NATIONAL IRRIGATION BOARD

OCRA COMPANY LTD

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RIVER COUNTY

CONTRACT NO: NIB/T/042/2O13-2014

FINAL REPORT

March, 2015

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LIST OF ACRONYMS

CBOs	Community Based Organizations
CPP	Consultative Public Participation
DAO	District Agricultural Officer
DEP	District Environmental Plan
EA	Environmental Audit
EIA	Environmental Impact Assessment
EISR	Environmental Impact Assessment Study Report
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
ESIA	Environmental and Social; Impact Assessment
ESMP	Environmental and Social Management Plan
FAO	Food and Agricultural Organization
FGD	Focused Group Discussion
GOK	Government of Kenya
IEC	Important Environmental Components
KWS	Kenya Wildlife Services
NEAP	National Environmental Action Plan
NIB	National Irrigation Board
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
PRSP	Poverty Reduction Strategy Paper
PAPS	Persons Affected by Project
TOR	Terms of Reference

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EXECUTIVE SUMMARY

The proposed Rehabilitation of Bura Irrigation and Settlement Scheme Project is located some 200 km North of the mouth of the Tana river. The area is characterized by unreliable rainfall and adverse food insecurity. The project is therefore aimed at constructing a new gravity canal measuring 26.375 km which will increase irrigation potential of the Bura Irrigation and Settlement Scheme leading to an improvement of the food security status of Tana River County. The cost of constructing the new gravity canal from the intake at Korakora to Nanighi where it joins the existing canal from the pump station is estimated at two billion Kenya shillings (Kshs. 2billion).

Construction of phase 1 of the Bura Irrigation and Settlement Project commenced in 1979 and comprised a temporary pump station of 6.45m3/sec installed capacity for the development of an initial area of 6,700 ha. The use of a pump fed irrigation system has resulted in project irrigating a total of 2500ha of land registered under 2245 farmers against a target of 6700ha of land which was supposed to carry 5150 families. Secondly, the use of diesel pumps has also inflated operation and maintenance costs thus prompting National Irrigation Board to revert to developing a gravity system with an intake at Korakora.

This Environmental Impact Assessment, was conducted in accordance with the legal requirement stipulated in the Environmental Management and Coordination Act (EMCA) of 1999 and its subsequent supplements; the (Environmental Impact Assessment and Audit) Regulation, 2003; EMCA (Waste Management) Regulations, 2006 and EMCA (Water Quality) Regulations, 2006; EMCA (Controlled Substance) Regulations, 2007; EMCA (Noise and Vibration Control) Regulations,2009; EMCA (Emissions Control) Regulations,2006; EMCA (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009; EMC(Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations,2006; the Land Acts, Water Act, Irrigation Act among other pertinent legal and institutional framework regulating irrigation development.

The key outcomes of the consultations done with the community members include:

- Clarifications on the coverage of the project in terms of area;
- Clarifications on the role of the communities in the project;
- Identification of people affected by the project;
- Information of the fate and impact of the project on the people settled within the project area;
- Clarification on the modalities for compensation for the land taken up by the irrigation canals;
- Compensation of people affected by the project

Baseline Survey of existing impacts

Both positive and negative impacts of the project were highlighted during consultations with key stakeholders and also with the community.

Positive Impacts

The major positive impacts that all the communities visited agreed on are as stated below.

1. The canal will lead to availability of water for irrigation and this will lead to improved agricultural activities.
2. Availability of water both for domestic use, livestock, bees and other purpose during the wet and dry seasons.
3. Bee farming will be improved due to presence of flowering plants throughout the year.

4. Food security will be achieved both at an individual household level and at a national level due to increase in farm production.
5. Reduction in poverty levels of many households. This will be as a result of the availability of more farm outputs that can be sold in the available markets.
6. Employment opportunities will be created
7. Farmer's opportunities for training;
8. Efficient use of natural resources;
9. Enhancement of women and youth participation in economic activities; and
10. Promotion of linkages to agro-based NGO and other funding institutions.

Negative Impacts

The key negative impacts of this study are that there will be displacement of people along the canal way since the canal has passed in the middle of a settlement area in a whole village. Also due to the fact that the project is in a marginal area and involves water abstraction, possible conflicts between pastoralists and agro pastoralists and human wildlife conflicts. Other minor negative impacts highlighted by the community include:

1. Problems with disposal of earthwork wastes: establishment of working areas and storage of construction materials at the project sites in the area has been poorly done.
2. Loss of riverine vegetation especially grass species due to clearing the canal routes and dumping of excavated wastes.
3. The excavation of the canal has commenced and there has been interruption of transport and blocking of corridors and paths through which livestock and people access the river respectively.
4. The canal excavation will lead to air pollution due to the dust from the excavation site.
5. Children and animals falling in the canal and getting injured or even drowning.
6. Noise from the machinery during construction.
7. Increase of mosquito prevalence and therefore increased incidence of malaria and other water-borne diseases during to prolonged presence of standing water.
8. Diversion of water in laghas to canals leading to drainage of laghas and lack of irrigation water in farms during the wet season. Drainage of wetlands and ox-bow lakes.
9. Interference with graveyards, cemeteries and Mosques. There was a consensus between the proponents and the local community that as much as possible the canal will not tamper with these areas.

The consultant has carried out full Environmental and Social Impact Study (ESIA) on the project.

Canal way leave acquisition compensation plan.

A Resettlement Action Plan (RAP) expert and a valuer have transversed the area analyzing all the people affected by the project, their assets and the extent of the impacts. Modalities of compensating the communities affected were worked out. Both land and structures have been assessed and the total area acquired for the way leave is 753.6 acres. The number of households affected was found to be 2829 and the total number of parcels of land for compensation was found to be 2914 since some households had more than one parcel of land. The affected members of the community have been compensated for loss of land and structures.

The valuation per acre of land was agreed upon by the community and the proponent to be Kshs. 40,000. The grand total compensation for land and other assets such as housing is approximately Kshs.80, 600,000 (Eighty Million Six Hundred Thousand).

Full ESIA study

This full ESIA study report describes the project including project activities and possible environmental impacts likely to arise during the construction and operation phase of the project. In addition, the report proposes appropriate mitigation measures where negative impacts are likely to occur and ways to enhance the positive impacts of the project. The report also has a comprehensive Environmental Management Plan (EMP) and an Environmental Monitoring Plan (EMoP).

Structure of the Report

This ESIA report starts with an executive summary which highlights the issues discussed during public consultations, the significant findings and the way forward. The main report is arranged in eight chapters.

In chapter one the report provides the description of the project background, location, purpose, objectives and NEMA reporting requirements.

Chapter 2 dwells on the policy, legal and institutional framework. The chapter outlines the overview of legislative framework, regulatory, international guidelines and conventions relevant to this project.

Chapter three gives light to the study methodology to be used by the consultants to carry out the ESIA study.

In chapter four the report gives a description of the baseline project environment. This chapter gives description of the environmental setting of the proposed project and surrounding areas, e.g., climate, soils, geology, vegetation, fauna, land use, human populations, socio-economic, cultural heritage.

Chapter five provides the highlights of the public consultation programmed.

Chapter six discusses the results of the household survey including analysis of beneficial and adverse impacts of the project on the biophysical and human (social, cultural and economic) environments and mitigation measures of negative impacts as suggested by the community. Resettlement Action Plan, analysis and compensation all the people affected by the project and their assets is also highlighted.

In chapter seven issues concerning the decommissioning of the project, impacts of decommissioning and an EMP for decommissioning are discussed.

The project alternatives are presented in chapter eight where the report looks at scenario of irrigation technology options.

Chapters nine, ten and eleven highlight on conclusions and recommendations, references and appendices respectively.

CHAPTER ONE

1 INTRODUCTION

1.1 Project Background

One of the key strategies of increasing agricultural productivity in Kenya according to the Vision 2030 document is utilizing a million hectares of currently idle land, and new cultivation of up to 1.2 million hectares of newly opened lands. This vision can only be achieved through irrigation development because much of the currently underutilized and idle land lies in the Arid and Semi Arid (ASALS) regions of Kenya.

The government of Kenya has recognized the importance of promoting irrigation development in the 9th National Development Plan (2002-2008). Indeed, it has underscored the fact that development of irrigated agriculture is a critical intervening strategy to achieving food self-sufficiency, alleviation of poverty and stimulation of economic growth especially among the rural population. The National Irrigation Board (NIB), a state corporation is mandated, to oversee development and improvement of irrigation schemes across the country.

The proposed Rehabilitation and Expansion of Bura Irrigation Project is located some 200 km North of the mouth of the Tana river. Approximately 40% of Kenya's identified irrigable area lies in the Tana River Basin and studies of the Bura/Hola area were first carried out in the 1950s with feasibility studies of the Bura Irrigation and Settlement Project being undertaken in the 1970s.

Construction of phase 1 of the Bura Irrigation and Settlement Project commenced in 1979 and comprised of an installed temporary pump station of 6.45m3/sec capacity for the development of an initial area of 6,700 ha. The use of a pump fed irrigation system resulted in project irrigating a total of 2500 ha of land against a target of 6700 ha. Secondly, the use of diesel pumps has also inflated operation and maintenance costs thus prompting NIB to revert to developing a gravity system with an intake at Korakora and a 26.375 km gravity canal to join with the existing main canal from the pumping station at Nanighi.

To achieve the above, the National Irrigation Board (NIB) contacted SABBOUR associates in association with CAS and AL DOWAILAH Consultants to carry out detailed designs of the project, followed by the construction supervision.

1.2 Description of the Project Area

The project is located in Tana River County within Tana North Sub-county in Madogo and Bura divisions. The proposed gravity irrigation project will traverse a total 19 villages some of which are located in the riverine flood plain. The community within this area practices agriculture supplemented by livestock production, fishing, hunting and honey gathering. It was noted that the community living in this area does not possess any other land apart from what they are currently cultivating. A majority of the Tana North Sub-county is comprised of rangelands unsuitable for arable agriculture.

Therefore, livestock production under pastoralism is the key land use in the area. This mode of agricultural production is predominant as one move from the banks of the river into the interior dry land.

1.3 Project Objectives

The main objective of the project is to provide a gravity fed irrigation system which will enhance efficiency of irrigation water conveyance; increase area under irrigation and achieve food self-sufficiency and security at the local and national levels.

The main activities will involve rehabilitation of the scheme major components, which comprises-:

(i) Irrigation Water supply which includes a water diversion (intake) channel from Tana river at Kora Kora (for gravity water supply to the scheme),
(ii) Sedimentation basin
(iii) River bank protection works using gabions,
(iv) Access roads,
(v) Construction of water drops.
(vi) Farms clearing,
(vii) Conveyance system; (Construction of a new main canal from Korakora to Nanigi – 26.2km) and rehabilitation of the existing main canal to Masabubu (57km)
(viii) Distribution system; (Rehabilitation of secondary canals (57km) & tertiary canals 140km)
(ix) Night storage reservoirs;
(x) Drainage networks;
(xi) Rehabilitation of existing buildings and workshops;
(xii) Rehabilitation of road network.

1.4 Scope and Content of the ESIA Report

All environmental and social issues related to the proposed project are considered separately and accordingly in compliance with the provision of the EMCA 1999, the (Environmental Impact Assessment and Audit) Regulations 2003 and other pertinent regulations related to the project. The main objective of this report is to ensure that all the potential Environmental and Social Impacts have been identified and workable mitigation measures proposed for adoption during project implementation.

1.5 Justification for the Project

Expansion of irrigation and drainage infrastructure is considered a priority by the government in enhancing agricultural productivity and thereby contributing to food security and poverty alleviation. By this recognition, the government through the proponent has identified the Bura Irrigation and Settlement Scheme for Expansion due to the realization that the use of a pump fed irrigation system has resulted in project irrigating only a total of 2500ha of land registered under 2245 farmers against a target of 6700ha of land which was supposed to carry 5150 families. Secondly, the use of diesel pumps has also inflated operation and maintenance costs thus prompting NIB to revert to developing a gravity system with an intake at Korakora. Indeed, the development of irrigation infrastructure in the Bura Irrigation and Settlement, Tana River County is considered very beneficial and cost effective. Upon completion of the gravity canal, the local communities are expected to engage in more productive agricultural farming which in turn would lead to food security, reduced poverty levels and disease incidences in the project zone. Equally, a significant segment of households in the project areas will benefit from resulting jobs created through farming and also income from sale of agricultural produce.

1.6 Project Cost

The cost of the construction of the new gravity canal and other related infrastructure along the 26.375 km is estimated at two billion Kenya shillings (Kshs. 2 billion)

1.7 Objectives of the study

The objective of this study was to carry an Environmental Impact Assessment of the proposed Rehabilitation and Expansion of the existing Bura Irrigation Canal Project to determine whether or not the project activities will have any adverse impacts on the environment, taking into account environmental, social, cultural, economic and legal considerations.
The specific objectives include: -

- To establish the baseline environment of the proposed Bura canal expansion and rehabilitation Project ;
- Identifying the impacts of the project and project activities on the environment
- Proposing mitigation measures for the significant negative impacts on the environment
- Generating the baseline data for monitoring and evaluating impacts, including mitigation measures during the project cycle.

1.8 Study Methodology

1.8.1 Overview

This study process has adopted an integrated approach where data and information evaluation, field investigations, consultations among the team of experts, interviews and discussions with stakeholders and affected parties were undertaken at the same time. The study begun with intensive documentary and literature review of the proposed project documentation, District Development Plans, District Environmental Action Plan, regulations and guidelines (Environmental Management and Co-ordination Act and other related statutes and international codes such as the Water Act and Land Act) and other relevant literature.

Reconnaissance surveys including field visits have been undertaken for physical evaluation of the areas. This has had a specific focus on the biophysical and socio-economic environments. The sensitive environmental receptors, biodiversity, land use and development trends, physiographical features and climatic conditions along the project route were evaluated and analyzed. The social and economic status was also evaluated through organized consultative meetings at the administrative and community levels in order to collect perceived information on the impacts associated with biophysical and socio-economic dimensions of project implementation. Household surveys through semi structured questionnaires and observational visits are in progress.

The ESIA study team made field visits to the proposed site and already conducted desktop study to establish the following:

- Baseline data which included; biodiversity, socio-economic and environmental assessment;
- Legal policies, Legislative and Institutional Framework governing the proposed project;
- Perception of the proposed project from the local communities;
- Compatibility of the proposed project with the environment;
- Types of waste to be generated, proposed management and disposal methods
- Potential positive and negative impacts of the project.

The study has assessed and quantified the possible impacts of the proposed project to the residents in general and other administrative areas that share resources with the project beneficiaries.

1.8.2 Site Visits

Information gathering was conducted through site visits to the project and its surrounding areas including households from 15th to 20th February 2014. Further consultations were done in December

2014 to February 2015. Household questionnaires have been administered. The study has involved a systematic field traversing of the area to quantify perceived impacts of project on:-

- Existing land uses
- Land conflicts and ownership
- Areas of insecurity
- Institutions and organizations in the area
- Vegetation cover of the area
- Existing sensitive environmental receptors including underground and surface waters; animal feeding grounds and migration routes, and methods of protection from destruction, interference, contamination and extinction
- Waste management and disposal methods

1.8.3 Consultative Forums

Seven (7) consultative meetings in form of community Barazas were held from 10th March to 15th March 2014 as follow up meetings to the initial site visits. A consultative meeting was held between Ocra Consultants, Sabbour/CAS Consultant and NIB Site Engineer at Engineer Abdelbasset's Office in Garissa. Focus Group Discussions with elders of the area were also conducted. Key informant interviews with elders, government officers from relevant ministries and Non Governmental Organizations were conducted during the study.

Further consultative meetings were held between the Resettlement Action Plan Expert, the valuer and the community from December 2014 to February 2015 when the Affected Persons Authority was compensated for way leaves and losses.

During the consultative meetings the following were discussed;

- Economic activities in the area
- Land management in the area
- Culturally important sites in the project area;
- Socio-economic and environmental challenges in the area;
- Indigenous and endemic flora and fauna;
- Conflict resolution mechanisms
- Areas of the project with People affected by the Project;
- Possible mechanisms of compensation of PAPS;
- Institutions and organizations in the area (NGOs, CBOs);
- People affected by the project;
- Assets affected by the project;
- Compensation mechanisms of PAPs
- Actual compensation exercise.

CHAPTER TWO

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 General Overview

Kenya has a policy, legal and administrative framework for environmental management. Under the framework, the National Environment Management Authority (NEMA) is responsible for ensuring that Environmental Impact and Social Assessments (ESIAs) are carried out for new projects and Environmental Audits on existing facilities as per the Environmental Management and Coordination Act 1999.

