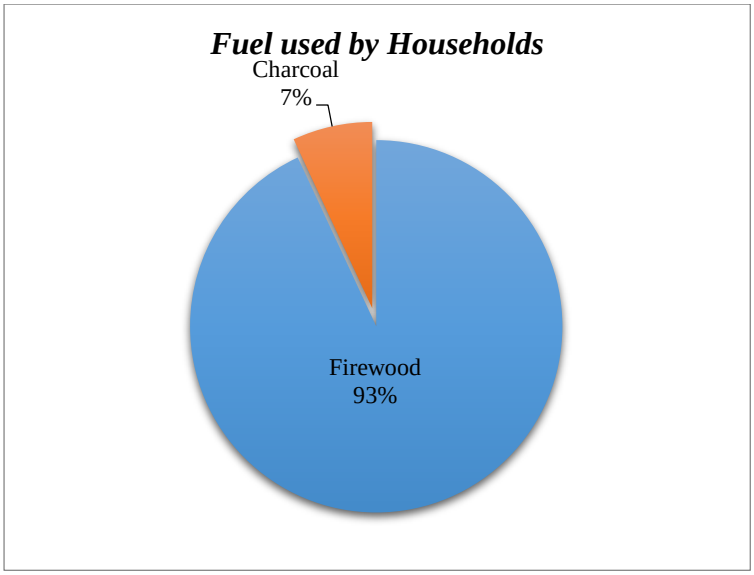


Figure 7-8: common fuel used in Korr

7.3 DRINKING WATER ISSUES

7.3.1 Sources and Quality of Drinking Water

The study established that the common sources of water in Korr are shallow wells, boreholes, Public and Private taps. As indicated in Figure 5-9, 8% of the people are supplied by either public or private taps while the majority, 63% rely on water from shallow wells. This implies that the government needs to put in more efforts to increase fresh water supply to her people.

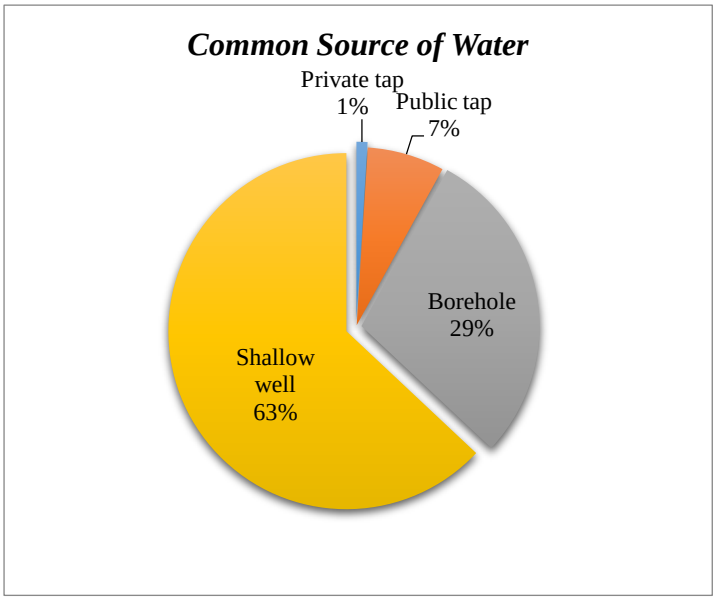


Figure 7-9: Common sources of water in Korr

The majority of Korr residents consider the quality of the water in the area to be fair, while a minor 12% of the population consider the water as good. Only 3% of the population doesn't have access to proper water quality. This is illustrated in Figure 7-11.This disparity is reasonable as residents who do not receive public tapped water rely on untreated freshwater sources such as shallow wells and boreholes. The ongoing water supply project, again, is expected to ensure that Korr residents are supplied with water of the recommended quality.

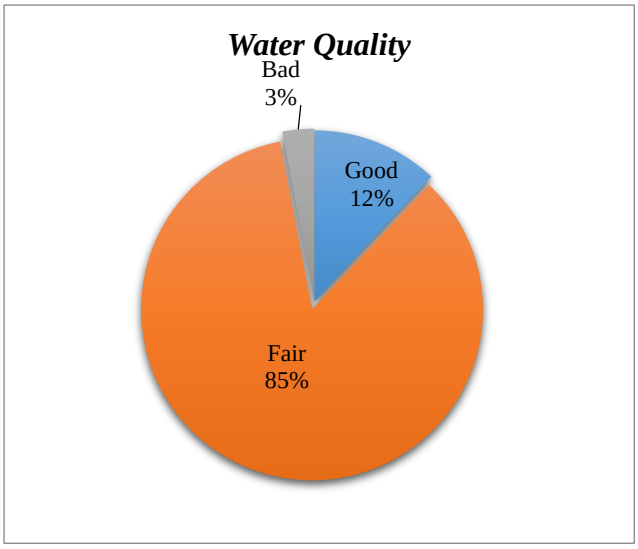


Figure 7-10: Perceived water quality in Korr

91% of the population fetch water everyday, 8% fetch every alternate day of the week as shown in Figure 7-12. The government then should work on reducing the time spent in fetching water daily by ensuring water services are close to the people.

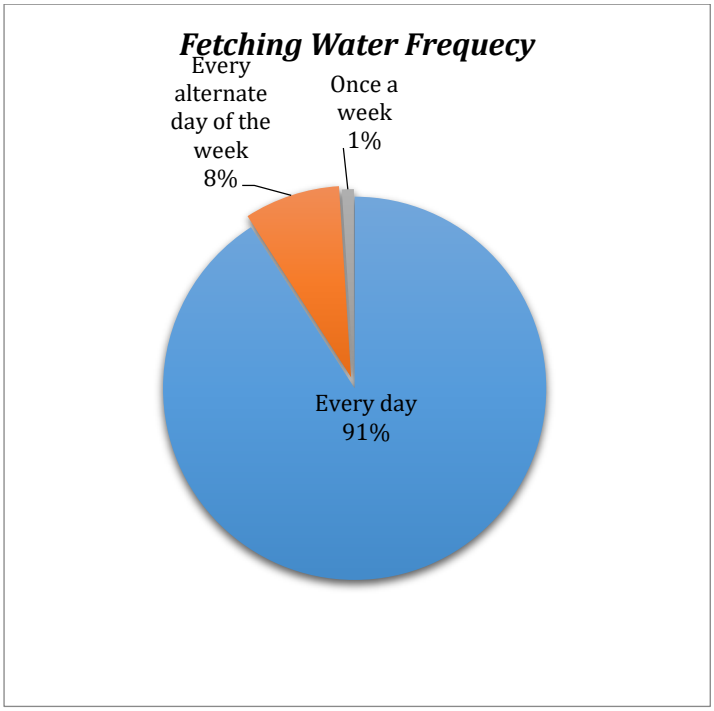


Figure 7-11: Frequency of fetching water

In most cases the existing water supply is not enough to meet the needs of all the people. 73% of the population felt that the water being currently provided wasn't adequate whereas the remaining 27% were being adequately supplied(Figure 7-12).

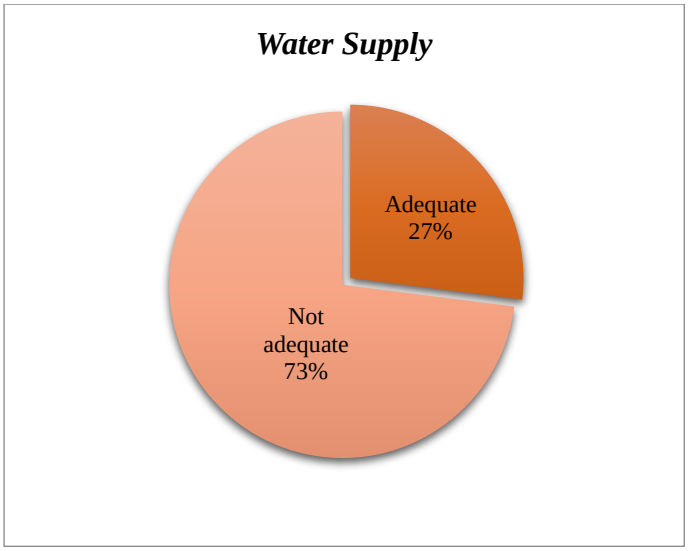


Figure 7-12: Adequacy of water supply in Korr

7.3.2 Distance To and Ownership of Drinking Water Sources

Korr residents travel varying distances to access drinking water sources. The distance to most of the water sources is less than a kilometer as shown in figure 7-13. Consequently, much time and energy is spent in search of water and it is hoped that this challenge will cease upon completion of the water supply project. Figure 7-14 breaks down the water sources they travel to access in terms of their ownership. It is apparent that half of the population accesses public water sources.

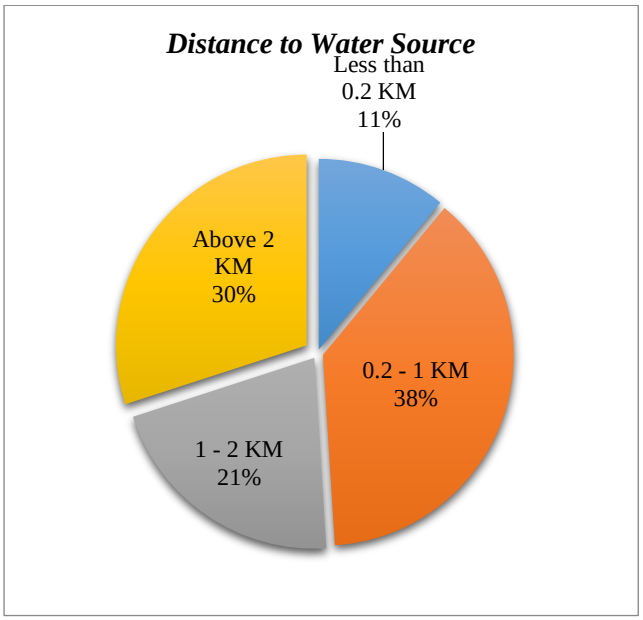


Figure 7-13: distance of the water sources

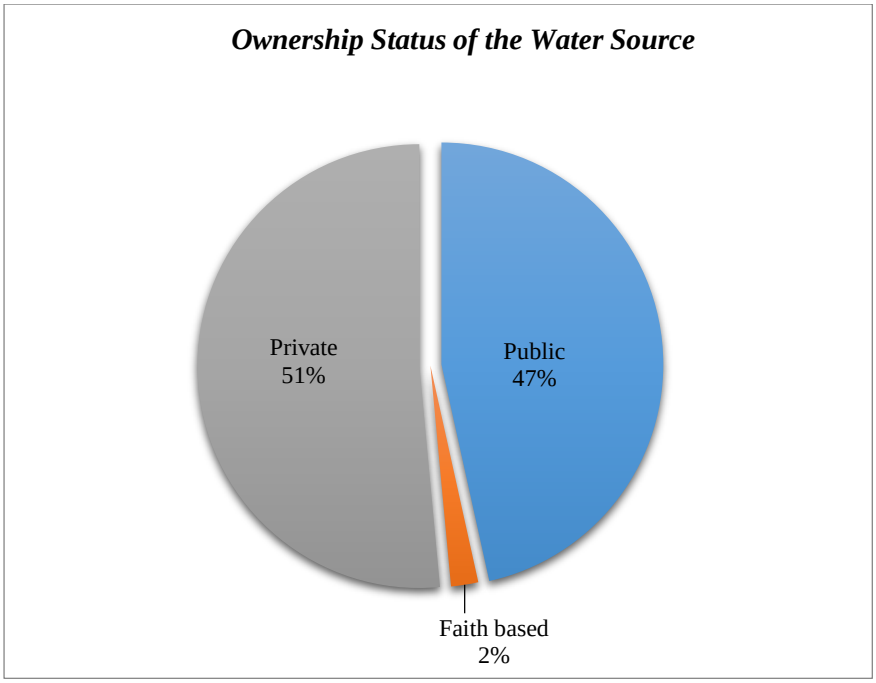


Figure 7-14: Ownership of the water sources

7.3.3 Cost of Drinking Water

The study established that 27% of the people paid for their fresh water needs as indicated in figure 7-15. As further shown in Figure 7-16, 64% of Korr residents spend more than Kshs2 for a 20 liter gallon of fresh water. This is quite costly, implying that a families with low income strain a lot to get water. NWSB should ensure that the people get affordable water supply and it is in this light that water supply infrastructure is presently been expanded in the County.

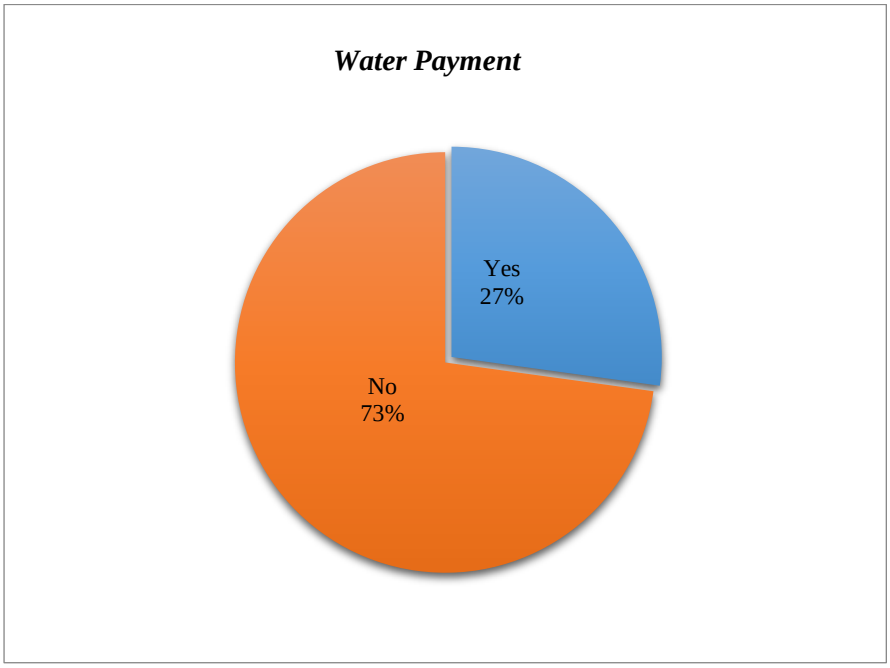


Figure 7-15: Payment for water

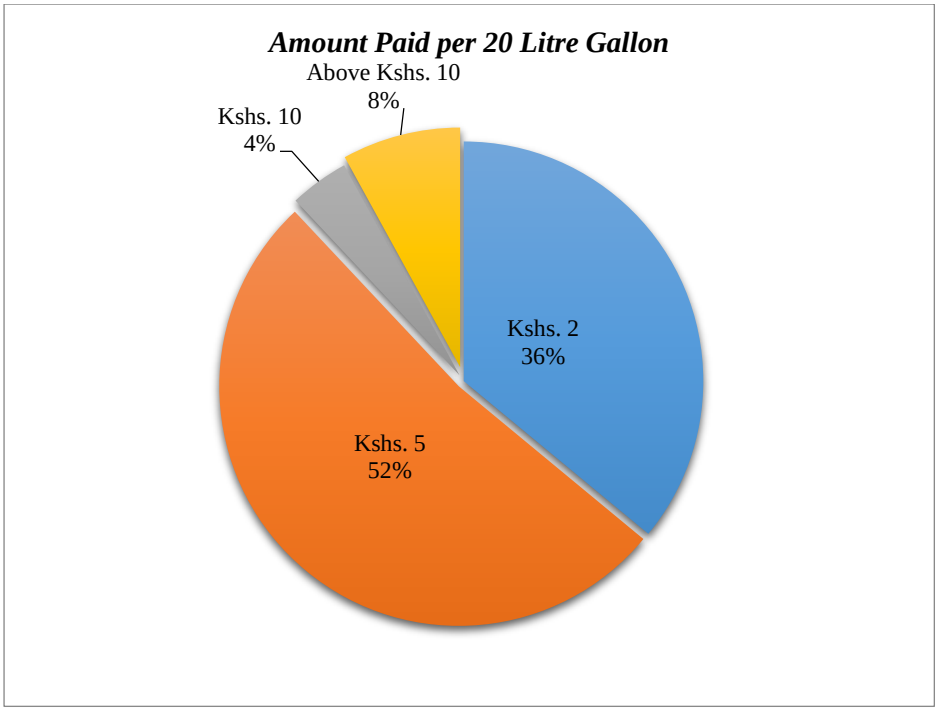


Figure 7-16: Cost of water in Korr

7.3.4 Common mode of transporting water and the challenges they face

The common modes of transporting are: use of pack animals, 50%, Carryin on the head, 24.5%, Rolling 20.6%, and hand driven carts 4.9% (Figure7-17) .Their is need to provide piped water to avoid tiresome and expensive modes of transporting water ,since the residents also spend by paying for water. The challenges they face are fatigue (56%); loss of time(42%) and cost of transportaiton at 2%, as illustrated in Figure5-19 .