ESIA studies are carried out in order to identify potential positive and negative impacts associated with the proposed project with a view to taking advantage of the positive impacts while providing effective mitigation measures for the negative effects. The requirements on ESIA are contained in sections 58 to 67 of the Act.

According to section 68 of the environmental management and coordination Act (EMCA) 1999, the authority shall be responsible for carrying out environmental audits on all activities that are likely to have a significant effect on the environment.

Environmental Auditing (EA) is a tool for environmental conservation and has been identified as a key requirement for existing facilities to ensure sustainable operations with respect to Environmental Resources and Socio-Economic activities in the project neighborhoods.

The government has established regulations to facilitate the process on ESIAs and Environmental Audits. The regulations are contained in the Kenya Gazette Supplement No. 56, Legislative Supplement No. 31, and Legal Notice No. 101 of 13th June 2003.

In the past, the government has established a number of national policies and legal statutes to enhance environmental conservation and sustainable development. The National Irrigation Board and the local Water Users Association groupings will have to observe the provisions of the various statutes and regulations that are aimed at maintaining a clean and healthy environment during the entire project lifecycle.

2.2 National Policy Framework

2.2.1 National Environmental Action Plan (NEAP)

According to the Kenya National Environment Action Plan (NEAP, 1994) the Government recognized the negative impacts on ecosystems emanating from industrial, economic and social development programmes that disregarded environmental sustainability. Following this, establishment of appropriate policies and legal guidelines as well as harmonization of existing policies have either been accomplished and/or are in the process of development. Under the NEAP process Environmental Impact Assessments were introduced targeting the industrialists, business community and local authorities.

2.2.2 National Policy on Water Resources Management and Development

While the national policy on Water Resources Management and Development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic

progress, it also recognizes the by-products of this process as wastewater. It, therefore, calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution.

Industrial, business and large scale agricultural development activities, therefore, should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating there from. The same policy requires that such projects should also undergo comprehensive ESIAs that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the discharges. As a follow-up to this, EMCA 1999 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during ESIAs are implemented.

In addition, the policy provides for charging levies on wastewater on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. The policy provides for establishment of standards to protect water bodies receiving wastewater, a process that is ongoing.

The key objectives of the policy include:

- To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,
- To ensure that an independent Environmental Impact Assessment (EIA) report is prepared for any industrial venture or other development before implementation,
- To come up with effluent treatment standards that will conform to acceptable health guidelines.

Under this paper, broad categories of development issues have been covered that require a "sustainable development" approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced re-use/recycling of residues including wastewater, use of low or non-waste technologies, increased public awareness raising and appreciation of a clean environment. It also encourages participation of stakeholders in the management of wastes within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

2.2.3 National Legal and Institutional Framework

The key national laws that govern the management of environmental resources in the country have been briefly discussed in the following paragraphs. Note that wherever any of the laws contradict each other, the Environmental Management and Coordination Act 1999 supersedes.

2.2.4 The Environment Management and Coordination Act, 1999

The Environmental Management & Coordination Act, 1999 generally provides for enjoyment to every person in Kenya by enhancing cleanliness and healthy environment while also placing responsibility to safeguard and enhance the environment. According to the Act an Environmental Impact Assessment Study needs to be carried out on projects specified in the second schedule of the Act that are likely to have a significant impact on the environment. This proposed project has been rightly classified among those that must be subjected to an ESIA study under the second schedule of the Act. It further stipulates that operators of projects should carry out annual environmental audits in order to determine

level of compliance with statements made during the EIA. The audit report should be submitted to NEMA.

The Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. It further places responsibility on operators of project which discharges effluent or other pollutants to submit to NEMA accurate information about the quantity and quality of the effluent and to seek effluent discharge licenses.

2.2.5 Environmental Management and Co-ordination (Water Quality)

These regulations are established under the Environmental Management and Co-ordination Act. These regulations apply to drinking water, water used for industrial, agricultural and recreational purposes, including water used for fisheries and wildlife, among others.
These regulations prohibits discharge or application of any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants into water meant for fisheries, wildlife, recreational purposes or any other purposes. The regulations provide for the creation of a buffer zone for irrigation schemes of at least fifty (50) metres in width between the irrigation scheme and the natural water body.

2.2.6 The Water Act, 2002

This Act has placed overall responsibility for water management with the Ministry of Water Resources and Irrigation. This Act has provided for the formation of a Water Resources Management Authority (WRMA) responsible for the management of lakes, aquifers and rivers, among other functions.

The Act empowers the minister in charge to promote the conservation and proper use of water resources and the conservation of water catchments, water sources and courses. It further prohibits the draining or interfering with wetlands for any purpose without proper authority.

2.2.7 The Water Resources Management Rules, 2007- Legal Notice No. 171

These rules are made pursuant to the Water Act. The rules requires permission by way of obtaining an abstraction permit from the prescribed authority (WRMA) by any person or institution seeking to abstract water from defined watercourses after payment of prescribed fees. It further requires permit holders for abstraction of water for irrigation purpose to renew after every 5 years. It prescribes that permit fees are based on the surface area to be irrigated. The rules restrict the permit holder only to use the flood flow for irrigation and will construct a reservoir to store enough water to irrigate the area specified in the permit for 90 days.

The Act has also provided for the formation of Water Resources Users Associations (WRUA) in order to ensure sustainable use of water management schemes. The rules requires the permit holder storing or arresting the flow of water by means of a dam or weir located on a body of water or watercourse to provide at a depth measured from the top of the dam or weir, an outlet, controlled by a valve, sluice gate or other device, which is capable of being operated at all stages of the flow of such body of water or watercourse so that the normal flow, or other flow as required by the Authority, of such body of water or watercourse can be passed through or around such dam or weir at all stages to enable for compensation of flow. The rules also states that authorized water users to be appurtenant to land which should be proved by way of an authentic title deed, lease agreement, easement, way leaves or a letter from the land owner or community endorsed by the provincial administration.

The rules also requires permit holder to pay to the designated Authority Water Users, charges on the basis of the water abstracted, diverted, obstructed or used including energy derived from a water resource.

2.2.8 The Land Act 2012

This is an Act of Parliament intended to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes.

Principles and values to guide Land management and administration

Parts 1 and 2 of section 4 of the Act outline the main guiding principles in land management and administration, binding to all land actors including state officers. These principles are to be applied when enacting, applying or interpreting any provisions of this Act; and when making or implementing public policy decisions. In discharging their functions and exercising of their powers under this Act, the Commission and any State officer or Public officer shall be guided by the following values and principles:

- Equitable access to land;
- Security of land rights;
- Sustainable and productive management of land resources;
- Transparent and cost effective administration of land;
- Conservation and protection of ecologically sensitive areas;
- Elimination of gender discrimination in law, customs and practices related to land and property in land;
- Encouragement of communities to settle land disputes through recognized local community initiatives;
- Participation, accountability and democratic decision making within communities, the public and the Government;
- Technical and financial sustainability;
- Affording equal opportunities to members of all ethnic groups;
- Non-discrimination and protection of the marginalized;
- Democracy, inclusiveness and participation of the people and
- Alternative dispute resolution mechanisms in land dispute handling and management.

Acquisition of Private Land for Public Use

Section 110 (1) of the Act provides that land may be acquired compulsorily under this if the Commission certifies, in writing, that the land is required for public purposes or in the public interest as related to and necessary for fulfillment of the stated public purpose.

In such an acquisition, this Act, in section 111(1) provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined.

The procedure for land acquisition is laid out in Part VIII of the Act. Elements for consideration under this procedure include the following:

- The Act requires that the owners, residents and their spouses should also be notified; as opposed to just the owners;
- The inspector would also have to get the consent of the occupier and give them not less than seven days notice to enter the premises;
- The Commission shall have the power of a court to summon and examine witnesses and compel the production and delivery to the Commission of documents of title to the land;

- Separate award of compensation to every person. An award is final and conclusive evidence of the size of the land, the value in the opinion of the Commission and the amount of compensation payable, whether or not the person attends the inquiry;
- Regulations and rules pertaining to this process are yet to be gazetted;
- Section 107 (4) allows for circumstances where the acquiring authority may proceed with land acquisition at Stage 1;
- The Commission shall make rules to regulate assessment of just compensation;
- The Act does not explicitly state when the inspection will be done. Whether it is before approval of the request for compulsory acquisition or before serving the notice for acquisition.
- The Commission may post pone an inquiry or adjourn the hearing of an inquiry from time to time for sufficient cause.

Land Registry

Section 7(1) of the Act provides for establishment of a land registry in each registration unit which shall keep registers of the following regarding land:

- A land register, in the form to be determined by the Commission;
- The cadastral map;
- Parcel files containing the instruments and documents that support subsisting entries in the land register.
- Any plans which shall, after a date appointed by the Commission, be geo-referenced;
- The presentation book, in which shall be kept a record of all applications numbered consecutively in the order in which they are presented to the registry;
- An index, in alphabetical order, of the names of the proprietors; and
- A register and a file of powers of attorney.

Maintenance of documents, including land title deeds

Further, section 9 (1) provides that the Registrar shall maintain the register and any document required to be kept under this Act in a secure, accessible and reliable format. These documents include:

- Publications, or any matter written, expressed, or inscribed on any substance by means of letters, figures or marks, or by more than one of those means, that may be used for the purpose of recording that matter;
- Electronic files; and
- An integrated land resource registers.

The register, as provided for in part 2 of section 9, shall contain the following particulars;

- Name, personal identification number, national identity card number, and address of the proprietor;
- In the case of a body corporate, name, postal and physical address, certified copy of certificate of incorporation, personal identification numbers and passport size photographs of persons authorized and where necessary attesting the affixing of the common seal;
- Names and addresses of the previous proprietors;
- Size, location, user and reference number of the parcel; and
- Any other particulars as the Registrar may, from time to time, determine.

These provisions are essential to the RAP as it is expected that the documentation for the affected land parcel will have to be updated in line with the laws of Kenya to show the changes due to the way leave acquired by the Athi Water Services Board.

2.2.9 The Public Health Act (Cap. 242)

This Act prohibits any person or institution from causing nuisance or conditions liable to be injurious or dangerous to human health. It further forbids discharge of any noxious matter or wastewater flowing or discharged from any premises into a public street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge.

2.2.10 The Physical Planning Act, Cap 286

The Act provides for the preparation and implementation of physical development plans and for related purposes. It gives provisions for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. This Act requires that a person who wishes to carry out development shall seek permission from the relevant agency before commencement of any works or risk punitive measures which include among others requirement to restore the land to its original condition. This Act further requires that a development application be sought from the relevant local authority accompanied by an environmental impact assessment report of the proposed development.

The site layout plan appended to this report shows the route of the entire proposed canal route. The proponent shall secure all mandatory approvals and permits as required by the law.

2.2.11 Valuation and Related Legal Issues

The valuation practice in Kenya is governed by the Valuers Act Cap 532, which provides for a Valuers Registration Board that regulates the activities and conduct of registered valuers. Valuers in Kenya are registered upon application to the board and are required to be full members of the Institution of Surveyors of Kenya (ISK).

The Act governs the formation and composition of valuation practices including the qualification of partners and directors in charge of valuation. The Board also deals with discipline and complaints in respect to valuation practice. Other statutes that govern valuation are the Government Lands Act Cap 280 that regulates the valuation for land rent while valuation for rating is governed by the Rating Act Cap 267. Land Acquisition Act Cap 295 governs valuations for compulsory acquisition purposes.
This Act is triggered as the valuer and financial analyst of the consulting team have applied the requirements of these laws and other market indicators to come up with the RAP budget and the market rate or replacement cost of compensating the PAP.

2.2.12 The Penal Code, Cap 63

The Penal Code prohibits any person or institution from voluntarily corrupting or foiling water for public springs or reservoirs, rendering it less fit for its ordinary use. In addition, the same act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighborhood or those passing along public way commit an offence.

2.2.13 Legal Notice 40 (Building, Operation & Work of Engineering) Rules 1984

These rules require the contractor to ensure health, safety and welfare of employees and states. It further requires the main contractor to notify the chief inspector within 7 days of commencing or undertaking building operation or works of engineering.

The rules require that walls of excavations deeper that 1.2m be reinforced with timber of suitable quality or with other suitable material to prevent so far as is reasonable practicable the danger or injury resulting from a fall or dislodgement of earthwork.
The rules further require that a scaffold of good construction and suitable strength shall be made available for any construction site where working at height is to be undertaken. A first aid box shall also be provided and be distinctively marked 'FIRST AID' and placed under the charge of a responsible person whose name shall be plainly indicated in a prominent place or near the box.

2.2.14 Overall Legal Compliance Statement

The proponent being a government agency has taken cognizance of the applicable legal obligations pertaining to this proposed development by demonstrating full commitment to compliances with applicable laws and regulations applicable to the implementation of this proposed project.

2.2.15 Registration Applications for WRUA

Most importantly, NIB has organized farmers in the proposed project areas into groups of Water Users Resource Associations (WRUA). Already, some of the groups have been granted registration by WRMA while rest of the applications are in the review process by WRMA and should be granted with registration.

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2.3 International Policy Framework

Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment and aimed at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority. The agreements of interest to Kenya can be categorized as those for protecting natural resources, atmosphere and social well being of man.

2.3.1 Protection of Natural Resources

There are 12 agreements of significance to Kenya under this category which the country has signed and ratified. This section reviews a number of policies that are triggered or met by the proposed project.

2.3.2 United Nations Convention to Combat Desertification (UNFCCC) of 1994:-

The convention requires parties to take climate change considerations into account in their relevant social, economic and environmental policies and actions. The proponent has undertaken this EIA with the aim of minimizing adverse effects of the project on the economy, on public health and on the quality of the environment. The requirements of this convention can be militate against to reduce impacts of climate change by growing trees suitable for the area. The proponent is advised to enhance the positive impacts of the project through engaging in activities that control climate change for example planting of trees and conserving the catchment through water conservation.

2.3.3 The World Commission on Environmental and Development

The commission focuses on the environmental aspects related to development and requires all development projects to be sustainable economically, socially and environmentally. The principle of the organization emphasis that development project should have no permanent negative impact on the biosphere and in particular the ecosystems.

It is recommended that the project proponent incorporate mitigation measures to ensure that the project impacts on the ecosystem in reduced. The consultants used participatory methods to involve the target group and concerned stakeholders in order to inform and enlightened them on the likely negative environment and social impacts for them to prepare mitigation measures so as to ensure the proposed project is sustainable throughout its life span.

2.3.4 The Convention of Control of Desertification-UCCD (1992)

This convention requires Parties to promote cooperation among
affected parties in the fields of environmental protection and the conservation of land and water resources, as they relate to desertification and drought. The proponent is advised to engage in activities geared towards eradicating drought through engaging in tree planting activities, encouraging clean energy use and water conservation.

2.3.5 African Development Bank Policies

African Development Bank Group policy on environmental sustainable development in Africa is based on an assessment of environmental constraints and opportunities that affect medium and long-term development objectives across the continent. It sets out the broad strategic and policy framework under which all Bank lending and non-lending operations will henceforth be made. In addition, it serves to guide policy and decision-making in those key sectors that depend upon the utilization of natural resources. It stress that's sustainable development and conservation of the environment cannot be achieved through good environmental planning of development projects alone.

Environmental issues will, therefore, be addressed by the bank within a more open and inclusive approach, which relies as much on effective partnerships, networking, awareness-building, institutional development and technical support as it does on the strict application of operational objectives

2.3.6 World Bank Safeguard Policies

A group of Operational Policies (OPs) has been identified by World Bank Management as being particularly important in ensuring that bank operations do no harm to people and the environment. There are 10 safeguard policies, comprising the Bank's policy on Environmental Assessment (EA) and policies on: Cultural Property; Disputed Areas; Forestry; Indigenous Peoples; International Waterways; Involuntary Resettlement; Natural Habitats; Pest Management; and Safety of Dams. The Bank undertakes screening of each proposed project to determine the appropriate extent and type of EA to be undertaken and whether or not the project may trigger other safeguard policies. The Bank classifies the proposed project into one of four categories depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

CHAPTER THREE

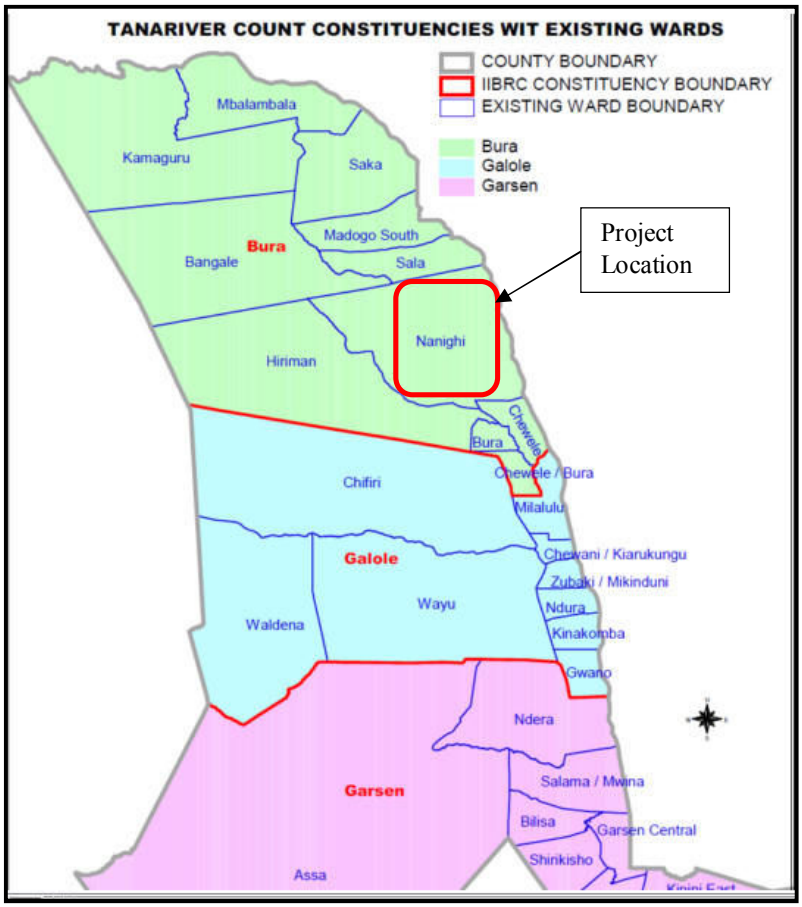
3 PROJECT BASELINE INFORMATION

3.1 Introduction

This section provides the baseline information of the proposed project area before commencement of the project. Materials in this chapter are based on desk study of available literature materials.

3.2 Project Location

The project is located in Tana River County within Tana North Sub-county in Madogo and Bura Divisions. The proposed gravity irrigation project will traverse a total 19 villages some of which are located in the riverine floodplain (Fig 3.1).



3. 1 Map Showing the Project a

The community within this area practices agriculture supplemented by livestock production, fishing, hunting and honey gathering. It was noted that the community living in this area does not possess any other land apart from what they are currently cultivating. A majority of the Tana North Sub-county is comprised of rangelands unsuitable for arable agriculture. Therefore, livestock production under pastoralism is the key land use in the area. This mode of agricultural production is predominant as one move from the banks of the river into the interior dry land.

3.3 Topography

The scheme lies on the Eastern side of the Tana river flood plain and 50km to the North of Hola irrigation scheme. Physiologically, the area falls on the sediment plain of the upper Tana river terrace at an altitude of approximately 70-90 m.a.s.l. Slopes are flat to gently undulating with gradients of less than 2%.

3.4 Climate

3.4.1 Rainfall

Rainfall is low, bimodal, erratic and conventional. Mean annual rainfall varies between 350-450 mm, mean annual evaporation is 2,366 mm. Rainfall is highly variable, patchily distributed and often intense which can lead to sheet and gully erosion. Long rains occur in April and May and the short rains fall in October and November. November is the wettest month with the little erratic rainfall especially in the hinterland, the District experiences drought almost every year. The coastline is therefore wetter than the hinterland. Higher rainfall at the coast supports crop production especially around Kipini where cash crops like cashew nuts, cotton, mangoes and food crops like bananas and maize are grown.

3.4.2 Temperatures

Tana River District is hot and dry. The average annual temperature is about 30°c and a minimum of 20°c. Along the coast, temperatures are hot and humid. Temperatures are highest in February, March and April (before the long rains) and are significantly high in September and October. These high temperatures lead to very high rates of evaporation and evapotranspiration.

3.5 Geology and Soils

Bura area is comprised of sedimentary rocks from the tertiary and quaternary periods, more specifically from the Pliocene, Pleistocene and recent epochs. The sedimentary deposits are made up of clayey soils intercalated with marine, deltaic, fluviatile, lacustrine and coastal- lacustrine sands, silts and clays which give rise to relatively flat topography. On the higher areas there are reddish brown soils while in low-lying areas; rich clays and silt are found. Alluvium deposits including gravel, sand, silt and clay cover the Tana river basin. Low to moderately fertile soils are found in the hinterland. According to the FAO/UNESCO classification, four major soil types were identified in the area distributed as follows-:

- Solonetz – 52% of the area;
- Cambisols – 31% of the area;
- Calcisols – 11% of the area;
- Vertisols 6% of the area

3.6 Agro-Ecological Zones

The District is a typical arid zone found in Agro Ecological Zones

- CL3: Coconut/Cassava Zone (Non ASAL)
- CL4: Cashew nuts/Cassava Zone (Transitional)
- CL5: Lowland Livestock/Millet Zone
- CL6: Lowland Ranching Zone (Arid)

3.7 Tana River hydrology

The water resource to be utilized for irrigation and drainage development under the Rehabilitation of Bura Irrigation and Settlement Scheme is the Tana River. Tana is the longest river in Kenya, it covering a distance of about 1,012 kilometers from the farthest source to the Indian Ocean.

It has an annual mean discharge of five billion cubic meters of water. The highest flood flow of water in Tana river is 3,560 m^3/s and the average is 165.228 m^3/s for Garissa gauging station (DHV, 1986) Tana River is situated between latitude 00 30' north and 20 30'south and longitude of 370 00' and 410 00'. The whole catchment area of the Tana river is about 100,000 km^2, covering about 20% of the land area of the country. This catchment holds a major portion of Kenya's agricultural potential (530,000 ha) and is the main source (80 %) of hydro-electric power. It sustains a population of about five million people.

Tana river is not confined within the district's boundaries. It traverses the Tana North Sub county from Tharaka District in the North to the Indian Ocean to the south. The river has influenced settlement patterns and economic activities along the areas it flows. As the River traverses the expansive coastal hinterland, it meanders in its lower course forming a large basin whose width ranges between two and forty two kilometers. Towards its mouth between Mnazini area and the Indian Ocean, the river creates an extensive delta, which is characterized by wetlands. There also exist seasonal rivers in the District found in the area west of river Tana in the North-eastern part of the District; popularly known as Laghas. These rivers flow in an East-west direction from Kitui, Makueni and Mwingi Districts eventually draining to river Tana. The hydrology for Tana river is dominated by series significantly large hydropower reservoirs that have been constructed on the Tana river and tributaries. Consequently the downstream flows no longer follow their natural patterns but are largely regulated by releases from these dams.

The river regimes have changed over time as the volume of water flowing has reduced. This is evident as floods are not as frequent as before. The main water uses are-domestic and agricultural. Tana river has changed it course several times over the year resulting in major changes both along the channel and at the river mouth.

According to the designs for the implementation of the new gravity canal for the Rehabilitation of the Bura Irrigation and Settlement Scheme, the water to be abstracted from the Tana river will be 11 m3. The water will then be conveyed by proposed 26.375km gravity canal to join the main canal from the pumping station at Nanighi.

Based on the designs there will be little or no impact for downstream user of Tana river. The Tana river being a permanent river will be able to meet the water requirement for the proposed project. The bed slopes of Lower Tana River according to Kenya Datum are shown below in Table3. 2

3. 2 Bed Slopes of LowerTana River

Distance (Km)	Elevation Difference (m)	Sloped	Remarks
0 – 100	7	$7 * 10^{-5}$	Starts at Indian Ocean
100 – 200	21	$2.1 * 10^{-4}$	
200 – 300	28	$2.8 * 10^{-4}$	
300 –400	38	$3.8 * 10^{-4}$	Bura at 371 km
400 – 500	33	$3.3 * 10^{-4}$	Nanigi at 420 km
500 –600	50	$5 * 10^{-4}$	Garissa at 509 km
600 – 630	17	$5.67 * 10^{-4}$	Mbalambala at 622 km

Source of data: Tana River Morphology Study (DHV, 1986)

3.8 Vegetation

Vegetation in the area comprises of woodlands, bush land and scrubland. The harsh climate and the perennial River Tana determine the natural vegetation in and round the Bura Irrigation Scheme. The vegetation can broadly be classified into three zones as follows-:

- The river line forest;
- The transitional zone;
- Dry bush-land / thorn-bush savannah.

The Tana river-line forest is of high diversity with 300 species recorded. Some of the plant species found here includes:

- *Hyphaene Conipressa*
- *Acacia robusta;*
- *Acacia elatior;*
- *Spirostachys venenifera;*
- *Cadaba farinose;*
- *Anisocycla blepharoespala;*
- *Rhus quartiniana;*

The dry bush-land or thorn-bush savannah is dominated mainly of -:

- *Acacia indica;*
- *Acacia recifiens spp;*
- *Acacia bussel;*
- *Acacia melifera;*

Plate 4.1: Scrub vegetation in the project area

3.8 Fauna

The fauna in and around the scheme is also determined by the harsh climate, the perennial river Tana and the natural vegetation found in the area. The existing fauna is classified as -:

- Protected wildlife areas: The wildlife found here includes: Terrestrial animals-Elephants, Buffalos, Giraffes, Gazelles, Warthogs, Columbus monkeys, Baboons, Vervets, Sykes, Bushbuck and Dikdiks.
- Aquatic animals: Aquatic animals-Crocodiles, Hippos, Turtles, Catfish, Tilapia, Frogs.
- Birds (Terrestrial)-Quails, Ostrich, Guinea fowls, Marabou stokes, Eagles, Herons, Bustards, Secretary Birds, Doves, Kites, Vultures, East coast Akalat, Tana River Cisticola, Malindi Pipit, Fischer,s Tulaco and the Southern Banded Snake Eagle.

3.9 National Reserves and Parks

Tana River Primate National Reserve (TRPNR)

The Tana River Primate National Reserve ecosystem consists of riparian forests, dry woodlands and savannah habitats on the east and west of the Lower Tana River.
The reserve was established to protect the Tana riverine forest and the two endangered primates, Mangabey and the red colobus monkey. The two primate species are the major wildlife attraction in the reserve.

The scheme is approximately 110 km from the Tana River Primate National Reserve (TRPNR).
The TRPNR was gazetted in 1976 and is part of the Tana River ecosystem, which extends from the headwaters on the Mt Kenya down to the delta, which merges, with the Indian Ocean. Thus, the ecosystem includes the section of the Tana River that passes through the Bura Irrigation Scheme. Important Plant species for the Red Colobus are *Sorindeia obtusifoliolata, Acacia robusta* and *Ficus sycomorus.*

Arawale National Reserve

Bura Scheme lies 13 km southwest of Arawale National Reserve, which is an area of national conservation importance. Arawale National Reserve in Garissa district was gazetted in 1973, covers an area of 533 km2 and is approximately 5 km from the left bank (or north-east bank) of the Tana river. It was established with the primary purpose of protecting a rare antelope species, which is only found in this region known as the Hilora or Hunters Hartebeest.

The ecosystem is also a stronghold for birdlife with over 200 species recorded in the area. These include the White-winged Apalis, African Open-bill Stork, Martial Eagle, Bat Hawk, African Pygmy-falcon, African Barred Owlet, Scaly Babbler, Black-bellied Glossy-starling, and the Golden Pipit.

3.10 Social, Cultural and Economic Characteristics

3.10.1 Livelihoods

Livelihood is derived from subsistence farming, pastoralism, fishing and to a small extent business. Nomadic pastoralists occupy the hinterland areas of the district. The area is characterized by rangeland is ideal for pastoral activities. Most pastoralists overstock leading to soil erosion and vegetation degradation; especially around water points. Agro-pastoralists are found in most parts along the river Tana and mostly in the southern parts where communities practice both agriculture and pastoralism. The Somali Wardei and Orma are pastoralists while Pokomo are agriculturists. The Malakote pursue mixed economies.

Fishing is done in the ox-bow lakes and in the Indian Ocean. Pokomos and Baum's are the two tribes involved in fishing. There are incidences of use of nets of low mesh sizes as well as use of poison-which ends up killing of immature fish (finally disposed of as by catch) and indiscriminate decimation of fingerlings.

Charcoal burning is another informal widespread income generating activity where all the tribes are involved in the activity. The practice has led to total de-vegetation leading to desertification.

Plate 4.2 Charcoal burning in the project area

3.10.2 Land and Land Use Changes in Tana River County

The land alongside the river Tana has been put to agriculture. The hinterland is mostly rangeland and is on pastoralism. Game parks and game reserves cover a big portion of the district land i.e. the Tsavo East National Park, Kora National Park and the Tana River Primate National Reserve (TRPNR).

3.10.3 Land Tenure

Unresponsive land adjudication and regimes have bred conflicts in the Sub- county. Ostensibly to promote productive land use, the government implemented a controversial land adjudication program in the area. Land was subdivided and allocated to individuals (mainly settled farmers) as private property. However it became apparent that this process did not go down well with the pastoralists since they thought it would limit their movement and that is why they opposed and continue to oppose the policy. Currently, land adjudication is going on in Ngao, Oda, and Tarasaa of Garsen Division (DLASO)

3.10.4 Trends in land use

Land that used to serve as grazing land and livestock marketing yard is now a gazetted as a national reserve. Large-scale agriculture is quickly replacing small-scale agriculture and pastoralism in the Tana delta with introduction of large-scale rice farming and the proposed sugar cane farming project. Impacts of land use changes include conflicts between different resource users e.g. diversion of river water for farming, construction of large dykes with a resultant effect of blocking flood waters (Most small scale farmers depend on flood waters).

3.10.5 Regulatory and institutional arrangements governing land administration

Currently, most of the land is trust land. The community regards most of the hinterland as communally owned land. Though most of the land is not yet adjudicated, parcels of land adjacent to the river are owned by the Pokomos as their ancestral land. Land degradation is very common in the hinterland especially around watering points. The land tenure system is a deterrent to conservation efforts i.e. there is lack of land ownership.

3.10.6 Dry Lands (Rangelands)

Tana river is found in ecological zones III to VI, as it's a typical arid zone. The area under agricultural production is smaller compared to that under livestock. Settlements are mainly along the river. Major causes of land degradation are overgrazing-which mostly takes place in the hinterland and especially around watering points. Deforestation is mostly common along the riverine vegetation where trees are cut down for fodder. In the hinterland, the practice of charcoal making is common as charcoal is locally exported to Malindi, Garissa and Mombasa Districts. Drought also causes vegetation to die away as the soil becomes dry and bare and cannot support life.

3.10.7 Agriculture

Agriculture is solely rural with no urban and peri-urban agriculture in practice. Key environmental issues related to agriculture include: cultivation along river bank and river diversions/brook formation.

3.10.8 Religion

The two major religions in the Tana North Sub County are Islam and Christianity with most of the Cushites being Muslims while Pokomos are in either Muslims of Christians.

3.10.9.Division of Labour

For pastoralists, there is division of labour or specific roles and functions for males and females. Men do mainly the herding and guarding of livestock as well as the selling and marketing. Women do the milking and selling of milk and ghee. Movement of livestock in search of pasture and water is the role of men.

3.10.10.Poverty levels

The poverty index of the District stands at approximately 72% (CBS, Hola) on average, total monthly consumption expenditure per person in 1997 was estimated at about Kshs 1846.00 in rural areas (GOK 2010).

3.10.11 Employment opportunities

The rehabilitation of the scheme will have a positive impact in creating employment which will increase income of the local population and hence their living standards.

3.10.12 Gender issues

Most of the people living within Bura Irrigation and Settlement Scheme are relatively poor with majority of families depending on relief food, which do not provide enough calories to sustain healthy lives. As a result there is a high rate of male migration to urban areas leaving female-headed households and also in charge of community development activities. Women are entirely responsible for all the domestic

and agriculture chores that are labour intensive and time consuming, despite having no control of assets accrued from their participation.

3.10.13 Health

There is one health center at Nanighi which is between 18km to 22 km away from the other villages in the project area. Common disease affecting the population include: Malaria, respiratory diseases, eye infections, Intestinal worms, Diarrhoeal diseases and malnutrition.

3.10.14 Education

Out of a total of 122 primary schools within Tana River District, six are located within Bura Irrigation and Settlement Scheme and Hola Irrigation Scheme areas. Similarly, there are nine secondary schools in the District and two of the schools serve the two irrigation schemes. The NIB supported three primary schools around Bura and Hola schemes, one started by the NIB (Rafiki), and two initiated by the farmers (Bahati and Kariakungu) in Hola scheme.

The schools in Bura have a low enrollment ratio, which is made worse by a high dropout rate. At present an estimated 69% of people in the District are illiterate, with a higher level among women. This has negative consequences for the development of the area.