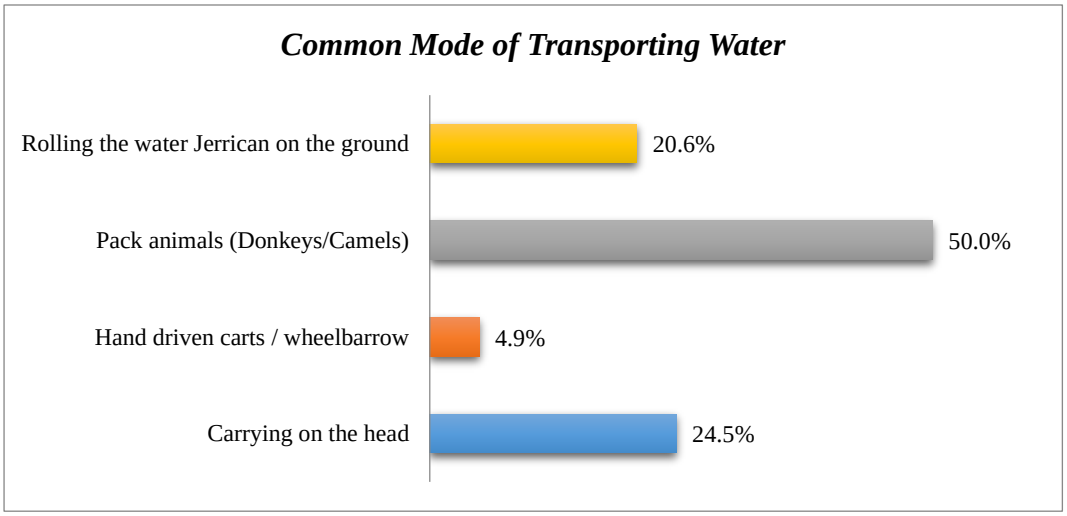


Figure 7-17: Transportation of water in Korr

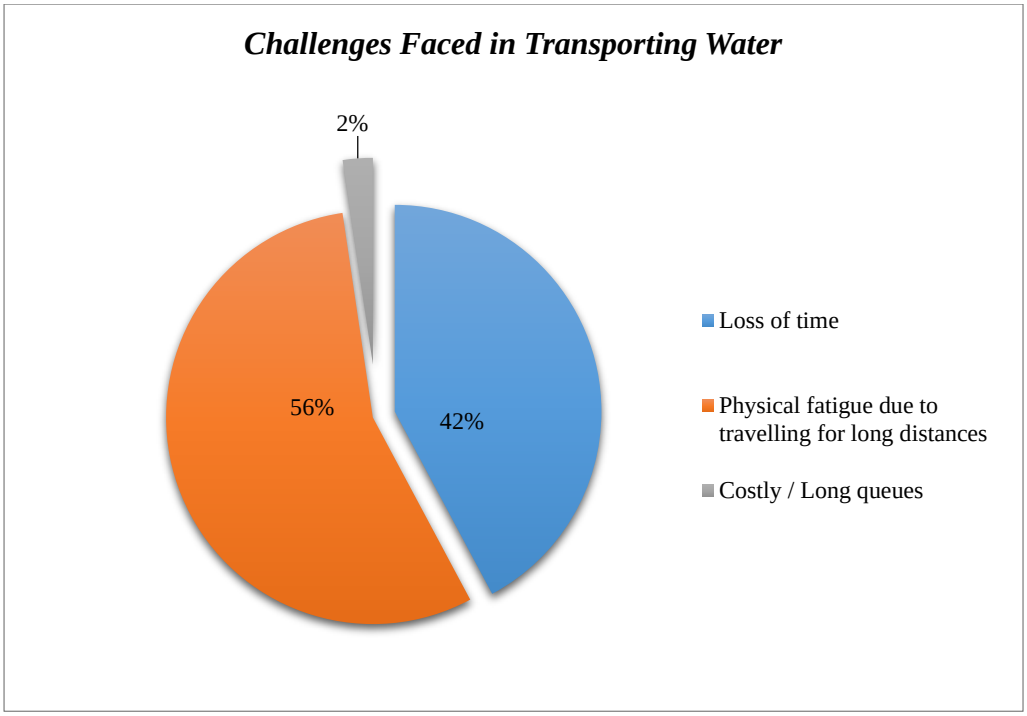


Figure 7-18: Challenges faced in transporting water

7.4 WASTE DISPOSAL

7.4.1 Existing Waste Disposal Systems

The study established that open area dumping was the most common waste disposal system for solid waste in Korr. 58% of the respondents burn their solid waste (Figure 7-19). Burning is second on the list of waste disposal methods. As it is well known, open-air burning is not a sustainable management option for solid waste as it is environmentally unfriendly due to release of GHGs to the atmosphere.

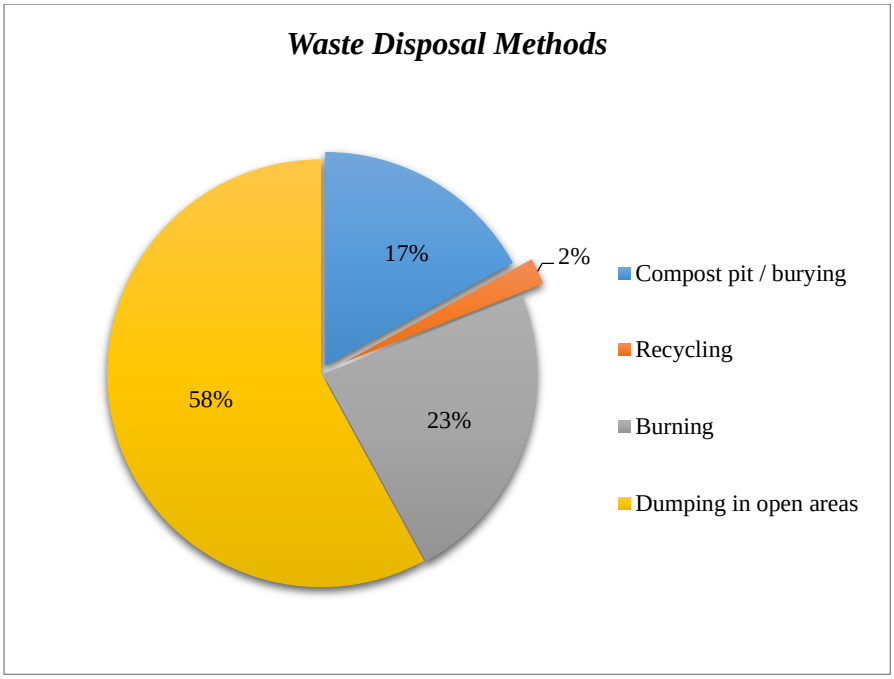


Figure 7-19: Methods of disposing waste in Korr

7.5 AVAILABILITY OF TOILET FACILITIES

The study probed the availability of toilet facilities in Korr area. It was established that only 21% of the people had toilets for their households (Figure7-20) with pit latrine being the most common among 100% of the residents (Figure 7-21).

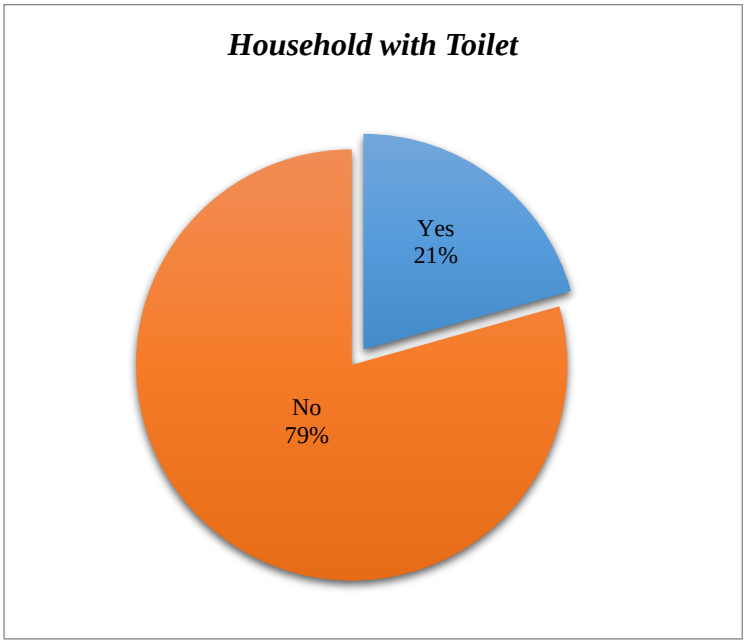


Figure 7-20: Households that own toilets

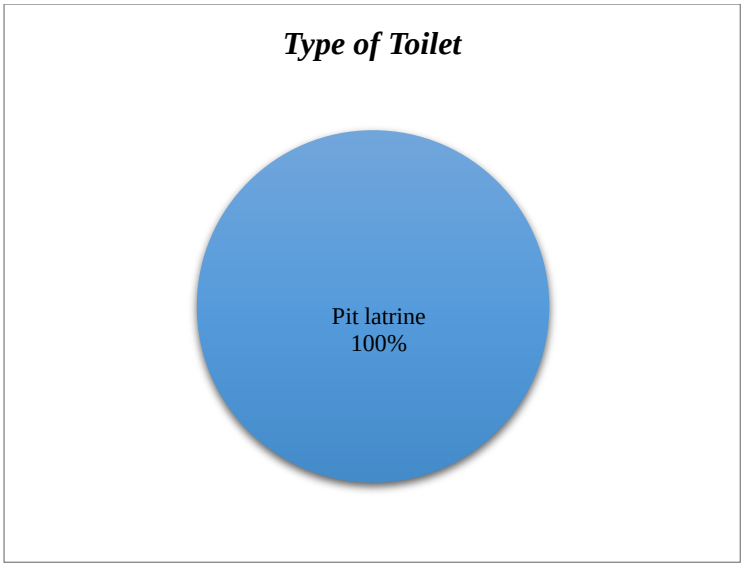


Figure 7-21: The common type of toilet in Korr

7.6 AWARENESS OF THE PROPOSED PROJECT

Public awareness of any infrastructure project plays a key role in its implementation and success. Thus, this study sought to establish the level of awareness of the proposed project among Korr residents. As shown in Figure7-23, a massive 45% of the people were not aware of the proposed project, and therefore numerous sensitization efforts need to be put in place by the client and the consultants to aid in the residents sensitization of the project.

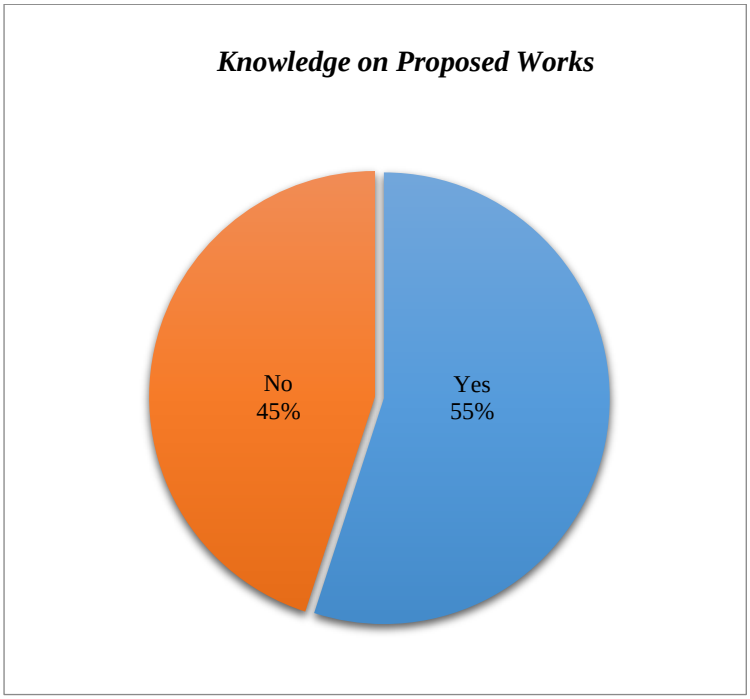


Figure 7-22: knowledge on the proposed project

7.7 PERCEIVED IMPACTS OF THE PROPOSED PROJECT

All infrastructure project have positive and well as negative impacts. In order to probe further their degree of awareness of the project, respondents were challenged to indicate their personal

perceptions of how the project would affect them. 82% of the people perceive that the project will affect them positively as indicated in Figure7-23 while the remaining 18% felt that this project would affect them negatively. The perceived positive and negative impacts are shown in Figure7-24 and Figure 7-25, respectively.

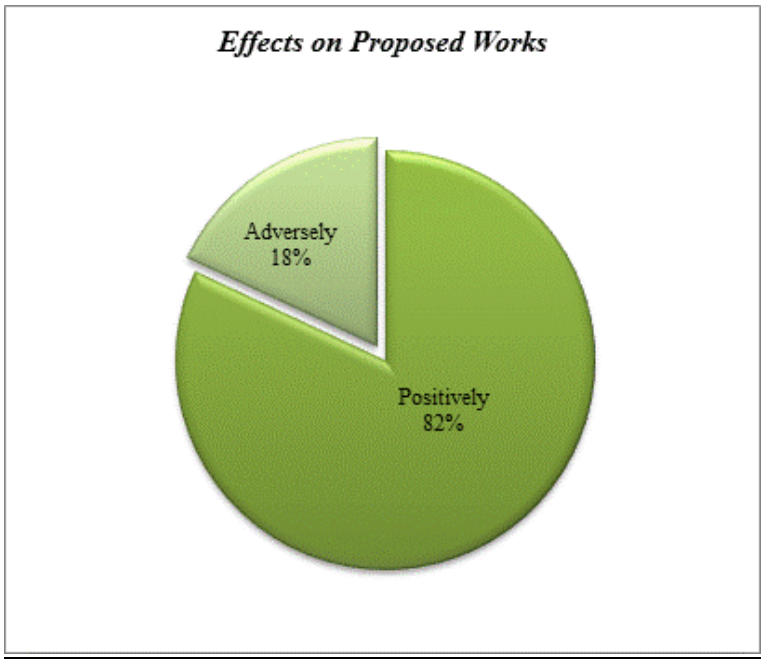


Figure 7-23: The figure shows the effects of the proposed works

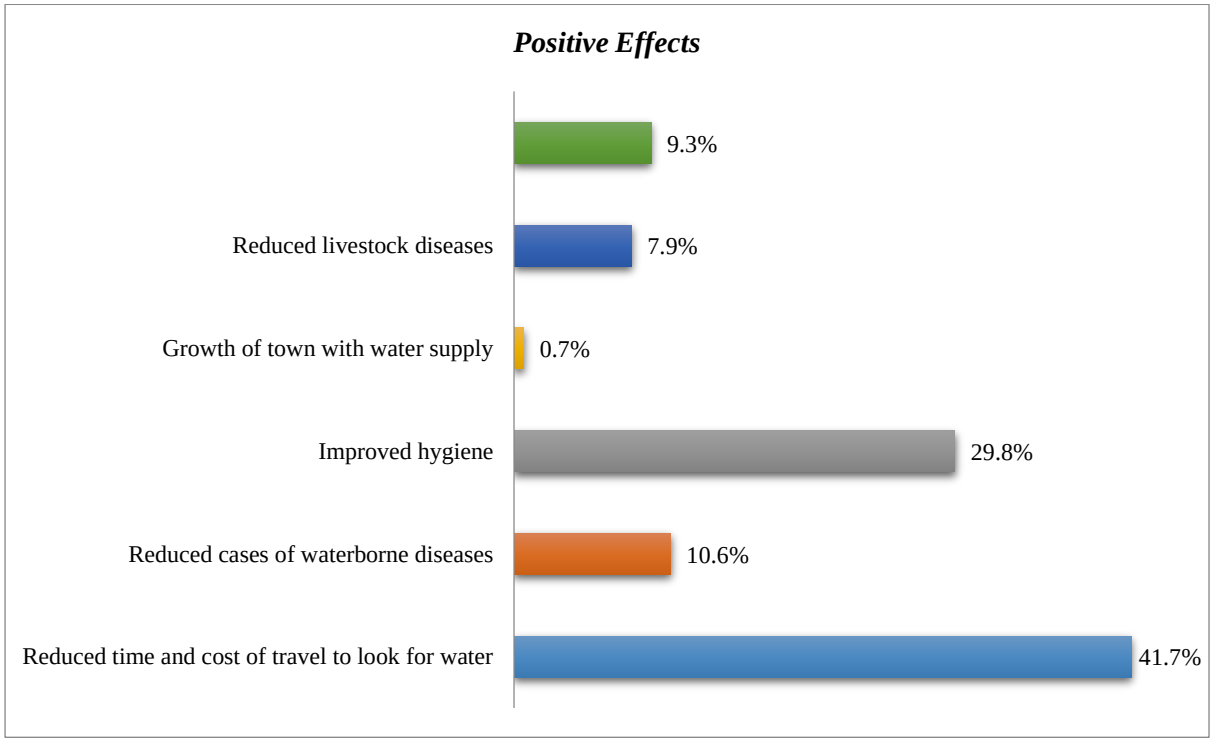


Figure 7-24: Positive effects of the project

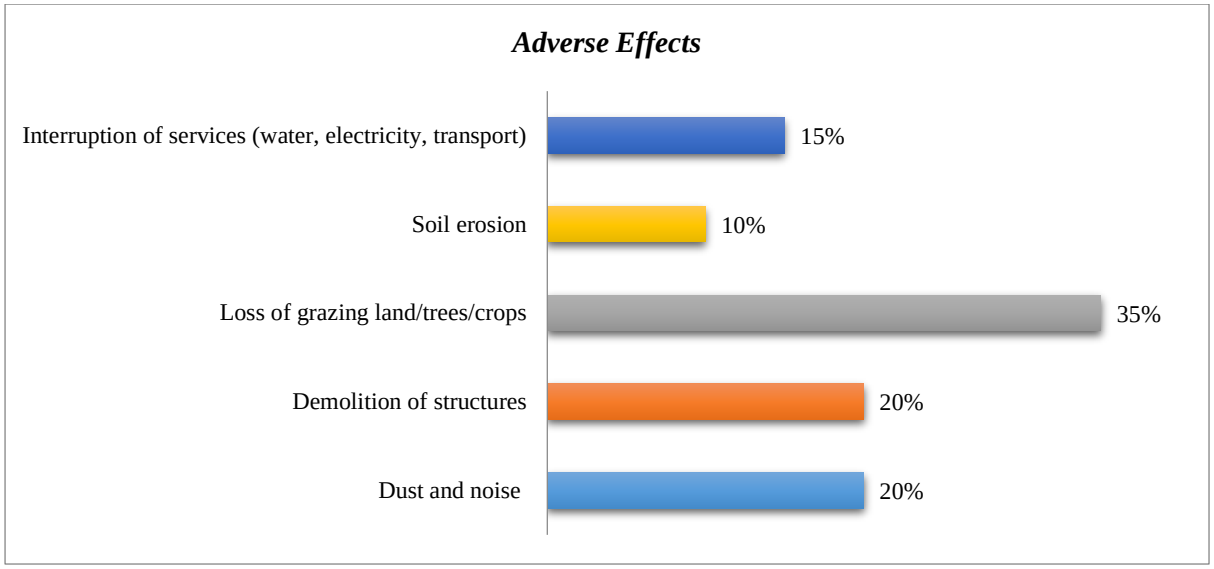


Figure 7-25: Adverse effects of the project

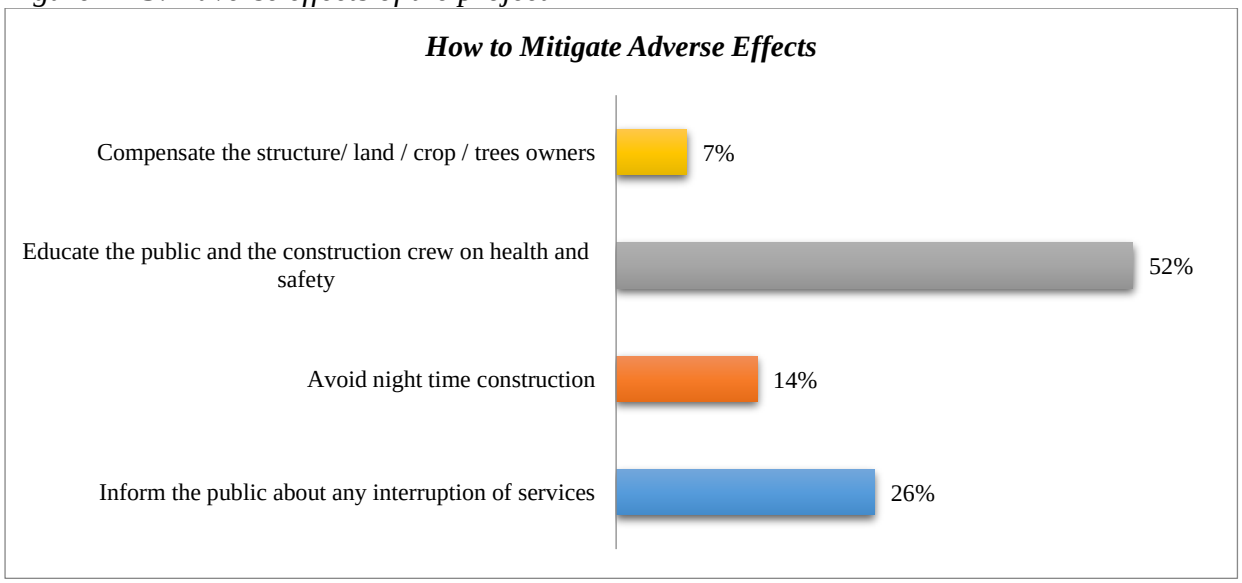


Figure 7-26: Mitigation measures that would be undertaken to reduce the negative effects of the project

7.8 COMMON DISEASES & MEDICAL INTERVENTIONS TAKEN

This study established that Malaria still remains a significant health concern in Korr town among 70% of the population. According to the 2010 Kenya Malaria Indicator Survey (MIS), malaria prevalence in Kenya ranges from 5% in urban areas; 12% in rural areas and 38% in regions around Lake Vitoria. Thus, alongside projects such as this in Korr town, the government should consider measures to fight malaria in the region. By improving water availability and management in Korr town, it is anticipated that this project will reduce the amount of stagnant water in the town thus minimizing breeding sites for mosquito. This, to an extent, may reduce malaria cases. However, further efforts should be put in place by the government to rid Korr town of the Malaria pandemic. Figure 7-27 shows the common diseases and the percentage of respondents who considered them a key concern.

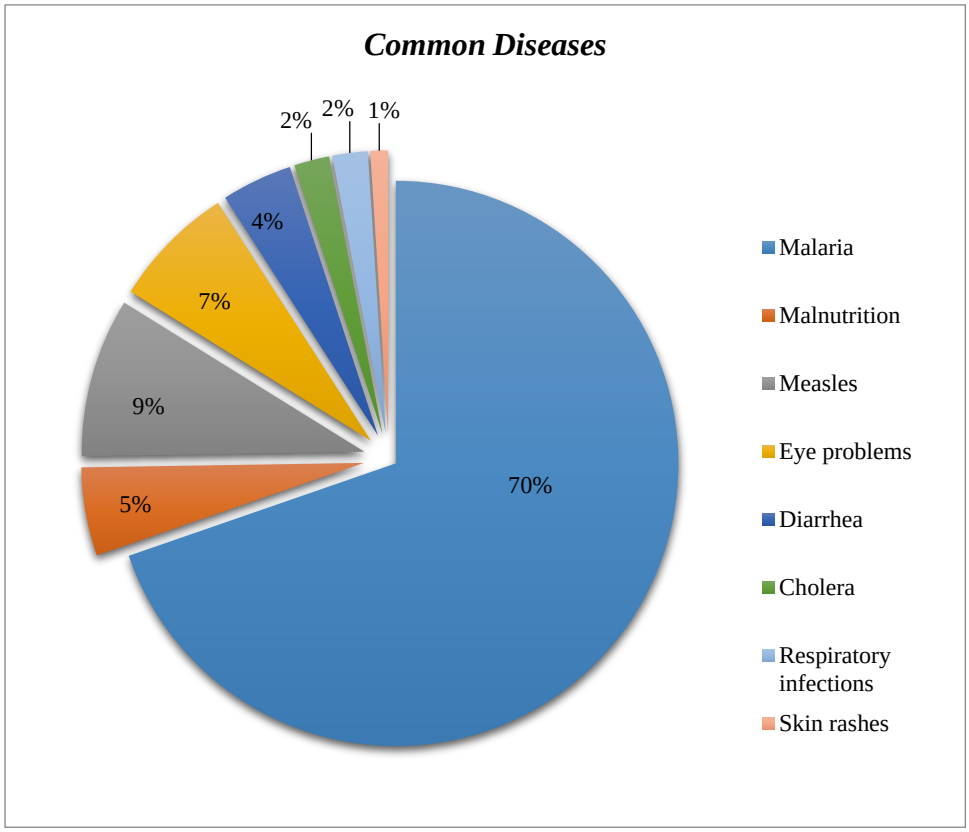


Figure 7-27: Common diseases in Korr

While sick, the respondents take a number of actions. This study established that 89% of the people seek medical attention while the rest either seek prayers, herbal or traditional doctors' help. This raises concerns of the possible risks posed by non-medical health interventions among a significant proportion of 11% of the population, as shown in Figure 7-28.

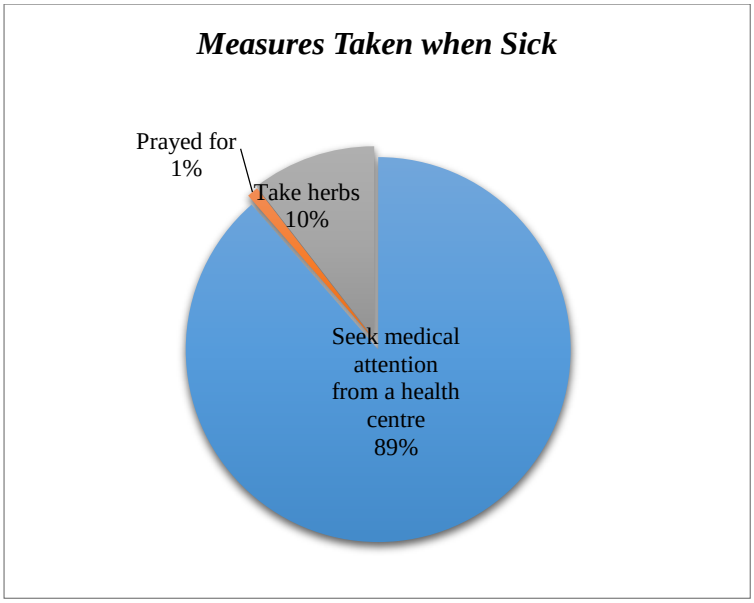


Figure 7-28: The figure shows the measures taken when the Residents are sick

The type/ownership of available health facilities was also probed by this study. The results indicated that majority of the people rely on public health services while about 6% depended on private-health facilities as shown in Figure 7-29. However, as shown in Figure 7-30, the distance to the nearest health facilities still remains a challenge, especially in Korr. This calls for intensification of health services to such areas.