3.10.15.Drinking water supply

Key water resources in the area include ground water reserves, shallow wells, boreholes, rainwater, the river Tana, and the vast Tana delta wetland. The river regimes have changed over time as the volume of water flowing has reduced. Drinking water supply facilities were constructed for the Bura Irrigation Scheme to abstract water from either the Irrigation canal or night storage reservoir and convey to a large treatment unit, one of the largest in the country, consisting of an elevated clarifier, rapid sand filter and disinfectant contact tanks. Water was then pumped into elevated tanks and distributed to the staff houses, the Bura club, guesthouse and communal water points in the 10 villages. However this treatment unit is underutilized and the ministry of water/Water Resources Management Authority should find ways of utilizing this facility fully for the benefit of the community.

3.10.16 Sanitation

There is no centralized sanitation system established for Bura Irrigation and Settlement Scheme. Many residents use bushes near to their houses to relief themselves. Proper sanitation facilities such as latrines provision are essential elements in sanitation and the control of diseases.

3.10.17 Infrastructure

3.10.17.1Road and means of transport

Tana river district is served with 1,119 km of roads, most of which are earth roads, which are often impassable during rainy seasons. The main road connects to the North with Garissa and beyond to Nairobi. It also connects to the South with Garsen and beyond to Malindi and Mombasa. One of the major limitations to the development of the Bura Irrigation and Settlement Scheme is its remote location.

The National Youth Service (NYS) is working on the national road to Nairobi and only 2 km remain unpaved; however the route south towards Mombasa is in a poorer state.

Trucks and buses provide transport between Bura/Hola and other major towns in Kenya. There are daily bus services between Bura/Hola and Nairobi and Hola and Mombasa. It is important to complete the remaining sections of these roads and to make regular repairs to the all weather road surfaces so that markets for inputs and products are accessible throughout the year. Some of the residents of the area

own bicycles and donkeys which are often used for transport, however, it was noticed that there are very few animal drawn carts in the Bura area.

3.10.17.2 Post and Telecommunication

Bura and Hola town have post and telecommunications offices providing communications links to the rest of Kenya. Mobile telephone network is available in the area and has improved communication though the network is poor.

3.10.18 Energy

There is no reliable mains electricity in the project area; therefore the majority of people rely on wood fuel for cooking and lighting. The source of wood fuel is the *Prosopis juliflora* (locally known as Mathenge), which grows extensively in the project area. Most schools and dispensaries have solar lighting equipments. Diesel and petrol driven pumps are used for small-scale businesses and gas is also used to a limited extent at dispensaries.

3.10.19.Other social amenities

Other amenities found in the area are recreational facilities, markets, and religious facilities. Within Bura, the community is served by a number of churches and mosques to cater for the variety of religions that are prevalent in the area. There are also a number of social centers where the communities can gather.

CHAPTER FOUR

4 SOCIAL-ECONOMIC BASELINE SURVEY OF THE PROJECT AREA

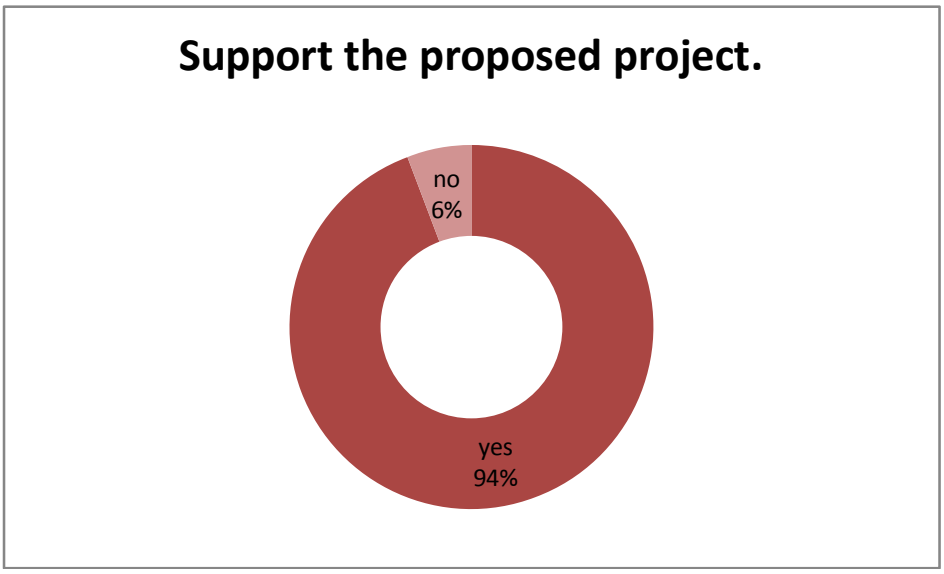
The social-economic survey was designed in such a way that it covered at least 5% of the project population. Households interviewed were composed of 87 respondents and the rest of the people were captured during focus group discussions, key informant interviews and consultative public participation through barazas organized with help of the local leaders such as chiefs and village elders. The respondents of household surveys were drawn from the 19 villages along the area where the gravity canal is being constructed.

4.1 Project Affected Persons (PAPs)

During the implementation of the Rehabilitation of Bura Irrigation and Settlement Scheme Project, there will be Project Affected Persons (PAPs). The PAPs will be found at the intake works, the sedimentation basin and along the 26.3 km gravity canal which will feed water to the old canal from the pumps at Nanighi.

The affected farmers are not direct beneficiaries of the Rehabilitation of Bura Irrigation and Settlement Scheme Project. However, the communities residing along the 26.3 km gravity canal will be able to access water for domestic use near their villages, an improved road (service road for maintaining the canal) and the opportunity to set small micro-irrigation schemes.

Due to the awareness created through the community leaders and public meetings, 94% of the respondents support the proposed project while only 6% do not support it (Fig.2).



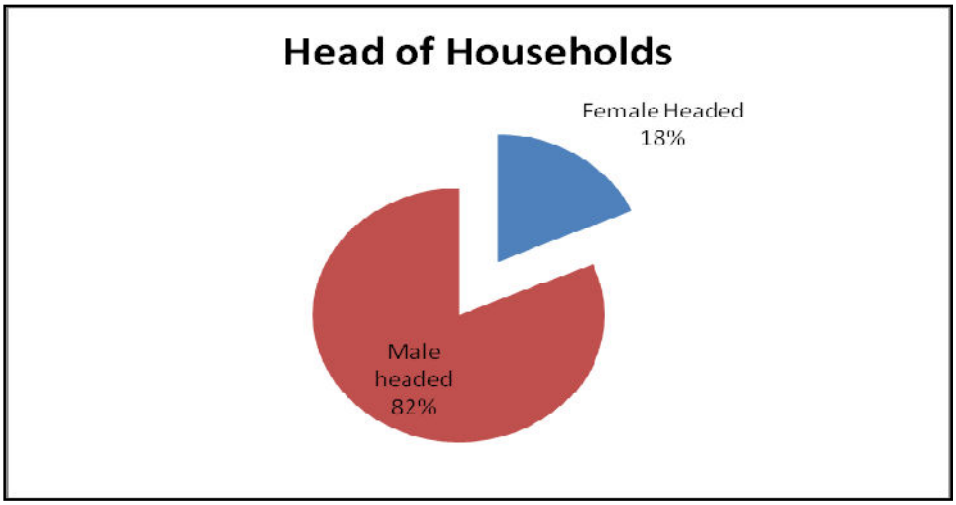
4. 1 Support for the Project

4.2 Household Characteristic

The survey involved 87 respondents who were interviewed using a household questionnaire. The respondents interviewed were 71.26% male, 26.44% female and another 2.3% were children (Table 4.2). According to the survey, 82% of the households in the area are male headed while 12% are female headed (Figure 4.3).

4. 2 Percentage of the various categories of households

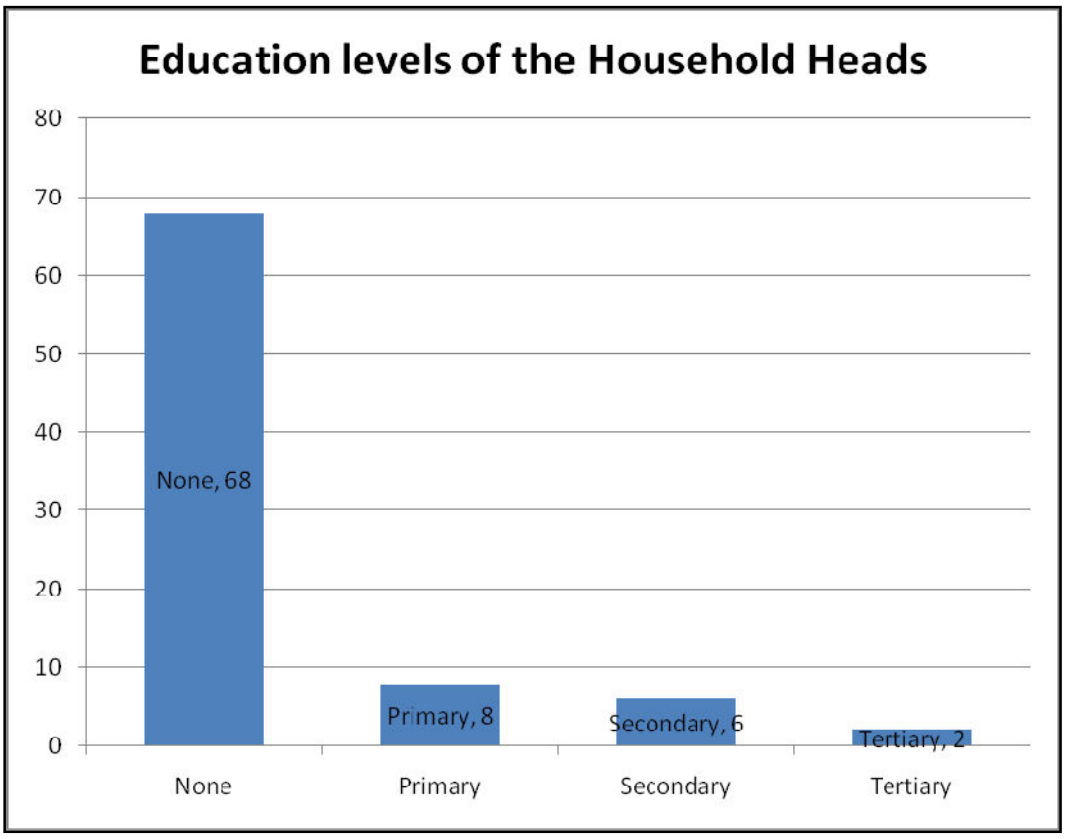
s	Frequency	Percent
Male	62	71.26
Female	23	26.44
Child	2	2.30
Total	87	100.0



4. 3 Heads of Households

4.3 Education and Literacy level

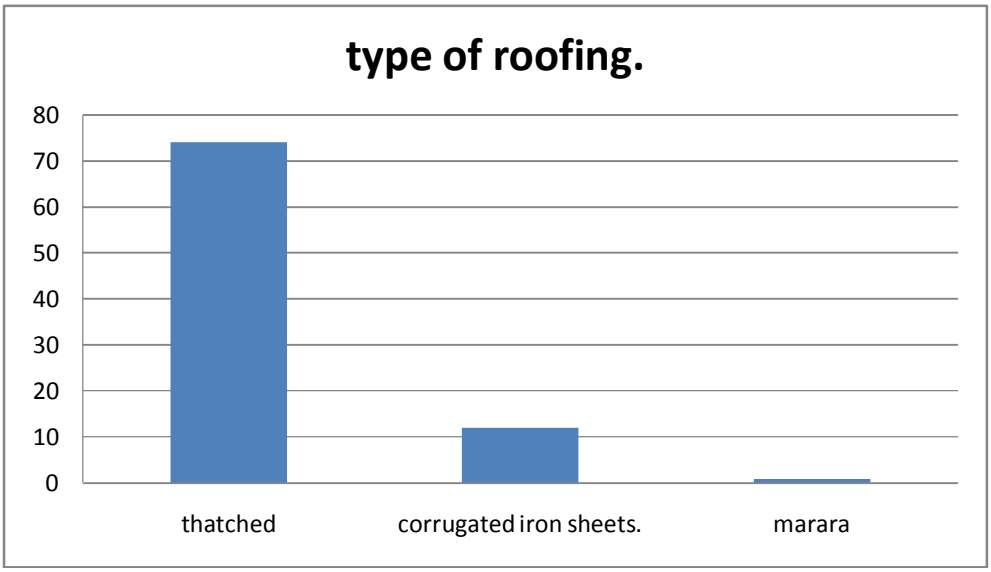
From the survey it is clear that majority of the household heads (81%) have had no formal education while another 10 % have attained primary level education. The share of respondents that has attained secondary and tertiary education is relatively low at 7% and 2% respectively (Fig 4.4). Low literacy level is a major challenge in the area as it affects the way decisions are made at household level and participation in development projects. These in turn affects adoption of technologies necessary for exploitation of resources in the area and improvement of livelihoods of the household and community.



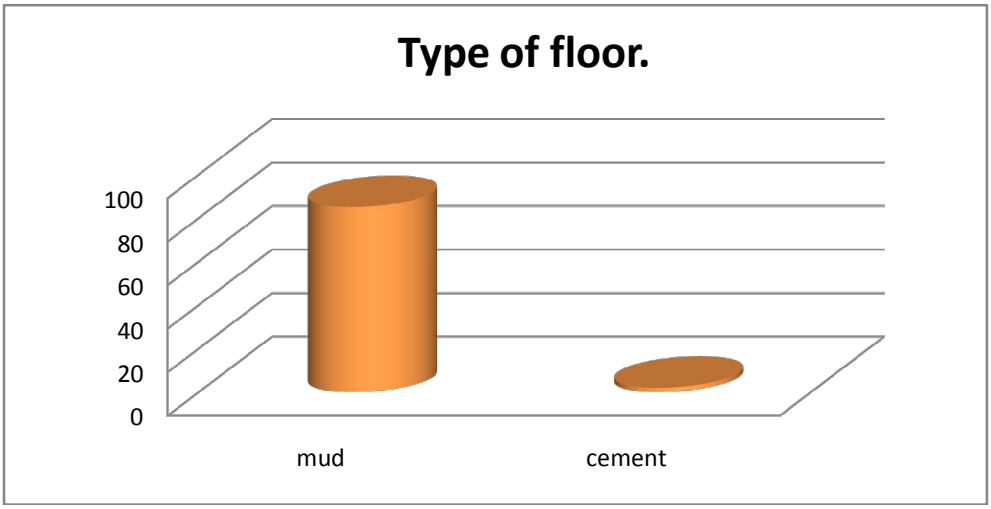
4. 4 Level of Education of Household Heads

4.4 Type of Housing

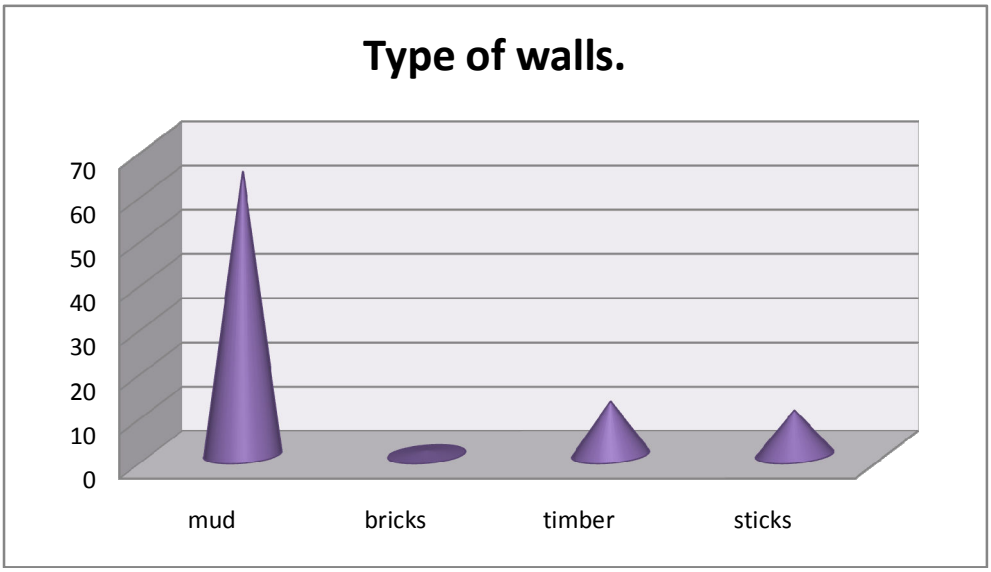
This survey assessed the type of houses occupied by the respondents. The main criteria for the assessment were by type of materials used for roofing, those used for the construction of the walls and also the floors. From the survey results, a majority of the households (85%) used thatch for roofing materials as compared to 14% of the households that use corrugated iron sheets. The most common material used for walls is mud (74%) followed by timber (14%) while the remaining 12% of the walls are made sticks and brick. The survey showed that majority of the households (98%) use mud for floors are of mud and only 2% of the houses have used concrete (Fig. 4.5 to 4.7).