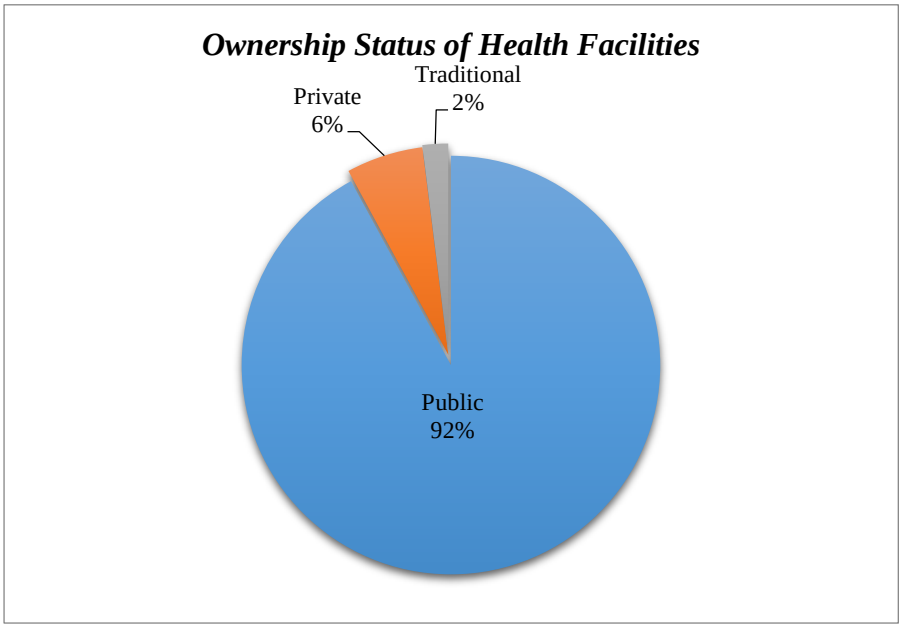


Figure 7-29: Ownership status of the health facilities in Korr

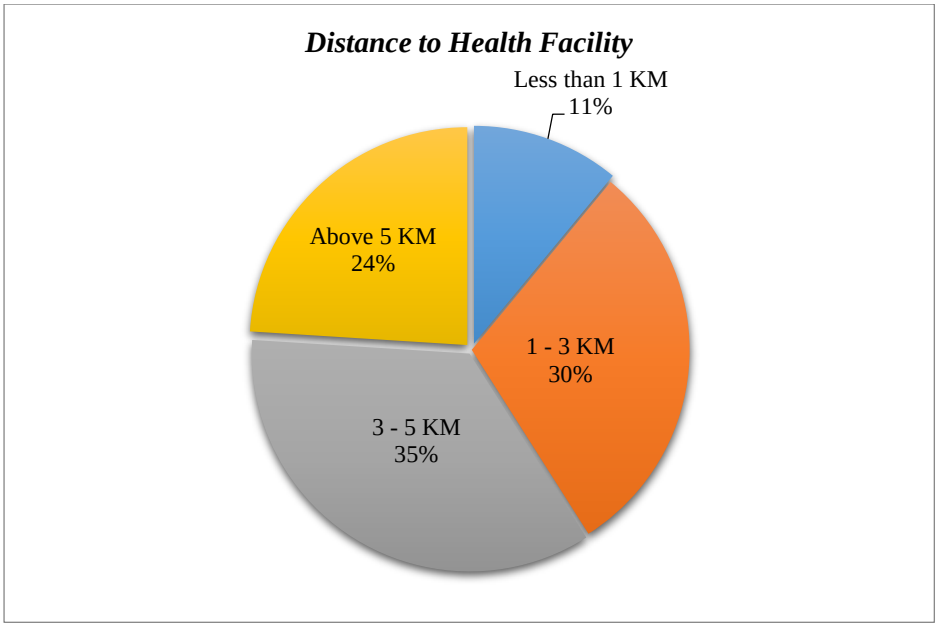


Figure 7-30: Distance of the health facilities

7.9 HIV/AIDS ISSUES

7.9.1 Awareness and Sources of Information

HIV/AIDs remains a major health challenge in Kenya and infrastructure projects have been found to have a significant bearing on its spread.

In terms of awareness, this study showed that most of the people (79%) are aware of HIV/AIDS (Figure7-31). As further shown in Figure 7-32, the dominant source of information on HIV/AIDs among Korr town residents is the media, particularly Radio and TV although health facilities, religious groups and families also play a significant role in disseminating such information.

In terms of HIV/AIDs spread. This study established that 99% of the household were not affected by HIV/AIDS as shown in figure 7-33. Only 1% revealed that at least someone in their household has ever suffered from the endemic.

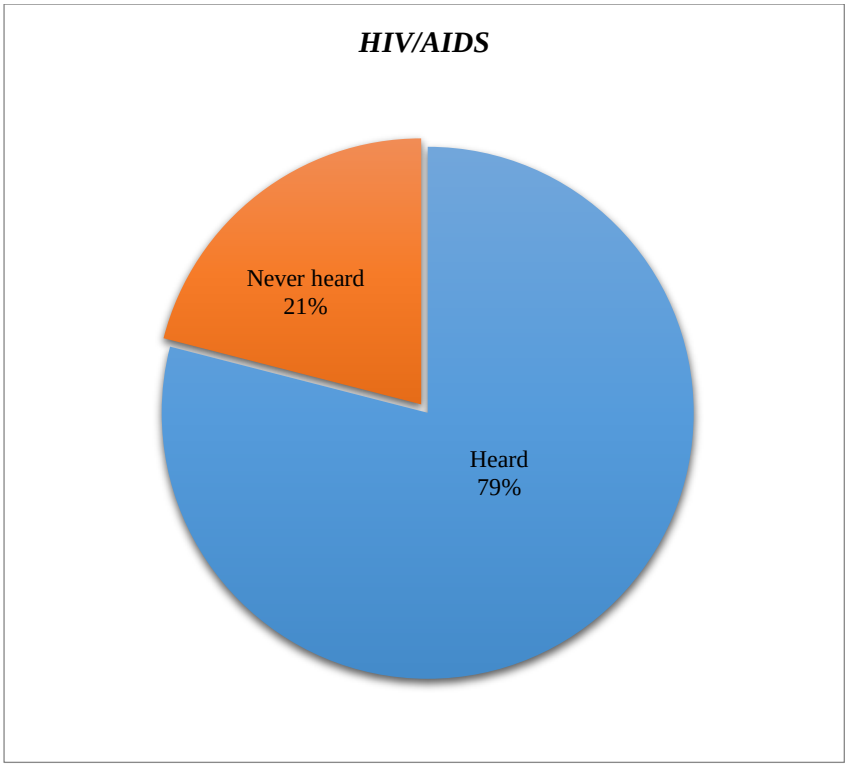


Figure 7-31: Awareness of HIV/AIDS in Korr

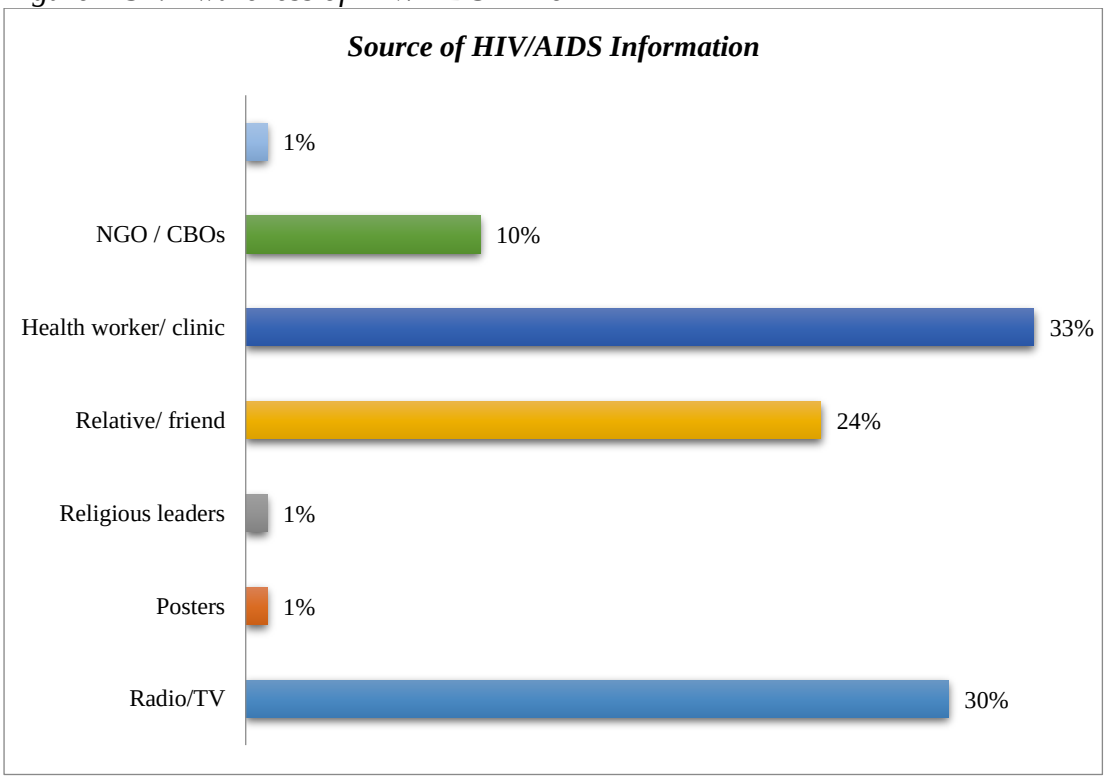


Figure 7-32: Sources of HIV/AIDS Information

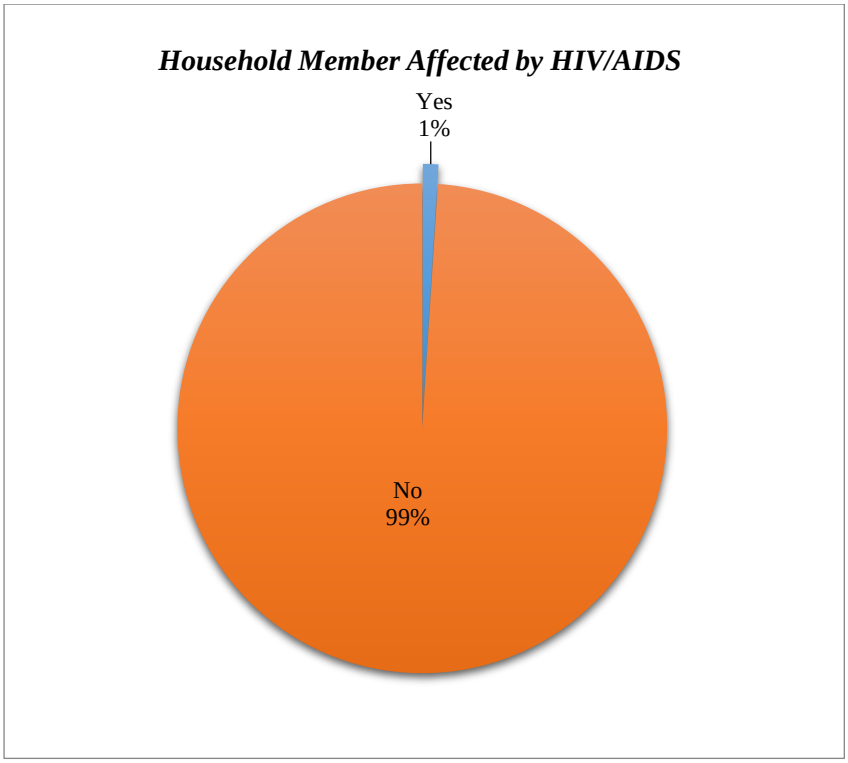


Figure 7-33: Household members affected by HIDS/AIDS

7.9.2 HIV/AIDs Testing and Prevention

This study showed that 69% have the knowledge that HIV/AIDS, as shown in figure 7-35, can be prevented. Although there is a high percentage of people who are aware of HIV/AIDS prevention, there is quite a number who don't know it could be prevented. The government should inform and sensitize the people on methods available for HIV/AIDS prevention. The study also showed that most of the people know where they could get HIV/AIDS voluntary testing and counseling as shown in figure 7-36. The people should be encouraged to go for testing in order for them to be aware of their status and be counseled,

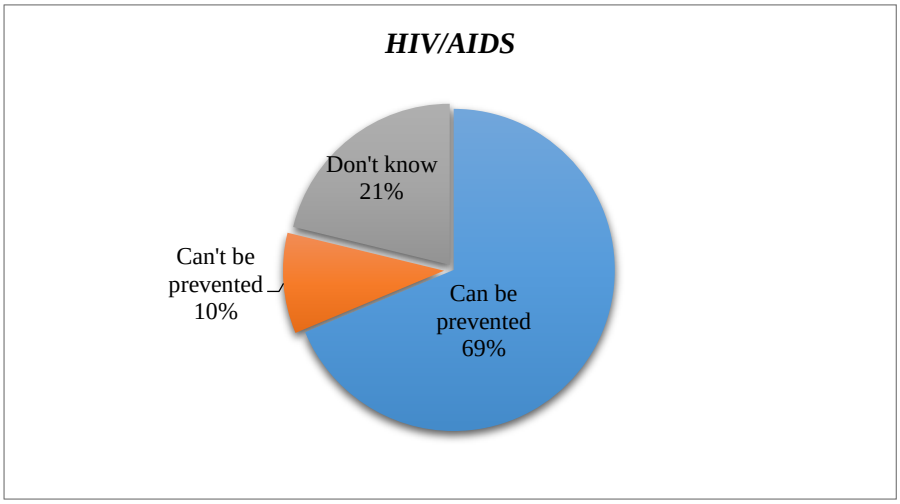


Figure 7-34: The awareness of Korr residents on the prevention of HIV/AIDS

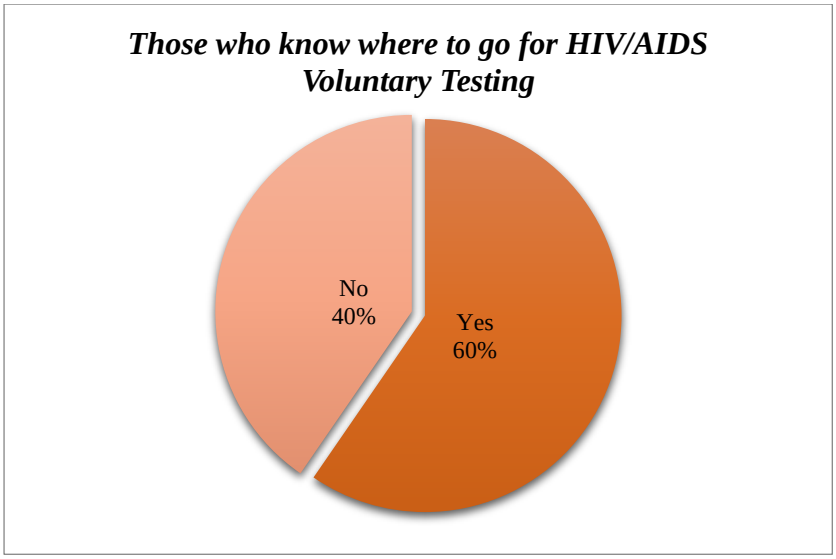


Figure 7-35: Awareness of HIV/AIDS voluntary testing areas in Korr

7.10 ENVIRONMENTAL ISSUES IN THE PROJECT AREA

7.10.1 Key Issues of Environmental Concern

The study established the key issues of environmental concerns as shown in figure 7-36 .the government should consider practicing on environmental and sensitize the community on its importance. The environmental issues could help the town note where environmental challenges occur and prevent them

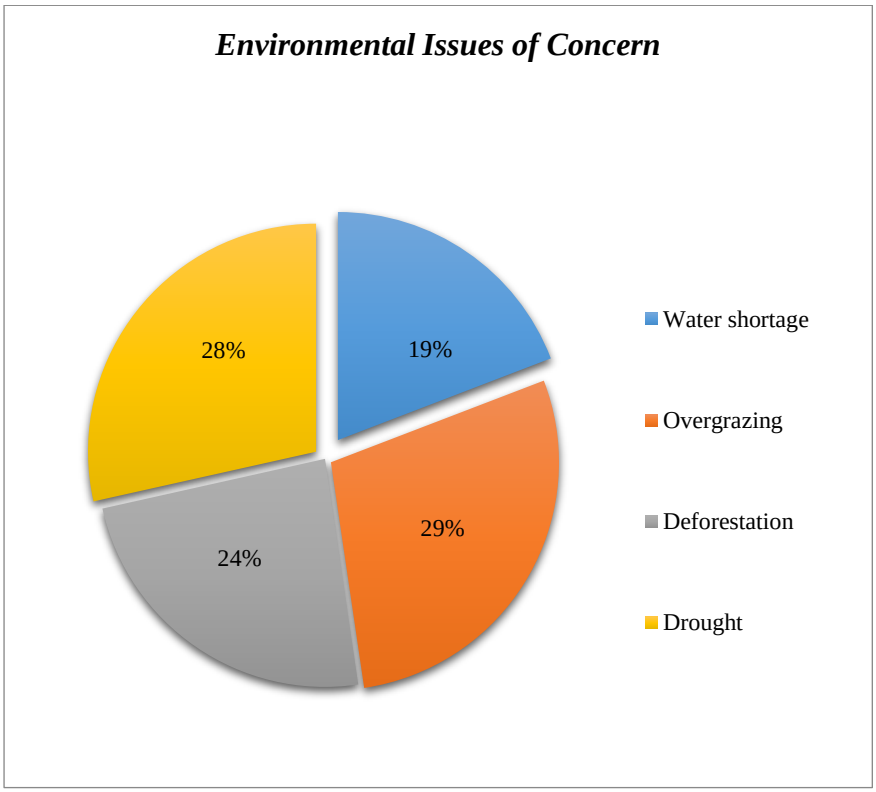


Figure 7-36: environmental issues of concern in Korr

7.10.2 On-going Environmental Conservation Initiatives

The study established that there were conservation initiatives going on in the town as shown in figure7-37. Tree Planting, educating the public and cleaning of mosquito breeding sites are the major environment conservation initiatives. The government should encourage and give more option of conserving the environment. The study established that most of the Non-Governmental organisations were involved with the conservation as indicated in figure7-38. The government should give initiatives to the groups that are mostly involved in conservation programs so as to motivate them. The study established that the project would assist with the conservation as indicated in figure7-39. The project would ensure creativity of conserving the environment by giving new ideas brought in by the professionals .The professionals would be putting up different conservation methods to adhere to NEMA.