4. 5 Type of roofing



4. 6 Type of floor

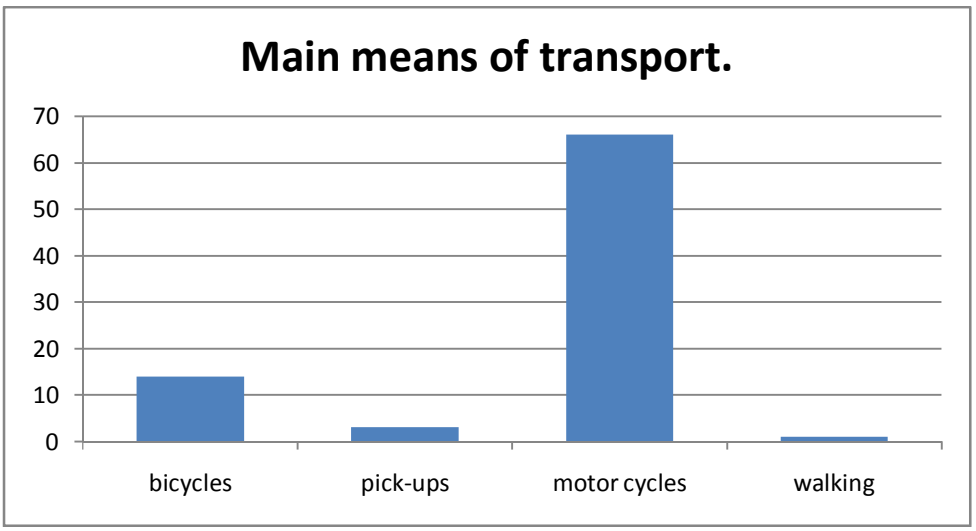


4. 7 Types of walls

4.5 Roads and Communication Infrastructure

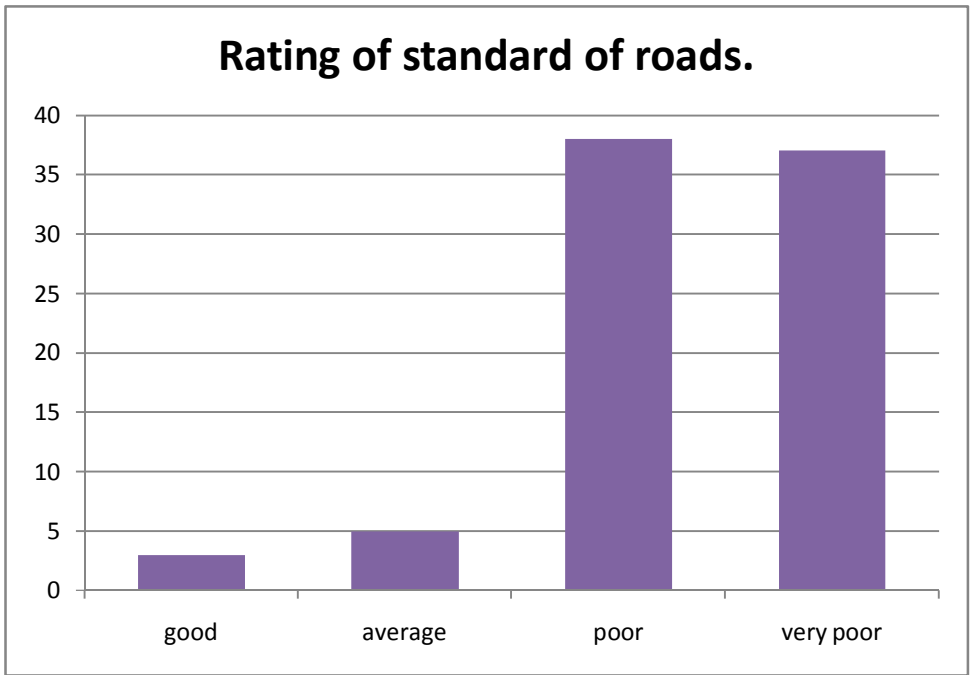
4.5.1 Road networks

Road networks are important in development as it improve access to markets and movement of the people. Roads in Tana River County where the project is being implemented are in poor condition. The roads linking the villages in the area under study and Bura town are earth roads that become impassable during the rainy seasons. The main road connecting the major towns such as Bura, Hola, Garsen, Malindi and Garissa is tarmac but has not been serviced. It is full of potholes and in general in very poor condition. Transport in the area is costly and some people offer transport services as an income generating activity by getting the sick to hospital, transporting people and goods to markets. The main use of transport is by motor cycles (78%) while other means are bicycles, pickups and walking (Fig 4.8).



4. 8 Means of transport in the area

Survey results show that the majority of the respondents (45.8%) rated the condition of roads as poor and 44.6% as very poor, compared to 9.6% of the respondents who rated the roads as good (Figure 4.9).



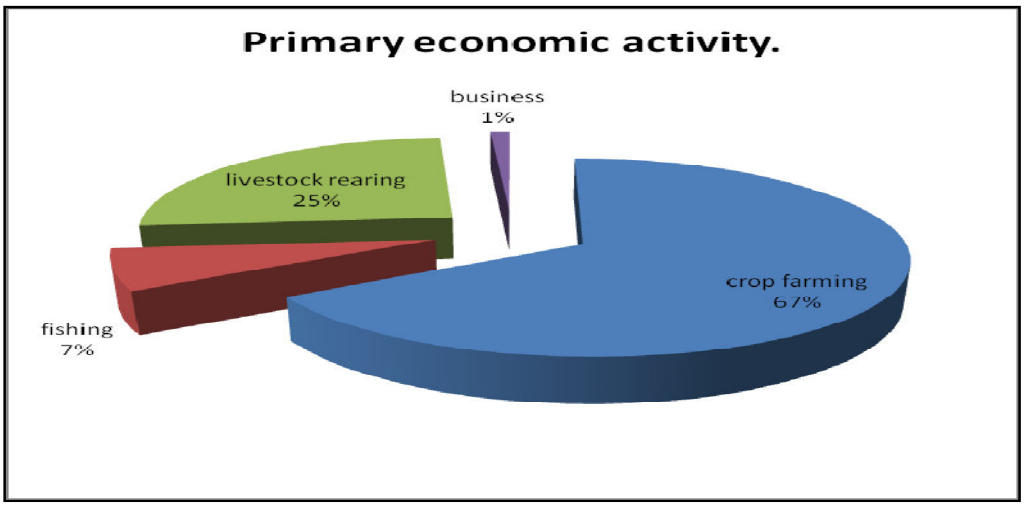
4. 9 Rating of standard of the road

4.5.2 Telecommunication

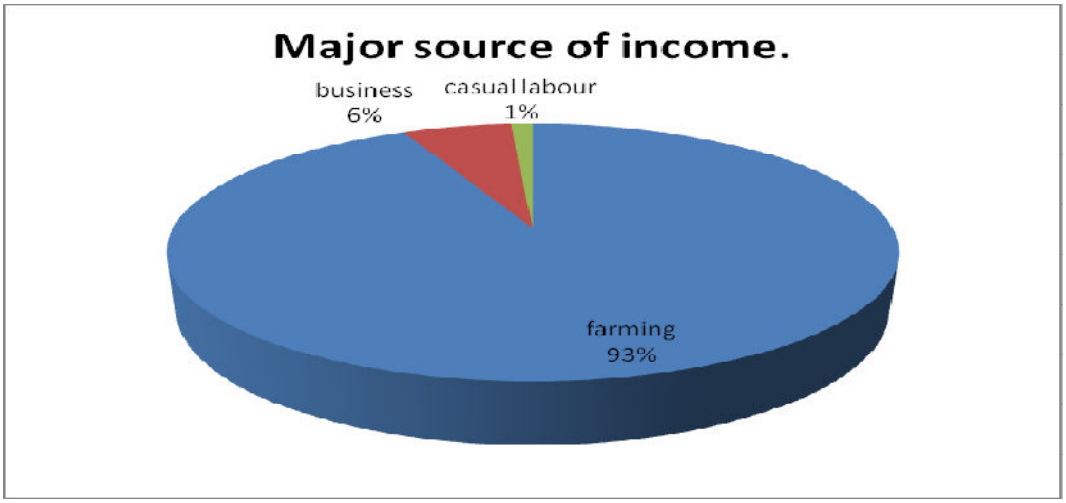
The area is covered by Safaricom and Airtel Mobile Networks thereby opening communication to other parts of the country. However, services like mobile money transfer like Mpesa are only available in Bura town.

4.6 Economic Activities and Agriculture

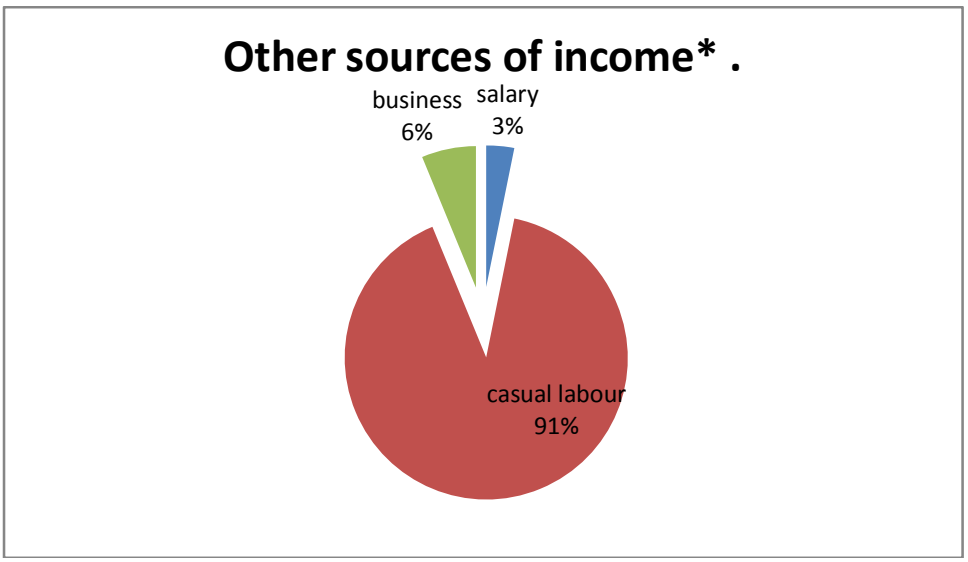
The results from the households survey established that 67% of the households had crop farming as their primary economic activity, 25% had livestock rearing as their primary economic activity and 7% and 1% had fishing and businesses respectively. Analysis of the survey result for the major income result indicated that 93% of the income comes from farming activities as compared to 6% and 1% from business and fishing respectively (Fig 4.10 to Fig 4.12).



4. 10 Economic activities in the area



4. 11 Major sources of income

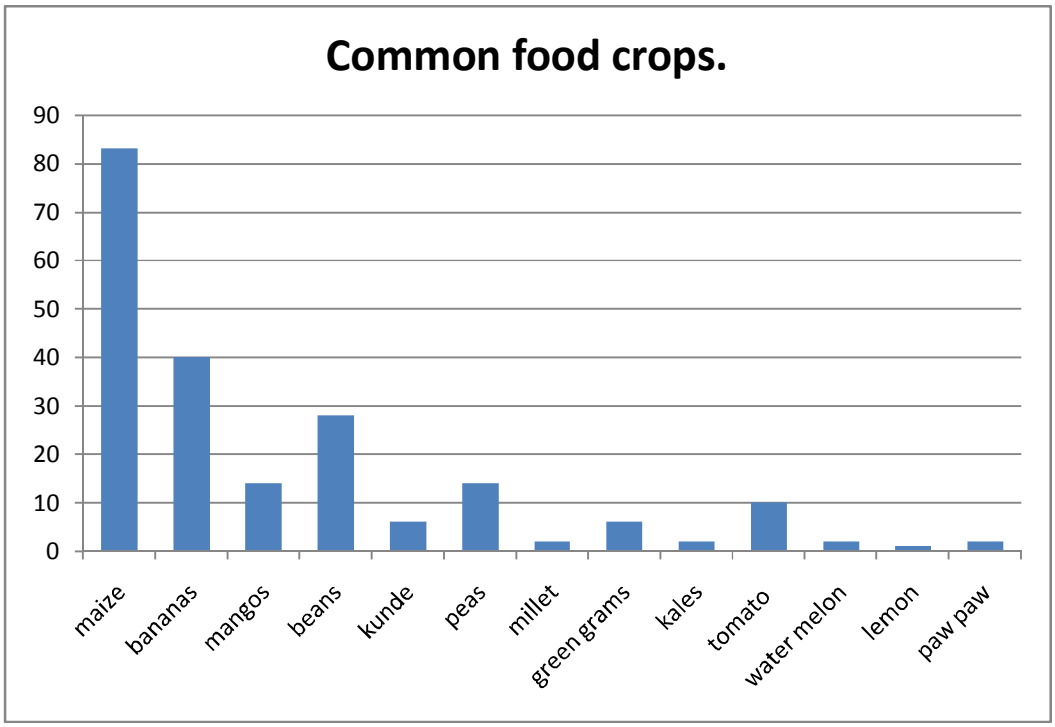


4. 12 Other sources of income

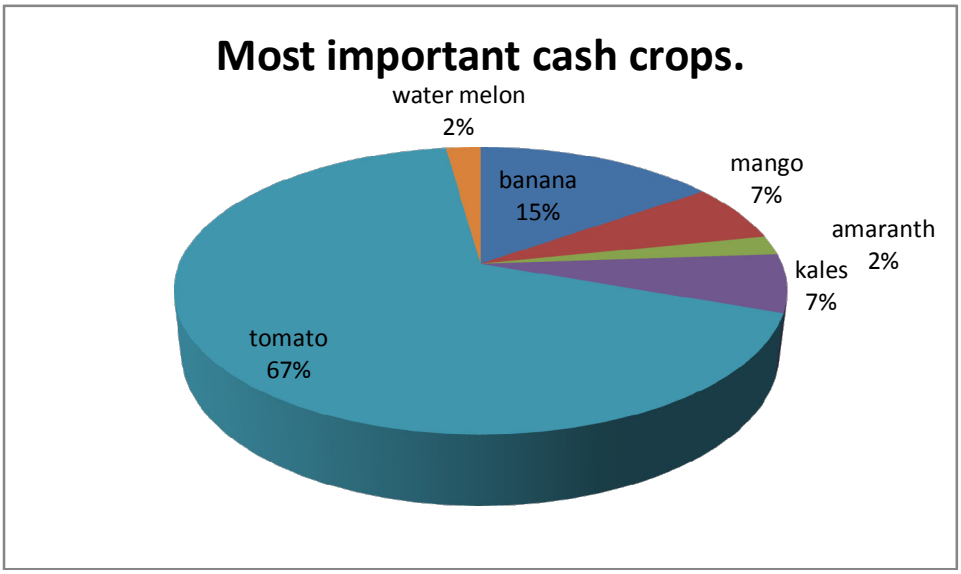
4.6.1 Agricultural Performance

4.6.1.1 Type and Rating of Crops Grown

The community in the area where the survey was conducted grows various food and cash crops. The most predominant food crops grown are maize, bananas, beans, mangoes, cowpeas, green grams and millet (Fig 4.13 and Fig 4.14).



4. 13 Common food crops in the area



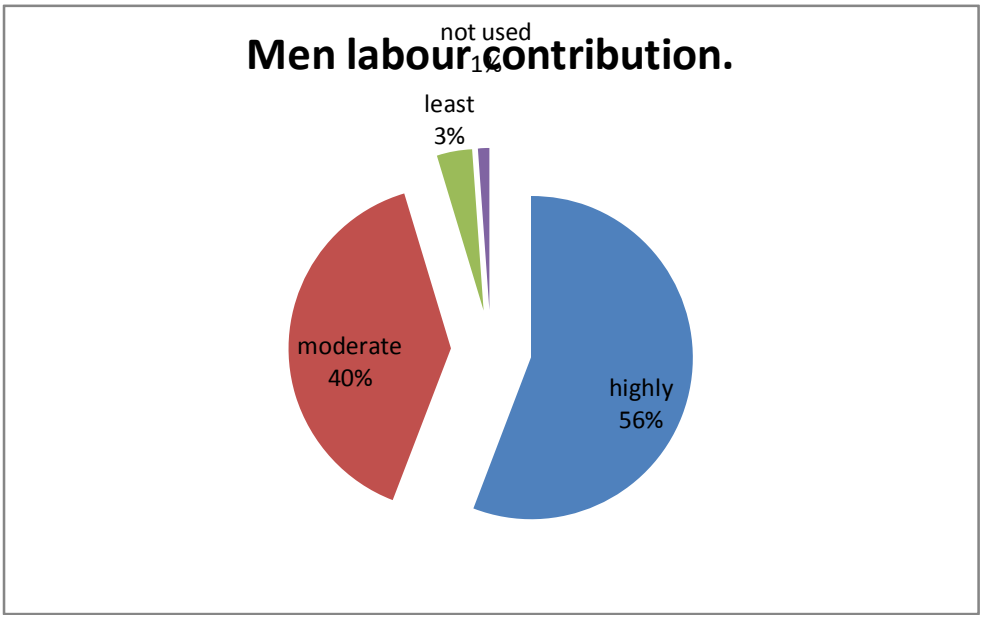
4. 14 Important cash crops in the area

4.6.1.2 Challenges to Marketing Produce

Challenges experienced are transportation cost of inputs and produce due to the poor state of roads. The other challenge faced by the farmers is the poor prices paid for their produce by the persons who have access to markets in Bura and Garissa towns.

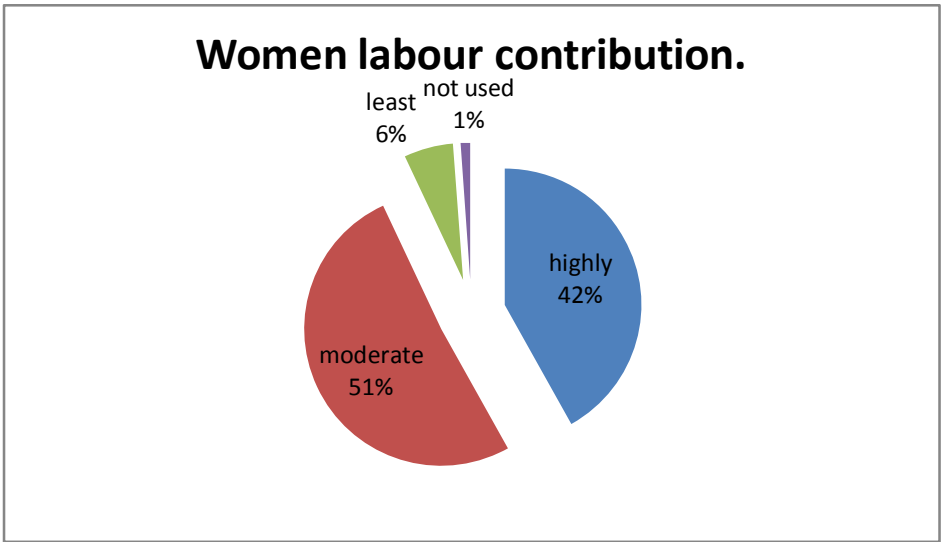
4.6.1.3 Labour

Respondents indicated that 56% of men are highly utilized as a source of labour (Figure 4.15) compared to 42% of women (Figure 4.15). Only 1% of the respondents felt that children are highly utilized as a source of labour, with 36% saying there is no child labour at all (Figure 4.16). 56% of the respondents ranked men as being highly used, 40% ranked them as moderately used, 3% as least used while 1% indicated that they were not used.



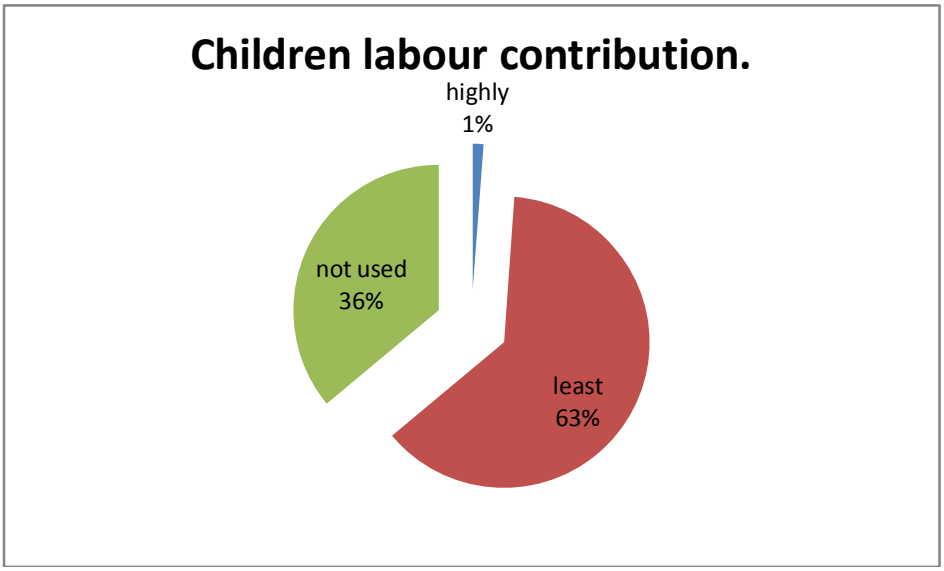
4. 15 Men contribution to labour

From the survey results 51% of the respondents ranked the contribution of women as being moderate, 42% ranked them highly, 6% ranked them as least used while 1 % said that women are no used to provide labour (Fig 4.16).



4. 16 Women contribution to labour

The survey findings established that 63% of the respondents indicated that children are least used, 36% indicated that they are not used at all with 1% said that they are highly used in labour provision (Fig 4.17).



4. 17 Children contribution to labour

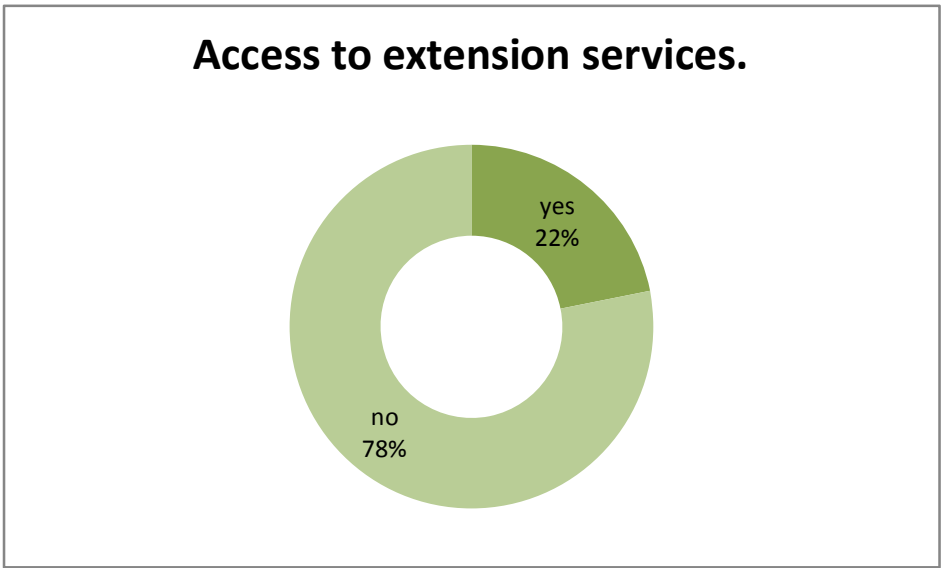
4.6.1.4 Type of livestock and their numbers

The communities along the river are mostly involved in crop farming. However, in addition to crop farming, the community also keeps cattle, goats, sheep and local poultry for sale and domestic use. The source of water for the animals is the Tana river.

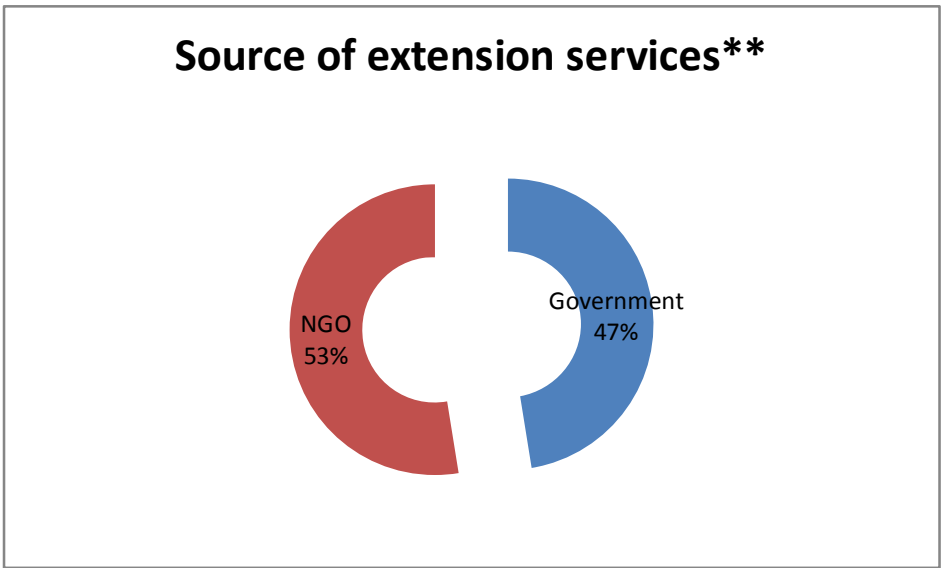
4.6.1.5 Agricultural and Veterinary Extension Service

Access to extension services plays a key role in modern agriculture. Adequate agricultural extension services lead to optimum use of available resources to ensure increased production and productivity of both crops and livestock. The services are also important in ensuring sound environmental conservation and management for sustainability.

According to the survey, only 22% of the respondents indicated having access to extension services and the majority, 78% do not access extension services. For those who those respondents accessing extension services, 53% indicated they got the services from NGOs while the other 47% got the extension services from the Ministry of Agriculture, Livestock and Fisheries (Fig 4.18 and Fig 4.19). There is need to increase coverage for agriculture extension services through deployment of extension officers in the area to take advantage of the opportunity available to the affected area to form mini-irrigation schemes.



4. 18 Access to extension services

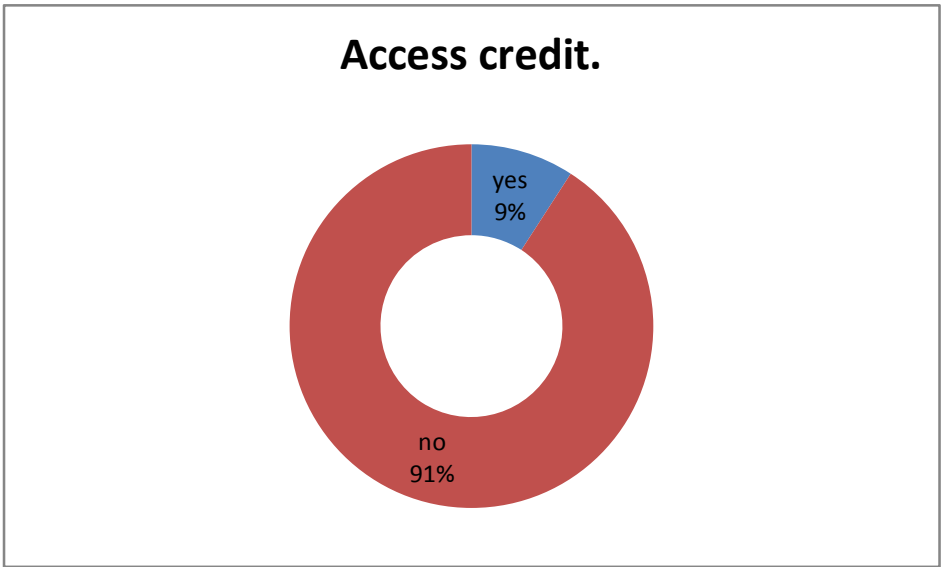


4. 19 Source of extension services

4.6.1.6 Credit Facilities

Farmers require credit facilities to enable them purchase farm inputs and perform operations and activities in their farms. Access to credit is a major component in transforming agriculture from subsistence farming to commercial farming.

From the households survey findings, a majority of the respondents (90%) had no access to credit and only 10% indicated they had access to credit facilities. The research findings established that a majority of the respondents who access credit facilities do so from Micro-Finance Institutions (MFIs) followed by commercial banks and groups coming third (Fig 4.20).

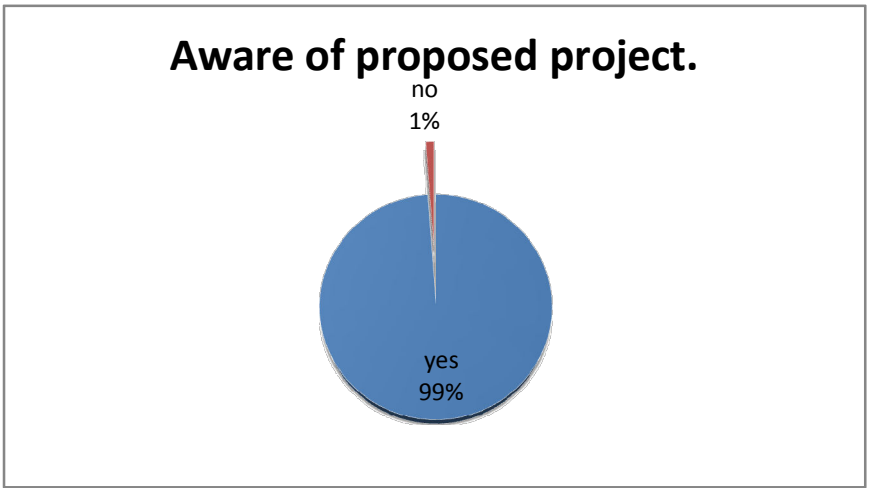


4. 20 Access to credit

Fig.4.19: Access to credit facilities

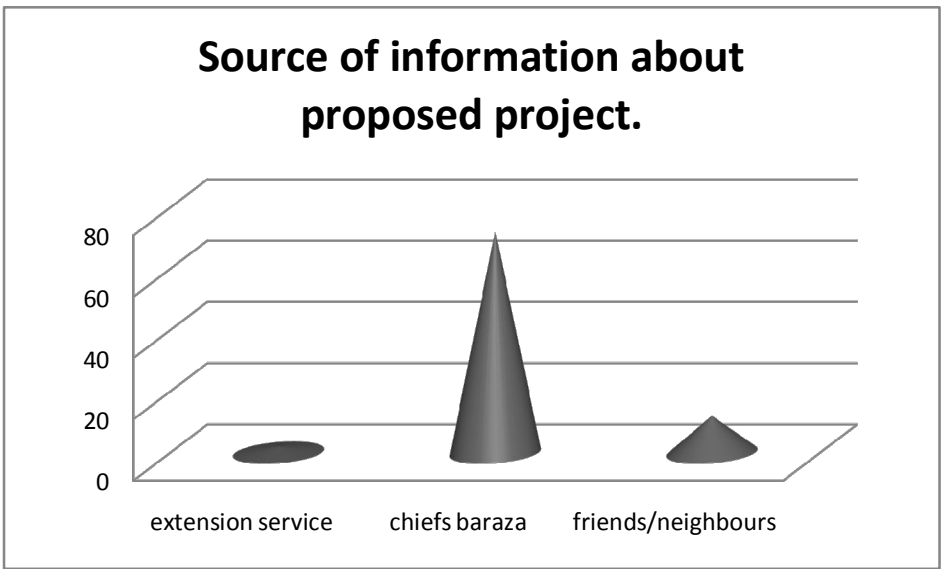
4.7 Community Awareness of the Project

The households survey gauged the community awareness about the project. Awareness of the project is indicative of the extent to which the views, decisions and suggestions relate to the respondents' knowledge about of the project. Figure 4.21 shows that majority of the participants (99%) were aware of the project.



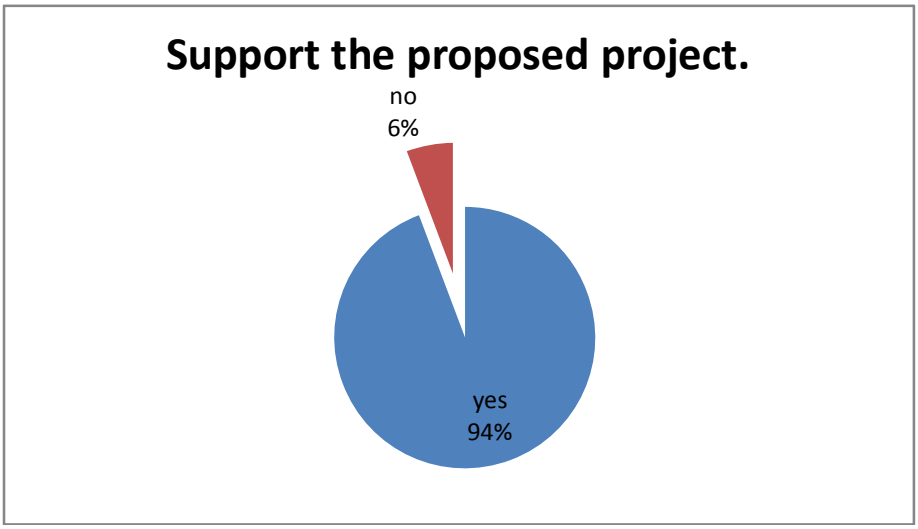
4. 21 Awareness of the project

The high level of awareness of the project means that the information collected from the respondents was based on good knowledge about the project and therefore the information is reliable for decision making on social and environmental related matters. According to the survey, the majority of the respondents got information on the project from chiefs' barazas (84%) followed by from friends and neighbours (14%) and Ministry of Agriculture at 2% (Fig 4.21).