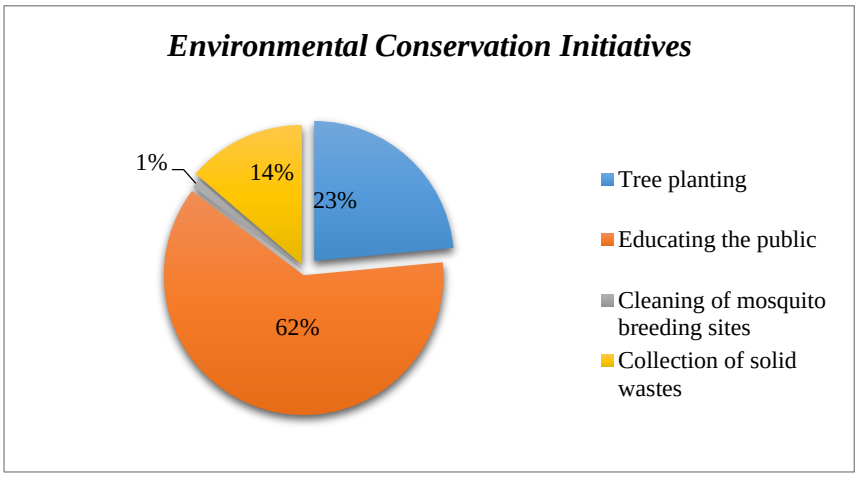


Figure 7-37: environmental conservation initiatives in Korr

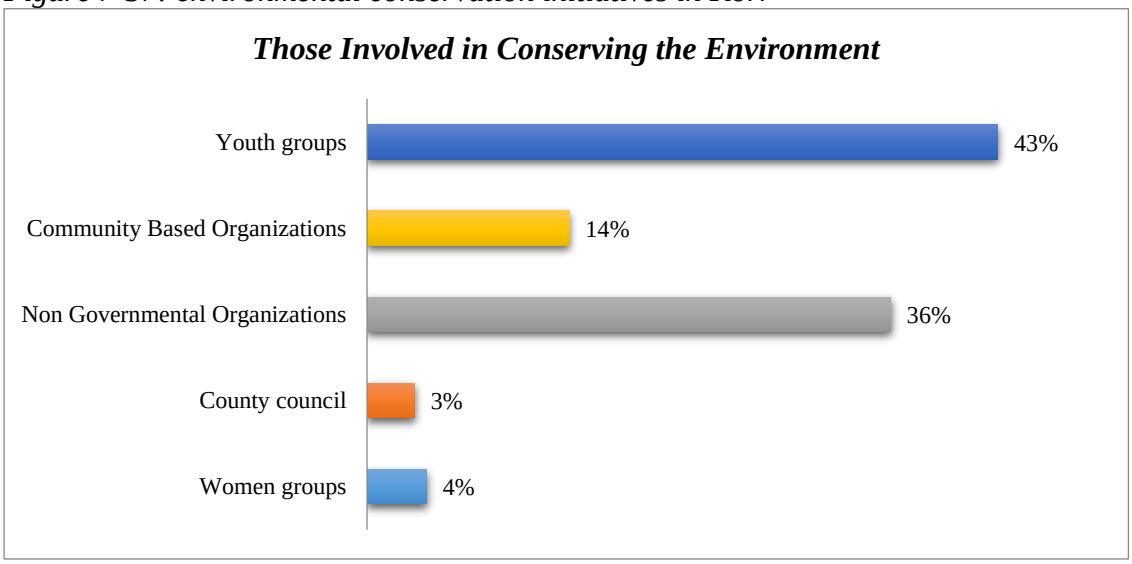


Figure 7-38: The groups involved in conserving the environment in Korr

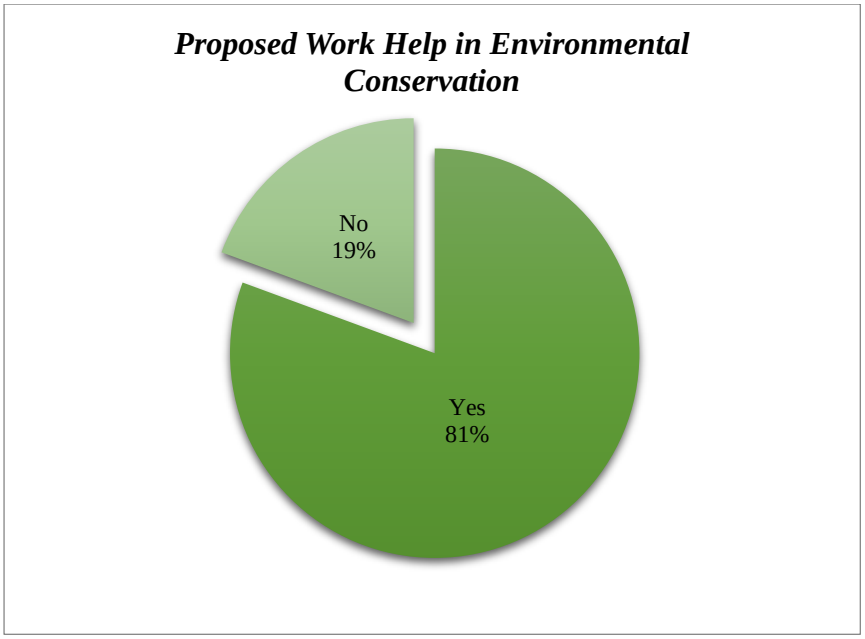


Figure 7-39: how the proposed project will help in conserving the environment

8 ENVIRONMENT AND SOCIAL EFFECTS OF THE PROPOSED PROJECT

This chapter presents the general environmental and social impacts which may result from the proposed project. The emphasis will be initially on the specific impacts that are likely to result from the nature of works including excavation and concrete works.

The construction of the improvements at the existing boreholes and the water distribution networks will greatly benefit the environment, however some of the project activities will have negative effects on the environment.

In general, successful implementation of the project will have high environmental and socio economic benefits to the people and will contribute to the health and wellbeing. Overall, expected negative impacts are related to the improvements to the existing distribution lines including construction of the tank. 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 2.1 presents a characterization of expected impacts.

Table 8-1Characterization 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
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

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
	Surface water pollution from construction wastes		X	X			X	X	X	
Noise and vibrations	Increase of noise and vibration levels due to construction activities		X	X		X			X	
Health & Safety	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		

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
	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 along the project route		X	X		X	X	X	X	
Health and safety	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 WSP 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		
	Vandalism and illegal connections/tapping		X		X	X	X	X	X	

Aspect	Predicted Impact	Characterization of Impacts			
		Nature	Effect	Time Range	Reversibility

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Ambient Air Quality	Increased levels of dust and particle emissions from construction vehicles and equipment		X	X		X	X		X	
Soil Pollution	Contamination of soil from the oil spills during construction		X	X			X	X		X
Noise and vibrations	Increase of noise and vibration levels due to construction activities		X	X		X			X	
Health & Safety	General construction related health and safety risks for workers		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
	HIV/AIDS and increased disease risks.		X	X	X	X	X	X		X
	Improvement in public health and sanitation through reduced use of dirty water.	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		X	X		X	X	X	X	
Impacts on Flora and Fauna	Loss of flora and fauna within the project site		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
Gender	Increased harassment of females within and around the site		X	X		X			X	
Crime Management	Increased insecurity around the project sites		X		X		X		X	
Child Labour and Protection	Potential for exploitation of child labour		X	X		X			X	
Labour influx	Risk of social conflict as a result of increase in influx population		x	x	x		x		x	

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 Korr 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 pipeline and associated works such as construction of the valve chambers, washouts 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.

Nevertheless, environmental impact assessments (ESIA) are now recognized as an essential component in any development project and as an important decision-making tool, and the appropriate procedures were followed.

8.1.1 Impact Identification

The identification of impacts in the ESIA study generally used the following methods:

- Compilation of a comprehensive list of key environmental impacts. These are such as changes in air and water quality, noise levels, wildlife habitats, bio-diversity, landscape, social and economic systems, cultural heritage, settlement patterns, and employment levels.
- Identification of all the sources of impacts such as dust, spoils, vehicles emissions, water pollution, construction camps, etc. using checklists or questionnaires. This was followed by listing possible receptors in the environment (e.g., crops, communities, and migrant labors) through surveying the existing environmental and socio-economic conditions and consultation with concerned parties.
- Identifying and quantifying various environmental and socio-economic impacts through the use of checklists, interaction matrices and overlays.

8.1.2 Impact Prediction

Prediction of impacts technically characterizes the causes and effects of impacts, and their secondary and synergistic consequences for the environment and the local community. It examines each impact within a single environmental parameter into its subsequent effects in many disciplines (e.g., deterioration of water quality and resulting socio-cultural changes). It draws on physical, biological, socio-economic, and anthropological data and techniques. In quantifying impacts, it employs socio-cultural models, economic models, and expert judgments.

It is worth noting that all prediction techniques of environmental impacts, by their nature, involve some degree of uncertainty.

8.1.3 Mitigation of Impacts

Each predicted adverse impact is evaluated to determine whether it is significant enough to warrant mitigation. This judgment of significance has been based on one or more of the following:

- Comparison with laws, regulations or accepted standards;
- Consultation with the relevant decision makers;
- Reference to present criteria such as protected sites, or endangered species
- Consistency with government policy objectives
- Acceptability to the local community or the general public

8.1.4 Impact Category

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:

8.1.4.1 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.

8.1.4.2 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.

8.1.4.3 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.

8.1.4.4 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.

8.1.5 Impacts emanating from the proposed project

The impacts are identified in to three stages:

- Pre-construction/planning phase impacts
- During construction and
- Post construction(operation phase)

8.1.6 Planning Phase Impacts

These are commonly associated resettlement of people along the pipeline routes. The proposed project area is located in community grazing land with little or no settlement, and along existing road reserves within the town. In addition the roads within the town have no encroachment onto the road reserve as such the pipelines will be dug with no permanent interference of human activities. The only features that may be affected by the proposed project include:

i. Natural vegetation along the pipeline way leave.

Mitigation measures

- The pipeline runs along roads and footpaths, the extension of the lines will be located along footpaths and roads so as to avoid land acquisition.
- Discussion with the local community on use of community land as part of the RAP screening
- On construction completion, access routes will be reinstated to their pre-project conditions for both people and animals.

8.1.7 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:

8.1.7.1 Site Related Oil Spills

During construction, oil spills may result from construction site equipment and storage.

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 for the construction machinery though induction and safety training;
- In case of spillage the Contractor should isolate the source of oil spill and contain the spillage 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;
- All vehicles and equipment should be kept in good working order, serviced regularly 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.
- All vehicle works should be done in one place to avoid chances of spillage in different parts of the camp

8.1.7.2 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. 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 of trenches, 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.

8.1.7.3 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 seasonal river. This may affect the river eco-system.

Mitigation Measures

- ❖ Construction materials and other debris (lime, cement and fresh concrete, etc.) shall be prevented from entering waterways.
- ❖ Ensure protection of the river ecosystem by proper handling of cement during civil works.

8.1.7.4 Social - Economic Impacts

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 not be available on the local level but certainly on the regional 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.

With availability of tap water there will be a possibility of increased investor interest in tourism related developments in the area and possible increase in property values for land with access to piped water.

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

The land in Korr is communally owned. The project components will be located within public land (road reserves) and on community land belonging to the Rendile tribe, who in accordance to the World Bank O.P 4.12 , were consulted and have agreed to provide the necessary wayleaves and land for the project implementation based on the conditions provided in the community resolution forms and the public consultation meetings.

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.
- Ensure effective and matching contractual provisions for contractor to manage labour influx
- 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

8.1.7.5 Air Quality

Construction activities of bush clearing, materials delivery, trench excavation 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 protective clothing like helmets and dust masks on construction crew.
- Construction sites and transportation routes 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.
- All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and with proper maintenance 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.
- Use of other dust palliative measures to reduce dust emissions

8.1.7.6 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.

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.
- Installation of temporary sound barriers if necessary.
- Selection of transport routes for large vehicles to avoid residential areas.
- Where possible, ensure non mechanized construction. This includes, employing locals during the trench excavation.

8.1.7.7 Biodiversity and Conservation Impacts

Removal of vegetation as well as trees will lead to loss of plants and animal habitat. The biodiversity affected includes insects such as butterflies and worms, small mammals, reptiles and birds. Water contamination with cement will cause it to be highly alkaline and toxic to plants and animals living in watercourses.

Mitigation Measures

- Re-plant the indigenous vegetation as much as practical once work is completed.
- Spare the vegetation that must not necessarily be removed such as trees.
- Minimize the amount of destruction caused by machinery by promoting non mechanized methods of construction.
- Ensure protection of the areal ecosystem by proper handling of cement during civil works.
- Cement mixing should be done in a designated area away at a safe distance from natural water courses.

8.1.7.8 Public Health, Safety & HIV & AIDS Impacts

Construction staff and the general public will be exposed to safety hazards arising from construction activities. The pipelines are to be placed primarily along the access roads these roads have pedestrian and vehicular traffic and this may cause an increase in the number 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.

In migration 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.

Improved clean water supply to the area will lead to improved public health and quality of life through reduced risk of waterborne and water-related diseases; and increased public satisfaction

Mitigation Measures

- Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards.
- Establish a Health and Safety Plan (HASP) for both civil and electromechanical work.
- Appoint a trained health and safety team for the duration of the construction work.
- Use of dust masks while working in dusty environment to avoid respiratory related sicknesses.
- Provide workers with 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 serious water loss risks.
- Roads passing through population centers will be water sprayed to reduce dust.
- 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.
- Work to minimize or altogether eliminate mosquito breeding sites.
- Provide appropriate human and solid waste disposal facilities
- Provide crossing points along the trenches to allow people to maintain their normal activities, also cautionary signage should be provided along the trenches.
- Provide clean toilets for workers

8.1.7.9 Service Delivery Impacts

The construction activities will cause disruption of services such as water supply and transportation within the project area. Where the water pipe crosses the road, excavation of trenches and laying down of the water pipes may cause disruption of transport within the project area. Trucks with heavy loads of construction materials may damage murram roads during the construction process. The trucks may get stuck on bad road sections (sandy soil is difficult to negotiate through) and these may cause disruption of transport.