4. 22 Source of information on the project

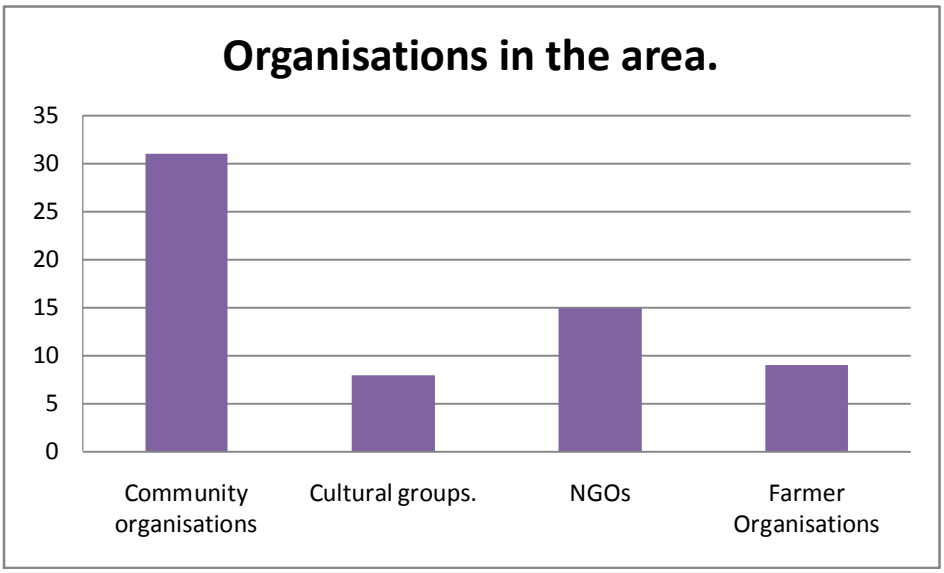
From the survey, a majority of the respondents (94%) indicated their support for the project while another 6% did not support the project (Fig 4.23).



4. 23 Support for the proposed project

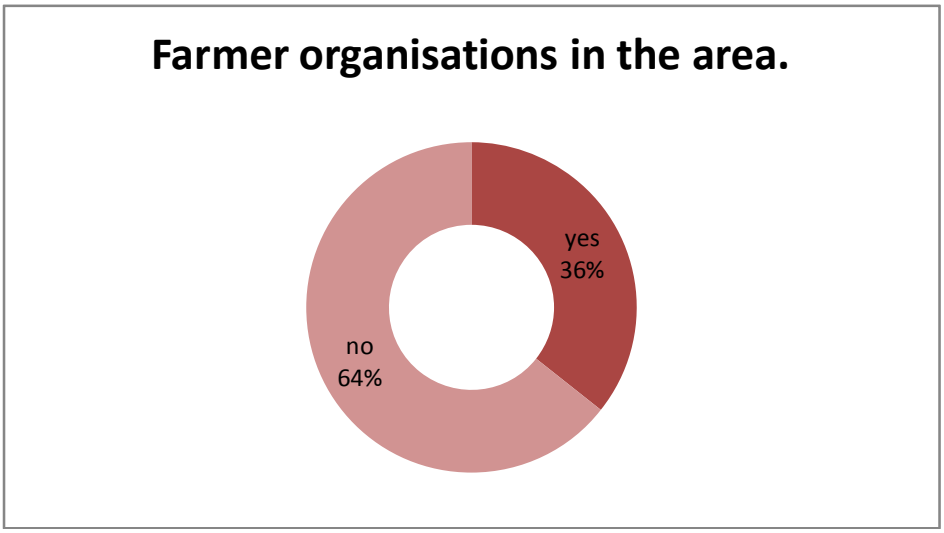
4.7.1 Organizations in the Area

From the survey results the most common organizations in the area are CBOs, NGOs were the second most common type of organization, farmer organizations and cultural groups were third and fourth respectively (Fig 4.24).



4.24 Organizations in the area

It was established that 64% of the respondents had farmer organizations in the area while 36% of them had no farmer organizations in their area (Fig 4.25).

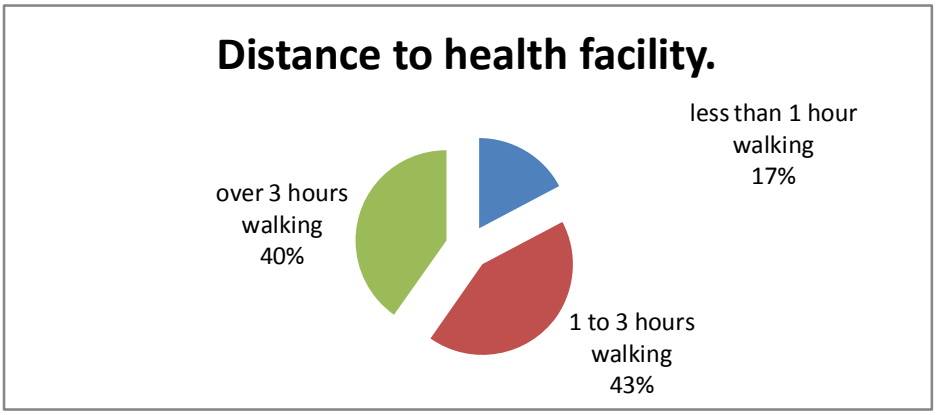


4. 24 Farmers organization in the area

4.8 Health Issues

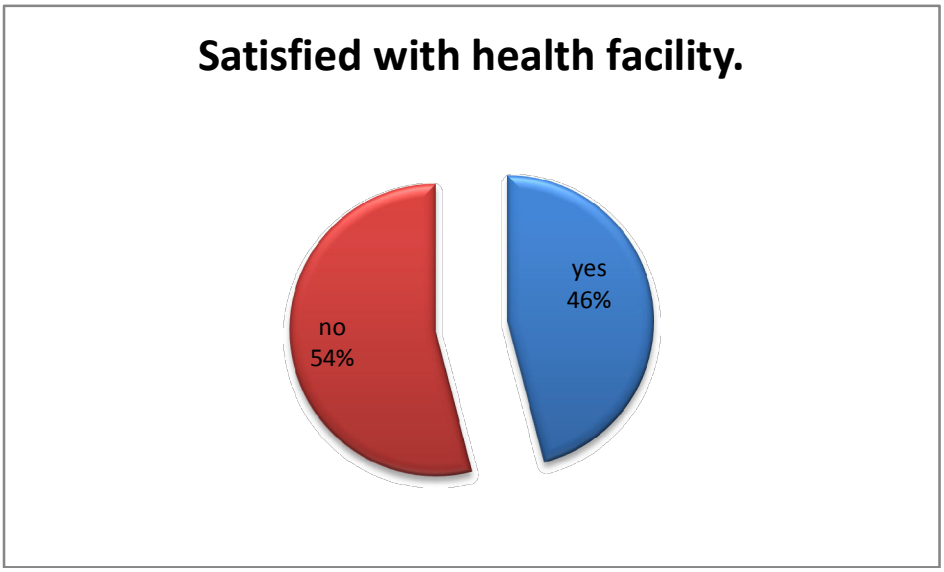
4.8.1 Health Facilities (Hospital and Dispensaries)

The community is served by two dispensaries, one situated in Nanighi Location and the other in Sala which is in Sala Location. The two dispensaries are at situated about 34km apart. Treatment for serious cases is referred to Bura District hospital which from the extreme end of the area where the survey was carried out is over 80km. The survey established that 43 % of the respondents walk for 1-3 hours to get to the dispensary, 40% walk for over 3 hours and 17% of them walk for less than an hour to get to the health facility (Fig 4.26).



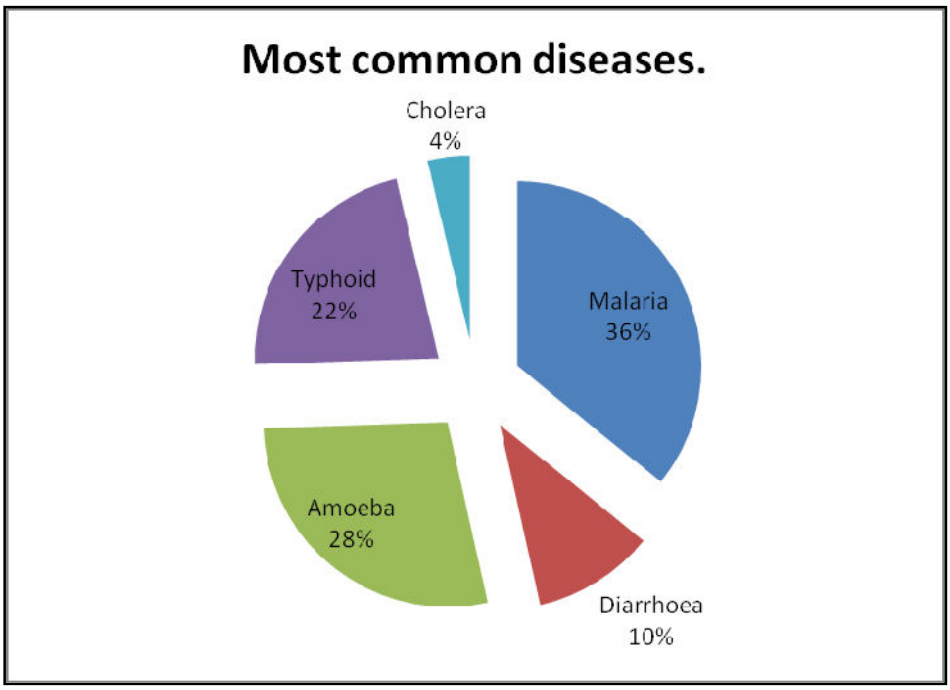
4. 25 Distance traveled to the nearest health centre

On whether the health facilities in the area are satisfactory, 54% of the respondents indicated that they were not satisfactory while 46% found them satisfactory (Figure 4.27). Those who indicated they were dissatisfied cited long distance to the health facility, the poor quality and lack of maintenance of the dispensaries. They also lack medicine and adequate qualified personnel in the health facilities.



4. 226 Satisfaction with health facilities

These findings suggest the need to improve on public health facilities and services to be able to provide adequate and effective medical services to the community, especially with the expected increase in water related health problems after the implementation of the project. These health problems including malaria, typhoid, amoeba and diarrhea which already the survey showed have high prevalence in the area (Figure 4.28).

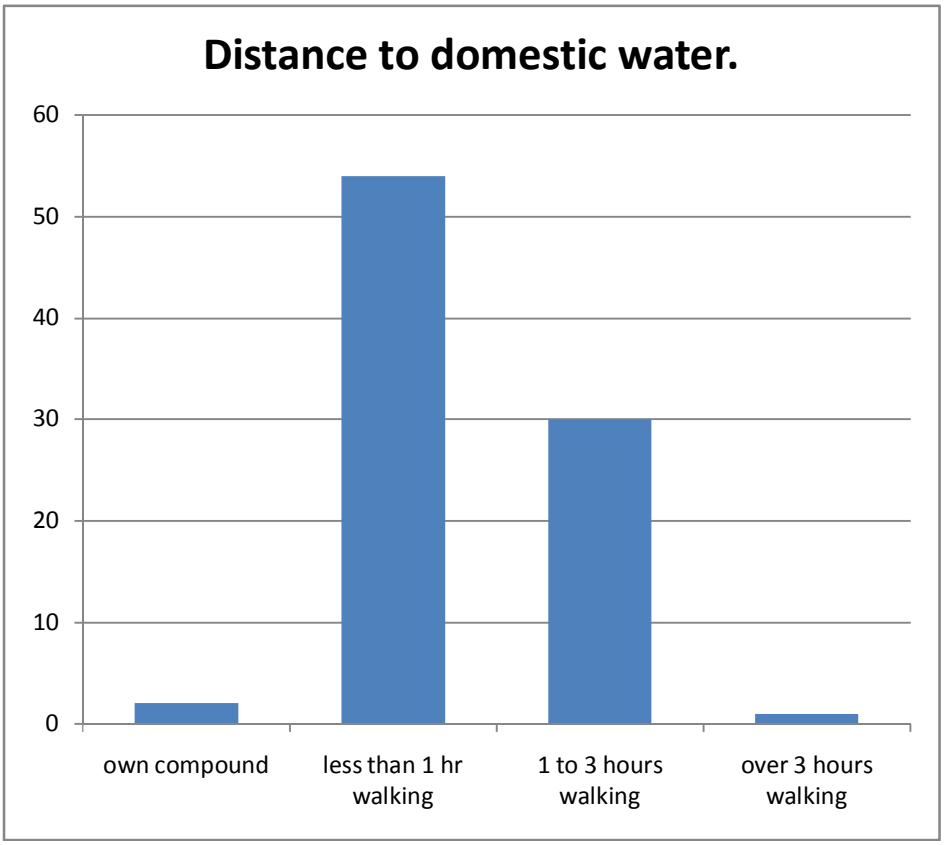


4. 27 Diseases prevalence

4.9 Water and Sanitation

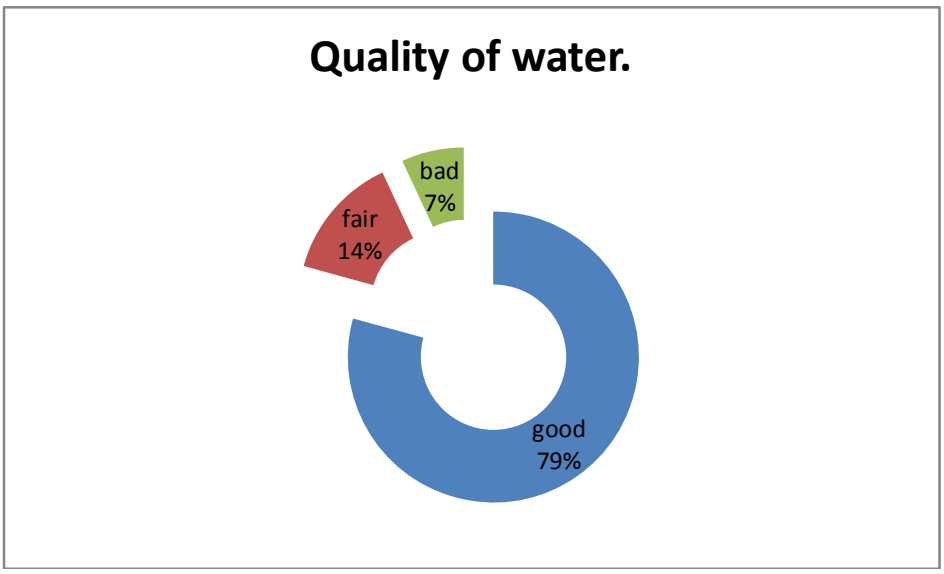
4.9.1 Source of Water

From the research findings it was established that 62% of the respondents walk for less than an hour to access domestic water while 35% walk for 1-3 hours, 1% walk for over 3 hours while the remaining 2% have water for domestic use in their own compounds (Fig 4.29).