The current water storage facilities may not be enough to handle emergencies brought on by the interruption in water supply. Areas of special attention include the learning and health care institutions.

The completion of the water project will alleviate the water problem and ensure better management of water supply as water losses will be detected. Metering will allow better pricing of water resources and could contribute to better water use management by consumers. Improved clean water supply to the area, sanitation and hygiene for residents with access to tap water will lead to improved public health and quality of life through reduced risk of waterborne and water-related diseases; and increased public satisfaction within the project area. This will lead to population growth and informal settlements causing increased waste water production and increased demand for emergency water supply from existing reservoirs

Mitigation Measures

- Provide appropriate signage to warn motorists and other road users of the construction activities, diversion routes to ward off traffic accidents.
- 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.
- Provide adequate water storage facilities to ensure adequate supplies to meet the new demand.
- Ensure proper maintenance of the water works
- Use pipes of good quality materials

8.1.7.10 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 labor and vending of foodstuffs to the construction workers. Where available skilled women will be used.

The increase in the distribution of water to the inhabitants will immediately transform their ways of life, especially for women who are the first concerned when it comes to water supplies.

Women who are the main economic players will have more time to spend on other economic activities.

Mitigation Measures

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

8.1.7.11 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 Measures

- 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

8.1.7.12 Impacts on Cultural Heritage

The Consultant did not identify any potential cultural sites that may be affected by the proposed project, however there is potential of uncovering a buried cultural site during construction and provisions must be made. The cultural sites include archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction.

Mitigation Measures

- Use of "chance find" procedures by the contractor _ See Appendix 12.4 for "Chance Find" procedures

8.1.7.13 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.

Mitigation Measures

- 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.

Impacts during operation and maintenance

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

8.1.7.14 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;
- Promote a more sustainable use of water resources with improvements in the infrastructure to reduce losses and introduction of better metering and billing procedures to encourage more efficient use of water;
- A comprehensive metering program (of production and consumers) is expected to keep the on Non-Revenue Water (NRW- technical and commercial losses) at an acceptable level;
- 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:

8.1.7.15 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. 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 rivers from pollution.
- Come up with regular trash collection system in the site areas so as to avoid accumulation of waste.
- In the long term the respective WSP should invest in a waste water collection and treatment system for Korr town to ensure proper handling of waste water. This would also help in protecting local environment from possible contamination with direct sewage.

8.1.7.16 Leaks and burst

During the project duration there may be leaks and bursts caused by various reasons such as excessive pressures, illegal connections, among others

Mitigation Measures

- A program of leak detection to be put in place to identify aging pipes for replacement to avoid major bursts and frequent repairs. In case of unavoidable major repairs, mitigation measures similar to those applied during construction to reduce the impacts of noise, dust, disturbance of flora and fauna.
- Leaks and pipe bursts to be promptly repaired to avoid contamination of water resources especially shallow ground water.
- Constant policing of network to check for illegal connections

8.1.7.17 Noise

Noise nuisance from vehicles and repair equipment. During O&M activities vehicles are required for inspection of pipelines 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.

Table 8-2 Noise level guidelines

Noise Level Guidelines

	One Hour L_{ACQ} (dBA)	
Receptor	**Daytime (07:00-22:00)**	**Nighttime (22:00-07:00)**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Mitigation Measures

- 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.

8.1.7.18 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. 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.

8.1.7.19 Socio - Economic Impacts

The expected improvements in metering and administrative billing procedures are likely to cause social and economic impact as this may result in higher water bills

Mitigation Measures

- The project will make use of the respective WSP approved rates and this impact is not foreseen

8.1.7.20 Impact on flora and fauna.

Impact associated with repair and replacement activities when there are leaks or bursts on pipelines will be loss of vegetation and disturbance flora and fauna.

Mitigation Measures

- A program of leak detection to be put in place to identify aging pipes for replacement to avoid major bursts and frequent repairs. In case of unavoidable major repairs, mitigation measures similar to those applied during construction to reduce the impacts of disturbance of flora and fauna.
- Leaks and pipe bursts to be promptly repaired to avoid contamination of water resources especially shallow ground water.
- After the repair works the land to be levelled to allow vegetation regeneration.

8.1.7.21 Land subsidence

This impact results from the over extraction of the ground water from the borehole.

Mitigation Measures

The pumps at the borehole sites are designed in such a way that ensures safe yields and thus, there is no risk of over extraction.

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.

9 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.

9.1 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 adjacent or along the pipeline route 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 production, transmission and distribution system to initiate immediate rehabilitation whenever problems are identified to reduce system leakage and bursts losses.

9.2 MITIGATION MEASURES

Mitigation measures have already been discussed in Chapter 8. However, a brief summary is included in the Environmental and Social Mitigation and Management Plan (ESMMP) in Table 9-1: 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 9-1: The Proposed Environmental and Social Mitigation and Management Plan (ESMMP)

Project Phase	**Environmental / Social Impact**	**Mitigation Measure**	**Responsibility**	**Cost (K.Shs.)**
Construction	Loss of flora and fauna	Re-plant the vegetation as much as possible once work is completed. Spare the vegetation that must not necessarily be removed such as trees.	Contractor Supervising Engineer	600.00

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
		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 clean-up which will be subject to approval);	County Officer-Water Energy and Natural Resources	
Construction	Air quality	Use protective clothing like dust masks on construction crew. Construction sites and transportation routes (those that are 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 (schools, 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.	Contractor Supervising Engineer	Cost included in PPE Cost of water spraying and vehicle maintenance included in Contractor's cost
Construction	Noise pollution	Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 22:00 to 6:00 near residential areas.	Contractor Supervising Engineer	Included in Contractor's costs

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
		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	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 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 clean-up which will be subject to approval); even though, no significant use of machinery is expected. 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 rivers, 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	Contractor Supervising Engineer	50,000.00

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
		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.		
Construction	Soil Related Impacts	In cases where it is identified that during construction there is a danger of increased run-off or at the project site, temporary drainage channels or holding ponds can be employed After completion of the construction works, restoration of the ground by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible. In areas prone to erosion, provision of soil stabilization in form of a retaining wall or planting of trees, subject to approval by the Resident Engineer Plan emergency response measures in case of accidental oil spills.	Contractor Supervising Engineers	Included in the Contractor's cost
	Impacts on Water resources	Ensure proper solid and liquid wastes disposal mainly from the construction camps, sites and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Contractor, Supervising Engineer County Water Officer	10,000.00 50,000.00

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
Construction	Public Health & Safety	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.	Contractor Supervising Engineer NWSB	200,000.00
Construction	HIV & AIDS Impacts	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. Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members Provide Condom dispensers at appropriate locations	Contractor Supervising Engineer Isiolo County Government NWSB	Included in sensitisation costs above 150,000.00 50,000.00
Construction	Socio-economic impacts	Unskilled construction and skilled (if available) labour to be hired from the local population as far as possible to minimize on influx of foreigners into the community. Use of manual labour during excavation and construction works where possible to ensure more employment of locals and hence ensure project support throughout the construction process. Ensure effective and matching contractual provisions/obligations (Terms of the contract) for contractor to manage labour influx.	Contractor Supervising Engineer	Included in Contractor's cost

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
		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		
Construction	Gender empowerment	Ensure equitable distribution of employment opportunities between men and women Provide toilets and bathrooms for both male and female workers on site	The contractor The Supervising Engineer	100,000.00
Construction	Crime Management	Fencing around project area. Working with local committees (e.g. "nyumba kumi) to provide security within the site in addition to the Contractor's own security. Removing any employee who persists in any misconduct or lack of care, carries out duties incompetently or negligently, fails to conform to any provisions of the contract, or persists in any conduct which is prejudicial to safety, health, or the protection of the environment. Taking all reasonable precautions to prevent unlawful, riotous or disorderly conduct by or amongst the contractor's personnel, and to	Contractor Supervising Engineer	Included in contractor's cost

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
		preserve peace and protection of persons and property on and near the site. Prohibiting alcohol, drugs, arms, and ammunition on the worksite among personnel. The contractor and Supervision Consultant should register in a log all events of a criminal nature that occur at the worksite or are associated with the civil works activities. The contractor and Supervision Consultant should report all activities of a criminal nature on the worksite or by the contractor's employees (whether on or off the worksite) to the police and undertake the necessary follow-up. Crime reports should include nature of the offense, location, date, time, and all other pertinent details.		
Construction	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	Contractor Supervising Engineer Local Administration	
Construction	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,	Contractor Supervising Engineer Local Administration	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
Construction	Impact on cultural sites	Implementation of chance find procedures see appendix **Error! Reference source not found.**	Contractor Supervising Engineer	25,000.00
Construction	Liability for loss of life, injury or damage to private property	Provision of PPE. To the construction workers at any time they are involved in the construction. The PPE should include clothing, helmets, and goggles. 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.	Contractor Supervising Engineer	30,000.00 50,000.00 40,000.00

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility	Cost (K.Shs.)
Construction	Miscellaneous Environmental issues	As prescribed by the Environmental Supervisor	Environmental Supervisor	75,000.00
Operation	Generation of solid waste	Sorting of all debris collected by the screens before transport to the relevant facilities. Continuous removal of solid waste to prevent overloading of the system to ensure efficiency in the cleaning of the combined storm and waste water. All transporters used should have a license from NEMA.	NWSB	
Operation	Noise Pollution	All transportation vehicles should be kept in good working order, serviced regularly in accordance to the manufacturers' specifications. All transportation vehicles should be licensed by NEMA	NWSB	
Operation	Increased Tariffs	NWSB incorporates the "pro-poor" policy in its billing.	Kinna WSP	

9.3 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 8 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.

In order to implement the monitoring plan, the Consultant proposes an additional cost of K.Shs. 150,000.00 per month for and environmental consultant during the construction period.

Table 9-2 presents the indicators that will be used to monitor the implementation of the water supply project. The indicators are selected based on the project and major anticipated impacts.

Table 9-2: Proposed Environmental and Social Monitoring Plan

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Frequency of monitoring	Responsibility	Corrective Action
Construction Camp	Public health and safety	• Prevalence rates of common diseases. • 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.	• Physical inspection • Documentation Number of complaints • Interview with residents	Monthly	Environmental Supervisor	Investigate non-compliance and make recommendations Implement recommendations
	Solid and liquid wastes	• Presence of scattered litter.	• Physical inspection • Number of complaints.	Monthly	Environmental Supervisor Contractor	Implement recommendations

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Frequency of monitoring	Responsibility	Corrective Action
	HIV&AIDS	• Number campaign meetings on transmission of diseases like HIV/AIDS and other STDs. • Number of condom dispensers within the site. • Number of ARVs provided to vulnerable persons	• Inspection of HIV/AIDS prevention services within the site. • Number of condoms, ARVs provided.	Quarterly	Contractor Environmental Supervisor	Implement recommendations
Project Site	Solid and liquid wastes	• Scattered litter • Flow of wastewater on the ground surface. • Provision of sanitary facilities to the construction crews.	• Physical inspection • Number of complaints	Monthly	Environmental Supervisor Contractor	Implement recommendations
	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	Monthly	Environmental Supervisor	• Implement recommendations
	Air pollution	• Level of dust generated. • Provision of PPE.	• Physical inspection • Interview residents including workers	Monthly	Environmental Supervisor	• Implement recommendations

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Frequency of monitoring	Responsibility	Corrective Action
			• Liaise with other stakeholders			
	Flora and Fauna	• Amount of vegetation removed	• Documentation of uprooted trees • Physical Inspection	Quarterly	Environmental Supervisor	• Implement recommendations
	Gender Empowerment	• Number of female employees • Number of male and female toilets	• Review of company staff records. • Physical Inspection	Quarterly	Environmental Supervisor	• Implement recommendations
	Cultural Heritage	• Records of identified cultural sites	• Review of records	Monthly	Environmental Supervisor	• Implement recommendations
	Crime Management	• Number of reported crimes • Number of complaints	• Review of records • Interviews with staff and local community	Monthly	Environmental Supervisor	• Implement recommendations
	Child Labour	• Record of employees including IDs	• Review of records • Interviews with staff and local community	Monthly	Environmental Supervisor	• Implement recommendations
	Gender Equity and Sexual Harassment	• Number of complaints	• Review of grievance redress forms. • Interviews with local community	Monthly	Environmental Supervisor	• Implement recommendations

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Frequency of monitoring	Responsibility	Corrective Action
	Loss of Life, Damage to Private property	• Record of accidents and damages done	• Review of records • Interviews with staff and local community.	Monthly	Environmental Supervisor	• Implement recommendations

9.4 IMPLEMENTATION ARRANGEMENTS- ROLE AND RESPONSIBILITIES OF EACH ACTOR

9.4.1 Contractor

The contractor has the major responsibility for safety and health during the construction phase on the projects only, and has the duties to plan, manage, monitor and coordinate the construction phase taking into account the general principals of prevention to ensure:

- Safety & Health-the project is carried out without risks to health or safety.
- CPP – to be drawn up as soon as practicable prior to setting up a construction site and updated, reviewed and revised so it continues to be sufficient.
- Coordination of the implementation of the relevant legal requirements to ensure that the employers etc. apply the general principals of prevention in a consistent manner and follow the CPP.
- Contractor training etc. – Ensure the necessary information, instruction, and training is received and appropriate supervision to comply.
- Cooperation with others – cooperate with any other person at the site or an adjoining site to enable others to perform their duties etc.
- Site rules – draw up.
- Welfare – ensure compliance throughout the construction phase.
- Liaison with PD – for the duration of the project and in particular regarding any information which is needed to prepare the H&SF or may affect the planning and management of the pre-construction phase.
- H&SF – is appropriately updated, reviewed and revised from time to time.
- Provide Site Inductions
- Prevent unauthorized access to the site.
- Workforce cooperation – arrangement which will enable the PC and workers to cooperate effectively in promoting and developing measures to ensure health & safety at work and checking effectiveness.
- Workforce consultation – consult workers in good time on matters connected with the project which may affect their health, safety or welfare.
- Workforce communication – ensure workers can inspect and take copies of certain information.
- Display the project notification on the site.

9.4.2 Supervising Engineer

The supervising engineer will assist NWSB in the direct oversight of the water supply project. He assist NWSB in determining the equipment required and justification through conducting feasibility studies. He will also ensure the safety of workers on sight.

9.4.3 County officer (Water, Energy and natural resources)

County officers will have the role in administration and management. They shall be responsible for the coordination, management and supervision of the general administrative functions in the county. They will ensure the facilitation and coordination of citizen participation in the development of policies and plans and delivery of services regarding the water supply project and also in the provision and maintenance of the water supply project. The county officers will also ensure that the project empowers the community.

9.4.4 Northern water services board

On the project NWSB will need to ensure that the following duties have been fulfilled.

Make suitable arrangements for managing a project so that health, safety and welfare are secured.

NWSB will assemble the Project Team and ensure that the functions and responsibilities of the Project Team are clear.

NWSB will Maintain and review the Management Arrangements to ensure they remain relevant throughout the life of the project.

NWSB will Provide Pre-Construction Information. Pre-construction information is information already in the Client's possession (such as an existing health and safety file, survey data, structural drawings, etc) or which is reasonable to obtain. This must be provided as soon as practicable to each Designer (including the Principal Designer) and Contractor (including the Principal Contractor) who is bidding for work on the project or has already been appointed.

A Health and Safety File is only required for projects involving more than one contractor. The Client must ensure that the Principal Designer prepares a Health and Safety File for their project. Its purpose is to ensure that, at the end of the project, the Client has the information that anyone carrying out subsequent construction work on the water supply will require to be able to plan and carry out the work safely and without risks to health.

Where a construction project must be notified, NWSB must submit a notice in writing to the relevant enforcing authority NWSB may, for practical reasons, agree that one of the other duty-holders for the project complete this notification. Where this is the case, NWSB should confirm this in writing with the relevant duty holder.

9.4.5 Local administration

The local administration will aid in ensuring that laws and regulations are adhered to the latter and also that the project goes on smoothly without external interference.

9.4.6 Environmental supervisor.

Environmental supervisor will advise NWSB and the contractor on how to minimize the project impact on the environment and, in some cases, oversee the delivery of impact reduction strategies. HE/SHE will typically develop and then measure the success of the schemes for waste management, recycling, pollution reduction and pollution prevention.

Depending on the role, responsibilities could include:

- implementing environmental policies and practices
- devising strategies to meet targets and to encourage best practice
- devising the best tools and systems to monitor performance and to implement strategies
- ensuring compliance with environmental legislation
- assessing, analysing and collating environmental performance data and reporting information to internal staff, clients and regulatory bodies
- confirming that materials, ingredients and so on are ethically or environmentally sourced
- managing environmental strategy budgets
- liaising with internal staff including senior managers and directors
- Acting as a champion or cheerleader for environmental issues as per the project.
- providing environmental training to staff at all levels
- writing plans and reports
- keeping up to date with relevant changes in environmental legislation and initiatives including international legislation where applicable
- producing educational or information resources for internal staff, clients or the general public
- liaising with regulatory bodies such as the Environment Agency (NEMA)

9.5 GRIVANCES REDRESS MECHANISMS

The table 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. Different grievances require different timeframes for their handling as their nature necessitates their handling by different agencies. However due to their sensitive nature, the stakeholders agreed that three weeks will be enough to address any grievance that arises as a result of the works.

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 9-3: Table Showing a Sample Grievance Form

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

10 CONCLUSION AND RECOMMENDATIONS

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

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

- There will be an increased supply of clean water to Korr town and Ballah region. This will in turn lead to an improvement in the public health of the population due to the reduction of water related ailments.
- The water supply to communities will reduce the time required and distance travelled to fetch water. This time so availed can be used in other economic activities thus enhancing the quality of life and living standards in the project area.
- 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.

The recommendations and issues which arose from public participation and consultation have been effectively highlighted and incorporated in the report after the said public participation and consultation meetings were held.

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.

11 REFERENCES

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- The Constitution of Kenya 2010
- The Land Act, No. 6 of 2012
- World Bank Operational Policies

12 APPENDICES

12.1 APPENDIX 1 SURVEY QUESTIONAIRE

Zamconsult Consulting Engineers

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT SURVEY QUESTIONNAIRE

An Environmental and Social Impact Assessment Survey is being carried out for the proposed_____ on behalf of the Northern Water Services Board (NWSB). 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? (tick)

(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? (tick)

(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) Pastoralism ..... (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) Camels.....

(6) Others .....

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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) Rolling the water Jerrican on the ground..... (8)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) Students missing School..... (4) Human wildlife conflict..... (3) Others (specify)
.....

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) .....

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

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

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

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

3.16 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) .....

3.17 If negatively, in what ways? (Tick)

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

3.18 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 Northern Water Services Board help in the conservation of the environment in the area? (1) Yes ..... (2) No .....

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

12.2 CHEMICAL ANALYSIS OF KORR

Figure 12-1Chemical Analysis of water at korr Borehole

WATER RESOURCES MANAGEMENT AUTHORITY

TITLE: Water Sample Analytical Certificate – Physical Chemical Results	**REF. NO : F/9/1/3**
	ISSUE NO : 04
DEPARTMENT: Technical	**REV. NO : 03**
ISSUED BY: DTCM	**DATE OF ISSUE: 15th April 2013**
AUTHORISED BY : TCM	**Page** : 1 of 2

Serial No: .....
Name of Customer: MASAAL AGENCY
Purpose of Sampling: DOMESTIC
Date Sampled: 5/10/15
Source: KOR COMMUNITY BOREHOLE 164M

Sample No: 0813
Address: .....
County: MARSABIT
Date Received: 7/10/15
Date Compiled: 9/10/15

PARAMETERS	UNIT	RESULTS	WHO STANDARDS	KEBS(KS 459-1:2007) STANDARDS
pH	pH Scale	7.59	6.5-8.5	6.5-8.5
Colour	mgPt/l	<5	Max 15	Max 15
Turbidity	N.T.U	2.4	Max 5	Max 5
Conductivity (25°C)	µS/cm	3070	Max 2500	-
Iron	mg/l	<0.01	Max 0.3	Max 0.3
Manganese	mg/l	<0.01	Max 0.1	Max 0.5
Calcium	mg/l	216	Max 100	Max 150
Magnesium	mg/l	102.2	Max 100	Max 100
Sodium	mg/l	252	Max 200	Max 200
Potassium	mg/l	17	Max 50	-
Total Hardness	mg$CaCO_3$/l	960	Max 500	Max 300
Total Alkalinity	mg$CaCO_3$/l	260	Max 500	-
Chloride	mg/l	610	Max 250	Max 250
Fluoride	mg/l	0.79	Max 1.5	Max 1.5
Nitrate	mgN/l	10	Max 10	-
Nitrite	mgN/l	0.01	Max 0.1	Max 0.003
Sulphate	mg/l	349.2	Max 450	Max 400
Free Carbon Dioxide	mg/l	30	-	-
Total Dissolved Solids	mg/l	1903.4	Max 1500	Max 1000
Arsenic	µg/l	-	Max 10	Max10
Others		-		

Name of Analyst CELLINE OBUYA Signature .....

WATER RESOURCES MANAGEMENT AUTHORITY	
TITLE: Water Sample Analytical Certificate – Physical Chemical Results	REF. NO : F/9/1/3
	ISSUE NO : 04
DEPARTMENT: Technical	REV. NO : 03
ISSUED BY: DTCM	DATE OF ISSUE: 15th April 2013
AUTHORISED BY : TCM	Page : 2 of 2

Comments by Head of Laboratory

Clear, hard, salty water. Treatment of the water is advised in order to make it suitable for domestic purposes.

Name: JORAM KIHUMBA
FOR: ATCM-CENTRAL WATER TESTING LABORATORIES

Signature: ..... **Date:** .....

WATER RESOURCES MANAGEMENT AUTHORITY
ASSISTANT TECHNICAL COORDINATION MANAGER
CENTRAL WATER TESTING LABORATORY
Tels: 020 2344159, 0720 560 712
0773 903 729
P. O. Box 45250 - 00100 NAIROBI

Issued by: .....

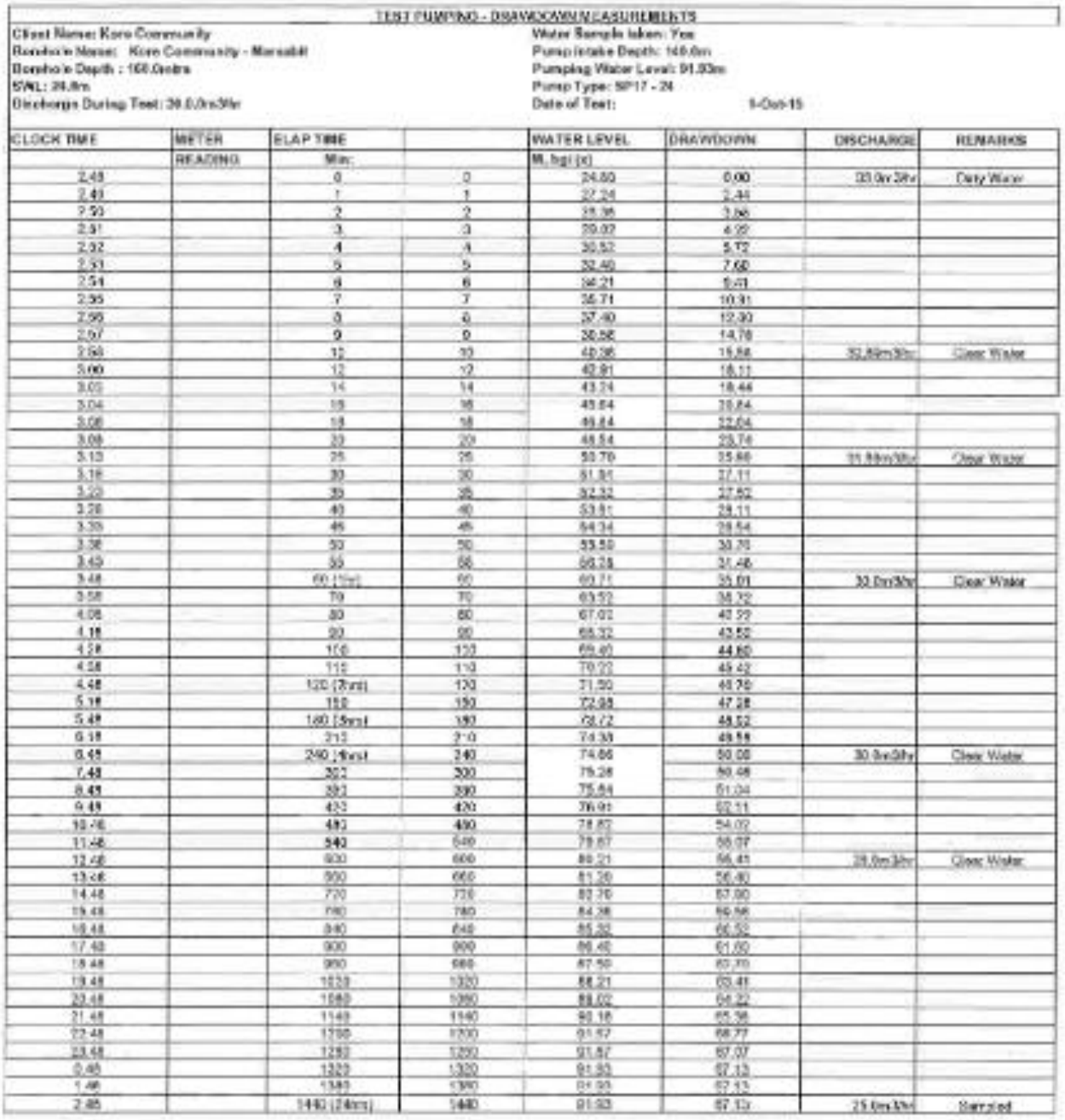
(Deputy Technical Coordination Manager)

Approved by:.....

(Technical Coordination Manager)

12.3 KORR BOREHOLE TESTED YIELD

Figure 12-2 Korr Borehole Tested Yield



TEST PUMPING - DRAWDOWN MEASUREMENTS

Client Name: Korr Community
Borehole Name: Korr Community - Marsabit
Borehole Depth : 150.0mbs
SWL: 26.8m
Discharge During Test: 30.0/m3/hr
Water Sample taken: Yes
Pump Intake Depth: 149.0m
Pumping Water Level: 91.93m
Pump Type: SP17 - 24
Date of Test: 1-Oct-15

CLOCK TIME	METER READING	ELAP TIME Min:		WATER LEVEL M. bgl (s)	DRAWDOWN	DISCHARGE	REMARKS
2.48		0	0	24.60	0.00	30.0m3/hr	Dirty Water
2.49		1	1	27.24	2.34		
2.50		2	2	28.96	3.66		
2.51		3	3	29.07	4.99		
2.52		4	4	30.32	5.72		
2.53		5	5	32.40	7.68		
2.54		6	6	34.21	9.41		
2.55		7	7	35.71	10.91		
2.56		8	8	37.40	12.80		
2.57		9	9	38.56	14.76		
2.58		10	10	40.36	15.56	32.5m3/hr	Clear Water
3.00		12	12	42.91	18.11		
3.02		14	14	43.74	18.44		
3.04		16	16	45.64	20.84		
3.06		18	18	46.84	22.04		
3.08		20	20	48.54	23.74		
3.10		25	25	50.79	25.99	31.8m3/hr	Clear Water
3.15		30	30	51.91	27.11		
3.20		35	35	52.52	27.92		
3.25		40	40	53.91	29.11		
3.30		45	45	54.34	29.54		
3.35		50	50	55.50	30.70		
3.40		55	55	56.26	31.46		
3.45		60 (1hr)	60	60.71	35.91	30.0m3/hr	Clear Water
3.55		70	70	63.52	38.72		
4.05		80	80	67.02	42.22		
4.15		90	90	68.32	43.52		
4.25		100	100	69.40	44.60		
4.35		110	110	70.22	45.42		
4.45		120 (2hrs)	120	71.00	46.20		
5.15		150	150	72.95	47.28		
5.45		180 (3hrs)	180	73.72	48.52		
6.15		210	210	74.39	49.19		
6.45		240 (4hrs)	240	74.86	50.08	30.0m3/hr	Clear Water
7.45		300	300	76.26	50.46		
8.45		360	360	75.84	51.04		
9.45		420	420	76.91	52.11		
10.45		480	480	78.82	54.02		
11.45		540	540	79.67	55.07		
12.45		600	600	80.21	56.41	28.0m3/hr	Clear Water
13.45		660	660	81.20	56.40		
14.45		720	720	82.70	57.90		
15.45		780	780	84.38	59.58		
16.45		840	840	85.20	60.32		
17.45		900	900	86.45	61.65		
18.45		960	960	87.50	62.70		
19.45		1020	1020	88.21	63.41		
20.45		1080	1080	89.02	64.22		
21.45		1140	1140	90.18	65.38		
22.45		1200	1200	91.57	66.77		
23.45		1260	1260	91.87	67.07		
0.45		1320	1320	91.93	67.13		
1.45		1380	1380	91.93	67.13		
2.45		1440 (24hrs)	1440	91.93	67.13	25.0m3/hr	Stemized

Table 12-1 Water Consumption Rates Guideline

CONSUMER	UNIT	*12.3.1.1 RURAL AREAS*			URBAN AREAS		
		High potential	Medium potential	Low potential	High Class Housing	Medium Class Housing	Low Class Housing
People with individual connections	1/head/ day	60	50	40	250	150	75
People without connections	1/head/ day	20	15	10	-	-	20
Livestock unit	1/head/ day	50			-		
Boarding schools	1/head/ day	50					
Day schools with WC without WC	1/head/ day	25 5					
Hospitals Regional District other	1/bed/ day	400 200 100			+ 20 1 per outpatient and day (minimum 5000 1/day)		
Dispensary and Health Centre	1/day	5000					
Hotels High Class Medium Class Low Class	1/bed/ day	600 300 50					
Administrative offices	1/head/ day	25					
Bars	1/day	500					
Shops	1/day	100					
Unspecified industry	1/ha/day				20,000		
Coffee pulping factories	1/kg coffee	25 (when re-circulation of water is used).					

12.4 SUMMARY OF PUBLIC CONSULTATION

12.4.1 Minutes of the public consultation meeting held at Sallah Korr location on the 2nd June 2017 at 10.00 am

1) *Present*
   - Marion Orina - Zamconsult Consulting Engineers (Consultant)
   - Kevin Morang'a - Zamconsult Consulting Engineers (Consultant)
   - Omar Abduba – Water Users Association Chairman
   - Jeremiah Indimole - Chief of Korr Location
   - General Public

2) *Introduction*

The meeting started at 10.00am and was chaired by the area chief, who introduced the Consultant to the attendees. He then invited the Consultant to give her presentation.

3) *Presentation on project by the consultant*

The consultant explained the need of the project to the general public. She explained that there will be the laying of raising mains and distribution network to supply water to the kiosks. She provided an elaborate explanation of the project scope to the general public indicating the points where the tanks will be constructed.

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

Q1) Gesiri Kimgolo started with a vote of thanks for the consultant for holding the public participation. He continued by acknowledging the problem of water scarcity. He pointed out that there are shallow wells in the area but it takes time for people to fetch water. He also pointed out that long distances are traversed in search of the water and therefore requested that the water networks to serve Bulah.

The consultant indicated that the distribution networks that are being done will bring the water closer to their area and the problem of traversing long distances together with the wasting of time due to long queues while awaiting to fetch water will be eliminated.

Q2) Kiborin Sekerani provided a vote of thanks to the consultant for the public participation. He indicated that engineers had been traversing the area in search of water. He further indicated that water can found in places near the borehole for extraction. He raised a concern that the water pumped from the borehole is not adequate to meet their needs and also at times, the machine for pumping the water does fail.

The consultant responded that with the construction of the new tank for water storage, their needs will be catered for and therefore no reason to worry about. The consultant indicated that the pump is being taken care of at the moment.

Q3) Nturunya Segerela indicated that several contractors have come to the ground and nothing has been done. Bad quality work is done by the contractors. He also indicated that only the contractors' benefit from the contract while the locals are left in misery as the project does not benefit them. He also requested that the locals uphold peace in case the project starts.

The consultant responded that she will inform the project engineer in regard to the work done by the contractor. She also indicated that the locals are at liberty to inform the project engineer in case the contractor does bad quality work since the project engineer makes regular visits to the project site.

Q4) Ngerio Galace indicated that there are many Manyatta's at Korr and yet the borehole is only one. He indicated that the water supply from the borehole is inadequate to meet their needs. He also indicated that the locals consume the same water as their livestock. People traverse long distances in search for the water. Ngerio requested that there be built another two borehole and two more water pans (*Sirango*) in the area to cater for their needs.

The consultant pointed out that NWSB was working hard so as to provide the locals with safe water. She also indicated that the funds at NWSB are limited and it will be hard for NWSB to undertake whatever he was proposing at once. She however indicated that she will articulate their opinions to NWSB for further action.

Q5) 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 11.10 am with a word of prayer.

12.4.1.1 List of Attendance

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

Public Consultation Meeting

Venue: Sallah Date: 2nd June 2017

Name	ID NO	Village/Orgainzation	Telephone No
KHAYATO MALGELE			722574525
ANTON SHORONDO			
KHUBOLAN SEGELE			728713537
NTHULUNYA SEGELE			
NGERIYO GALALE		SALEE	
SOGURE CHORODO			
HIRKENA ILMOTI			713828312
IRBAYE CHORODO			
LEIREN ARNIKH			
BAYEWA SEGELAN			
LECHEKU DOGO			
LEBOT KUIKUTOW			
ARILLO ORBORA			
GESILE KIMOGOL			9847740
ILMESURO SAMBAKHA			
INGOYO GALAGAN			
GALAH HAILE			
SATIM SEGELAN			
KHODOB SEGELAN			
DAHO BARGERI	60193	SALEE	
GAGEYSA DIRGEL			
DAHALE CHORODO			
KHOLOKHOLE KORII			
MARANATWO ILMOTI			
HARULE BURA			
DERACHE GELAGAN			
KOREWA CHORODO			716614257
YOKLE SEGELAN			
MALGIS SAMBAKEH			

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

PUBLIC CONSULTATION MEETING

Venue SALEE Date 2/6/2017

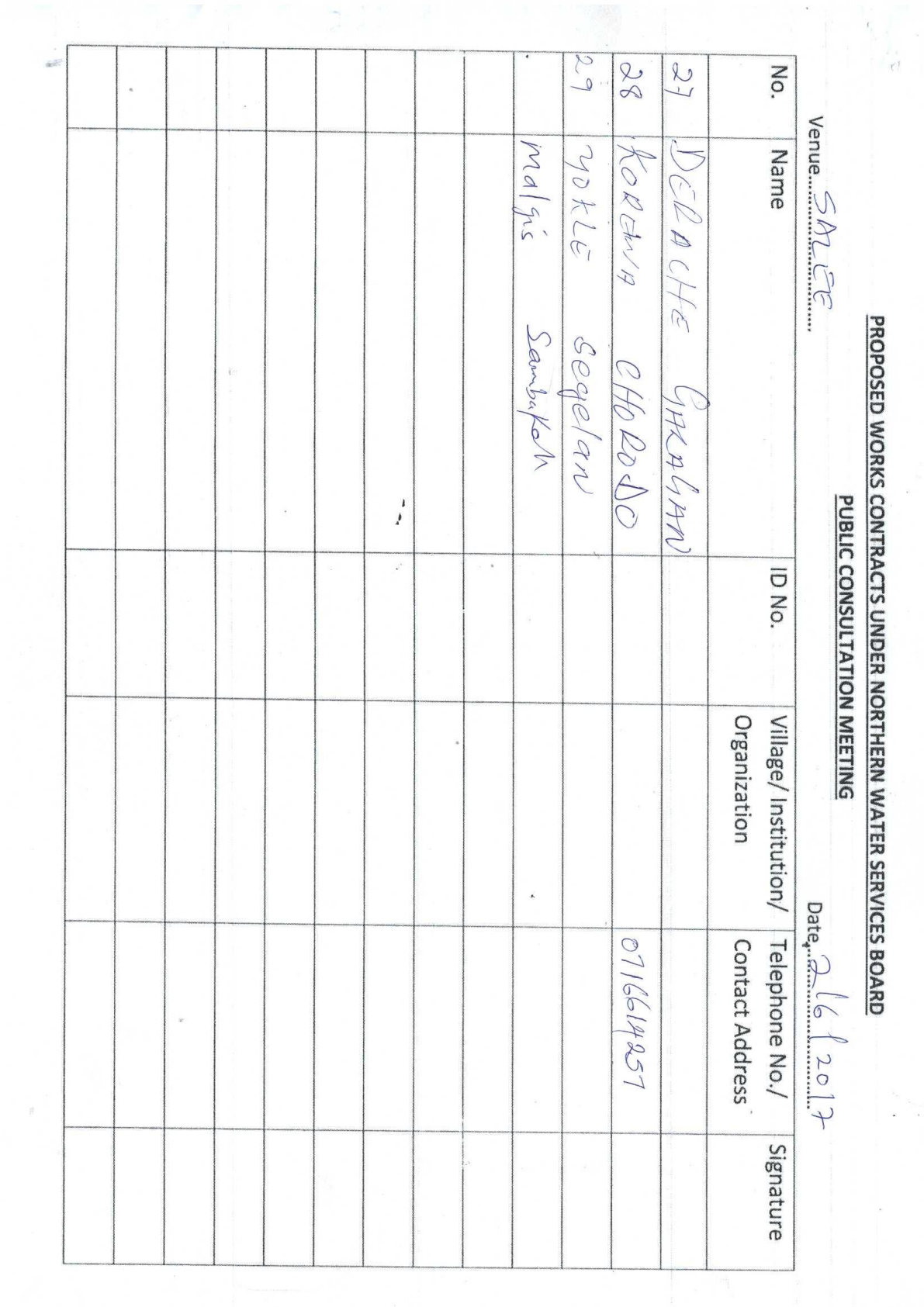
No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
1	KHAYATO WALGELE			0722574521	
2	ANTON SHORONDO				
3	KHUBDLAN SEGELE			0728713537	
4	NTHULUNYA · SEGELE				
5	LERWA LEMASEYO				
6	WGERIYO GALALE ·		SALE	0711148461	Galelu
7	SOLURE CHORODO				
8	HIRKENA ILMOTI			0713828312	
9	IRBAYE CHORODO				
10	LEIREN ARNIKH				
11	BAYENA SEGELAN				
12	LECHEKU DOGO				
13	LEBOT KUKUTOW				

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

PUBLIC CONSULTATION MEETING

Venue SALEE Date 2/6/2017

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
14	ARiHO ORBORA.				
15	GESILE KIMOGOL	9847740	SALEE	0707907635	
16	ILMESURO SAMBAKHA				
17	INGOYO GALAGAN				
18	GALAH HALE				
19	SATIM SEGELAN.				
20	KHODOB SEGELAN				
21	DAHO BAGERI	0060193	SALEE		
22	GAGEYSA DIRGEL				
23	DAHALE CHORODO				
24	KHOLKHOLE KORII				
25	MARANWATO ILMOTI				
26	HARULE BURA.				



PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

PUBLIC CONSULTATION MEETING

Venue: SALLE Date: 26/1/2017

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
27	DEBACHE GHKALIAN				
28	KORENYA OHBODO			0716614857	
29	YOKLE SEGELAN				
	Malgis Sambuyoh				

Figure 12-3Public Consultation Meeting List of Attendance at Sallah

12.4.1.2 Public Consultation Photos

Figure 12-4 Consultant giving a presentation on the water supply projects

Figure 12-5 The General Public seeking clarification

Figure 12-6 The public listening to the consultant

12.4.2 Minutes of the Public Consultation Meeting Held at Tugucha on the 2nd june 2017 at 12.20pm

1) *<u>Present</u>*

- Marion Orina - Zamconsult Consulting Engineers (Consultant)
- Kevin Morang'a - Zamconsult Consulting Engineers (Consultant)
- Joseph Loboyo Lepsuleng – Sub-County Water Officer
- Susan Kopeyina - Chief of Ballah Location
- Geoffrey Nyansagare-Project Engineer
- General Public

2) Introduction

The meeting started at 12.20pm and was chaired by the area chief, who introduced the project engineer, the sub-county water officer and the Consultant to the attendees. He then invited the Sub-County water officer to give his remarks who in turn invited the project engineer. The project engineer in turn invited the consultant to give her presentation.

3) Presentation on project by the consultant

The consultant explained the need of the project to the general public. She explained the project scope indicated ostensibly where the tanks will be constructed and where rising mains will be laid.

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

Q1) EliJumuri Olobura started with a vote of thanks for the consultant for holding the public participation. He indicated that water is for everyone and not for an individual and the locals have been distributing water to other people who bring livestock to the borehole. He indicated that there are times in which the livestock have been prevented consuming the water so that the people can get the water and this is as a result of the peace that does exist amongst them. He requested that water be only piped to schools and hospitals but not to any other place. He requested that NWSB not to bring any other problem from the ones they are already experiencing. He indicated that forceful distribution of the water will bring about clan animosities and they don't want that to happen. He asked for new more boreholes to be drilled in other places in Korr.

The consultant indicated that there will be no forceful distribution of water and it is the reason for the public consultation so that their opinions will be taken into account. She further indicated that NWSB will never bring any problem in the area but is looking for solutions for the locals to have access to safe water for usage.

Q2) Hussein Esingabana provided a vote of thanks to the consultant for the public participation. He indicated that water is life and they have no problem it being distributed. He further indicated that there is no person in the area who has ever been denied access to the water as

water has been provided by the Almighty God and therefore they are ready to share. Hussein indicated that the water at the borehole is inadequate and thus even if piping is done, it won't satisfy their needs. He further indicated that there is a conflict amongst the local in regard to the piping of the water. He indicated that the locals can resettle and move near the water source and they have no problem with that. He requested that the project ought not to be forced on the locals as this will fuel animosity amongst them. He also requested that a place where livestock have access to the water to be built with a new big tank for water storage. He also noted that the locals had not been notified of the project. He however requested that they be left to consume water from one place or else other borehole be drilled to serve other clans.

The general public in unison agreed to Hussein Esingabana statements and requested for a response from the consultant.

The consultant invited the sub-county water officer together with the project engineer to give their views in regard to the general public and Hussein statement. The project engineer agreed to their request in consultation with the Sub-County Water Officer to build new boreholes in other places. They also agreed to build a trough where livestock can access the water.

Q5) 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 2.00 pm with a word of prayer.

12.4.2.1 List of Attendance

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATYER SERVICES BOARD

Public Consultation Meeting

Venue; Tugucha Date: 2nd June 2017

Name	ID NO	Village/Orgainzation	Telephone No
DEBELICHO GALFIRE			
HUSSEN E GABUNA			
LEHUMARI ORBORA			
HIRKHALO LUHMUROGO			
SARIYO LUHMOROGO			

JITEWA THIRGEL
MURO GALFURE
LAMONYA E SIDELE
KOTOB THIRGEL
FURMAT SUBO
AGURAN IKIMIRE
KHOBOCHA E GABAN
LOGORI THIRGEL
ABORAN FAHANTE
L BABIKI HANU
GALAH LARABI
SAHARI THIRGEL
TUWA E GABANA
KHOBOCHA ILINYO
LORUGO E GABANA 717053404
SETLIM ORBORU

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

PUBLIC CONSULTATION MEETING

Venue...TUBCHA......... Date...02/06/017....

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
1.	Debelicho Galfire				
2.	Hussen Egabana				
3.	Lehuman Orbora				
4	Hirkhalo Luhmorogo				
5.	Sariyo Luhmorogo				
6.	Jitesa Thirgel				
7.	Nuno Galfure				
8.	Lamonyo E. Sidele				
9.	Kotobo Thirgel				
10.	Furmat Sabo				
11	Aguran Ikimole				
12	Khobocha Egabana				
13.	Logori Thirgel				

PROPOSED WORKS CONTRACTS UNDER NORTHERN WATER SERVICES BOARD

PUBLIC CONSULTATION MEETING

Venue: TUBCHA Date: 2/6/2017

No.	Name	ID No.	Village/ Institution/ Organization	Telephone No./ Contact Address	Signature
14	Aboran Fahante				
15.	Lbabiki Hanko				
16.	Galah Larabi				
17.	Sahai Thirgel				
18.	Tuwa Egabana				
19	Khobocha Ilnpo			0717053404	
20	Longo E. Gabana.				
21	setim orbum.				

12.4.2.2 Public Consultation Photos

Figure 12-7 Chief Introducing the Consultant and Her team to the General Public

Figure 12-8 Sub-County Water Officer Making a Presentation

Figure 12-9 The General Public Listening to the Consultant Make Her Presentation

Figure 12-10 Mr Hussein Raising His Concern In Regard to the Project

12.5 "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 take over;
- ✓ Notify the supervisory Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Ministry of Sports, Culture and the Arts immediately (within 24 hours or less);

Responsible local authorities and the Ministry of Sports, Culture and the Arts 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 an archaeologist of the National Museums of Kenya. 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 finding shall be taken by the responsible authorities and the Ministry of Sports, Culture and the Arts. 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 and the Ministry of Sports, Culture and the Arts concerning safeguard of the heritage.