4. 28 Distance covered to the nearest domestic water source

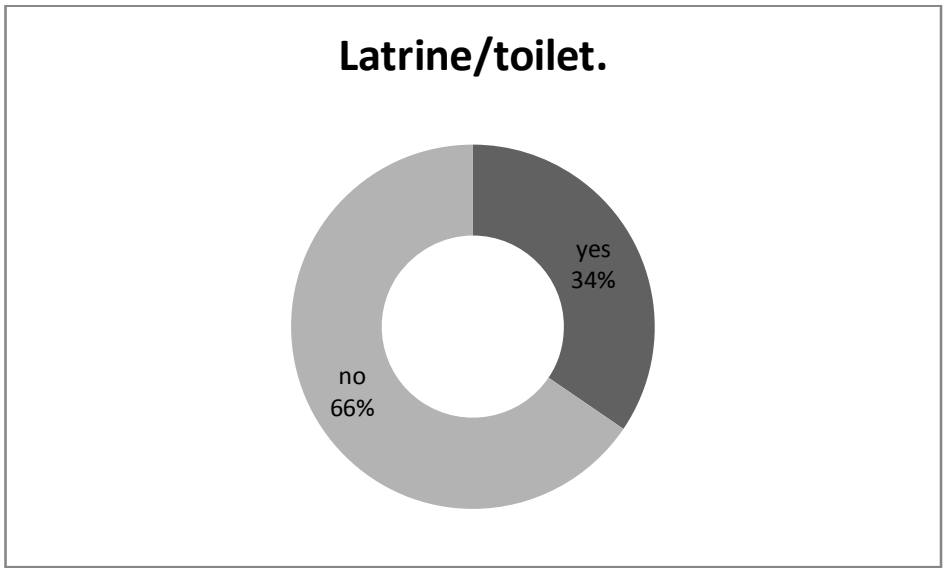
The source of most of the water for domestic use is from the Tana river and shallow wells. The survey indicated that 79% of those interviewed rated the quality of their domestic water as good, compared to 14 % and 7% who felt the quality of water was of fair and bad quality respectively (Fig 4.30).



4. 29 Quality of water for domestic use

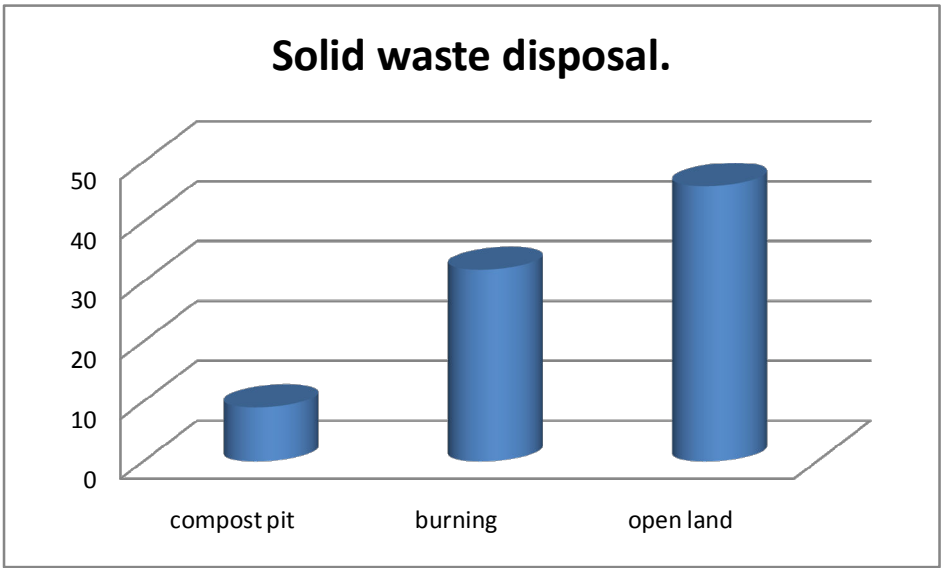
4.9 2 Sanitation management

From the survey findings, 66% of the respondents indicated there were no toilet facilities in their homestead compared with 34% of the respondents who indicated that they have the facilities (Fig 4.31).



4. 30 Toilet facilities in the households

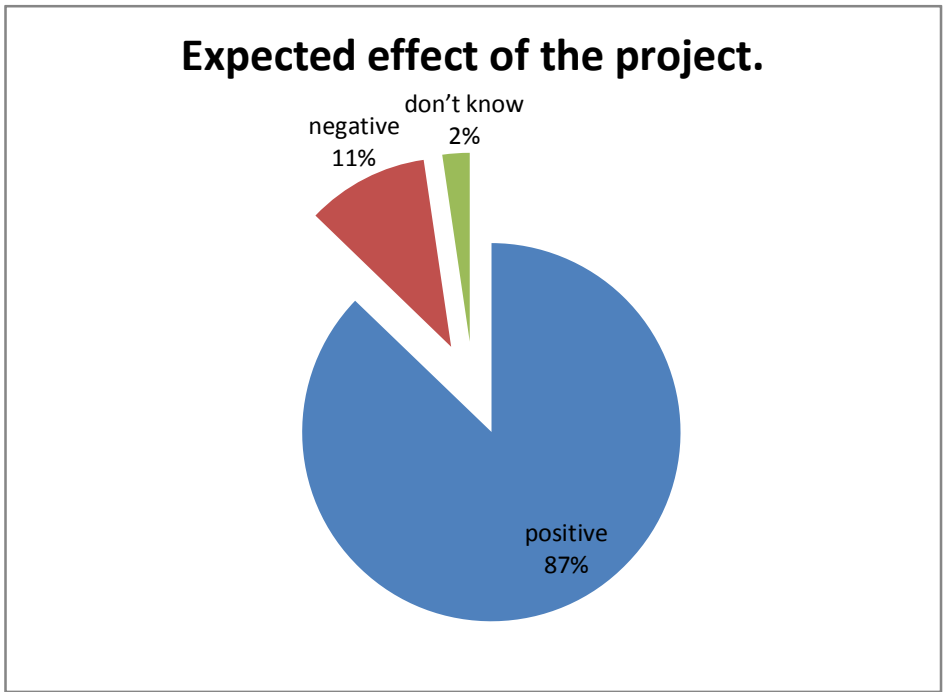
Most of the solid waste is disposed of on open land according to the survey results, burning is the second most common means of disposal of solid waste while the rest is put in compost pits (Fig 4.32).



4. 31 Solid waste management methods

4.10 Impact of the Project on the Community

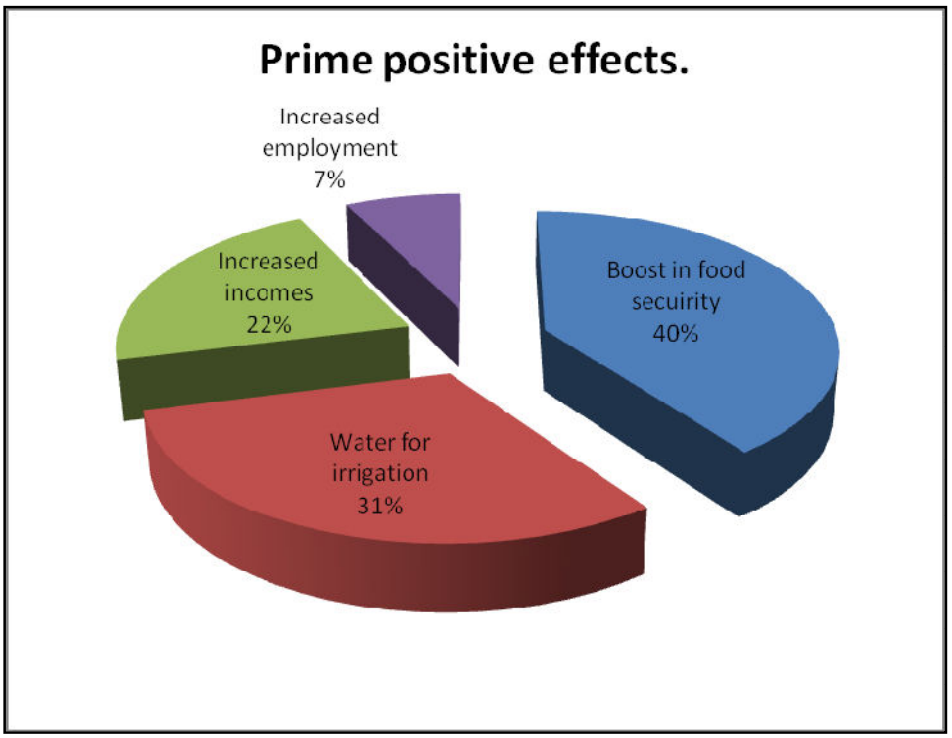
The survey results established that 87% of the respondents expect to be affected positively by the project while 11% expect to be affected negatively and the remaining 2% don't know what kind of effects to expect (Fig 4.33).



4.33 Community perception on the effects of the project

4.10.1Positive Impacts

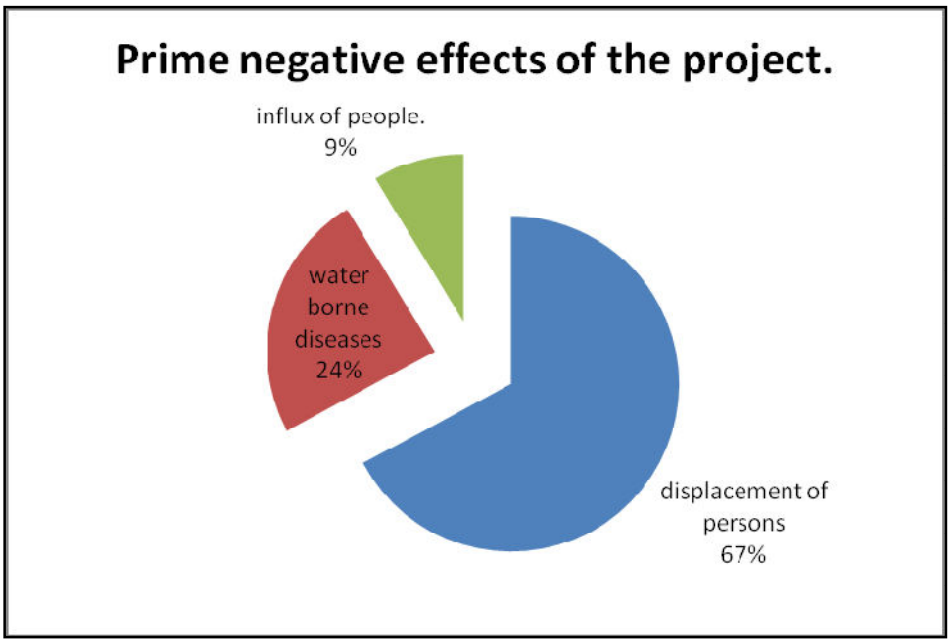
The survey results indicate that 40% of the respondents expect a boost in food security, 31% anticipate the availability of water for irrigation, and 22% expect an increase in incomes while 7% expect an increase in employment (Fig 4.34).



4. 32 Positive effects of the project

4.10.2Negative Impacts

From the survey findings it can be established that 67% of the respondents expect a displacement of persons, 24% expect an increase in water borne diseases and 9% expect an influx of people leading to social vices (Fig 4.35).



4. 33 Negative effects of the project

CHAPTER FIVE

5 PUBLIC CONSULTATIONS

5.1 Participatory Process

Towards the fulfillment of the Terms Of Reference, the ESIA was carried out through a participatory process to ensure that all the stakeholders including target beneficiaries and persons affected the proposed project are involved through provision of data and information, pointing out issues of concern and suggesting solutions on how various areas of conflict can be addressed. The purpose of stakeholders' participation is to ensure that all important environmental, social and economic issues relating to the project are clearly understood by all stakeholders to enable them to make informed decisions on the project including endorsement and provision of information and recommendations toward enhancement of positive impact and mitigation of negative impacts. The participation was achieved through the following activities: Community sensitization meetings/Barazas; Local leaders' workshops; Local leaders' tour of the project area; Focused Group Discussions (FGDs) and collection of household socio-economic baseline data using a predesigned questionnaire.

5.2 Community sensitization meetings (Barazas)

The community sensitization meetings targeted the general all community members within the canal area including agro-pastoralists and pastoralists. Five preliminary meetings were held with key informants and key stakeholders between 15th and 20th February and 7 follow up meetings in form of community Barazas were held from 10th March to 15th March. A consultative meeting with Sabbour Consultant, NIB Engineer and Ocra Company was held. The consultant was helped by the chiefs and local village elders to organize community barazas in 7 villages namely: Dhidha, Darime, Kumudhe, Jajavu, Dhabolo, Bawama and Nanighi.
The list of barazas held and attendance are as follows:

Table 5.1 List of Introductory Meetings

Activity	Date	Time	Venue
Bura Scheme Manager	17-02-2014	9.00am	Bura Scheme Office
Meeting with Deputy County Commissioner	17-02-2014	3.30pm	Bura Sub-County Office
Meeting with Deputy County Commissioner	18-02-2014	11.30AM	County Government Headquarters, Hola
Meeting with opinion leaders	19-02-2014	11.00am	Bura Club Hall
Meeting with Village Elders	20-02-2014	11.00am	Contractors Site Camp
Meeting with Resident	20-02-2014	9.00am	Resident engineers'

Engineer			office - Madogo

Between 10th March to 15th March (7) communities held the meeting in the following areas:

Table 5.2: Consultative Meetings held During the Scoping Exercise

Date	Time	Venue	Attendance
10/03/2014	10.00am	Dhidha village	45
	2.00 pm	Darime Village	163
11/03/2014	9.30 am	Kumudhe Village	146
	2.00 pm	Jajavo village	85
12/03/2014	10.00 am	Dhabolo village	168
	2.00 pm	Bawama village	83
13/03/2014	10.00 am	Nanighi village	169

Table 5.3: Meetings between the consultant teams

Name	Company	Designation
Josiah Gathuni	NIB	Irrigation Engineer
Engineer Abdelbasset Rayad	Sabbour/ CAS	Engineer
David Kiiru	Ocra Consultant	Sociologist
Dr Rebecca Karanja	Ocra Consultant	Environmental Expert
Jacob Omondi	Ocra Consultant	RAP Expert

The minutes of the meeting and the list of participants are attached as an appendix.
The agenda addressed during the meetings were:

1. Brief overview on the ESIA study to be undertaken by the consultants – scope, activities and work plan, study methodology etc;
2. Project area including geographical scope, infrastructure and expected benefits ;
3. Natural resources in the project area including water, land and wildlife ;
4. Identify people affected by the project and give recommendations on possible remedial measures;
5. Seek community views of mechanisms of compensating the people affected by the project;
6. Establish community awareness on environmental management issues, traditional environmental management approaches;
7. Share information and experiences of local community and stakeholder institutions on the pertinent social, economic and ecological issues in the project area;
8. Brainstorm on the potential positive and negative environmental and social impacts of the project;
9. Inform the community about the data collection process and their role;

10. Collect views from the community on preliminary recommendations to enhance the positive impacts and mitigate the negative impacts;
11. Get feedback from project the community members in form of questions / comments / issues on the presentation by the Consultant Team on various issues ;
12. To respond to questions, discuss and agree on various issues/concerns raised by the members of the community, as much as possible.

5.3 Challenges in the project area

The following are the environmental challenges highlighted by the elders and other key informants in the area:

- Drought spells: This leads to pastoralists migrating from one place to the other and this leads to destruction of vegetation due to overgrazing and loosening of the soil leading to soil erosion;
- Flooding: during the rain seasons, flooding occurs leading to destruction of crops along the river banks and deposition of sand in the farms;
- Charcoal burning: use of prosorpis juliflora for charcoal is permitted. However some covetous people harvest other tree species for charcoal disregarding the charcoal rules.
- Poor distribution of health facilities leading to upsurge of diseases.
- Land fragmentation and demarcation leading to conflicts.

CHAPTER SIX

6. POTENTIAL IMPACTS AND MITIGATION MEASURES REQUIRED FOR NEGATIVE IMPACTS DURING AND AFTER IMPLEMENTATION OF THE PROJECT

6.1 General perception on the project

The community members were of the feeling that the benefits of the canal passing through their land are minimal compared to the losses they will encounter. They were only concentrating on the direct benefits of irrigation farming on their pieces of land. The feeling was that with the loss of land to canal excavation, they may not be able to carry out meaningful farming activities. However the consultant educated them on the many indirect benefits they would have once the canal is complete and is in operation in the neighboring areas. The community members indicated that they would allow the canal to pass through their land but that they should be compensated for the loss of land and livelihoods.

6.2 Positive Impacts

PIC 1 The residents indicate support for the project by a show of hands.

They highlighted positive impacts of the canal as listed below:

1. The canal will lead to availability of water for irrigation and this will lead to improved agricultural activities.
2. Availability of water both for domestic use, livestock, bees and other purpose during the wet and dry seasons. The canal will ensure a reduction in the distance between the various households and the water collection points as compared to the long distances initially covered from the homesteads to the river.
3. Bee farming will be improved due to presence of flowering plants throughout the year. Food security will be achieved both at an individual household level and at a national level due to increase in farm production

4. Reduction of human wildlife conflicts: The canal will shelter human beings and animals from crocodile attacks by provision of watering points for animals along the canal.
5. Reduction in poverty levels of many households. This will be as a result of the availability of more farm outputs that can be sold in the available markets.
6. Employment opportunities will be created both to those working directly in the farms and to those working in other related sub sectors i.e. agro-inputs supply, processing and marketing of the farm produce.
7. The living standards of the locals will be improved. More farming activities using the canal water will be taken up will lead to increase in household incomes.
8. Diversification of farming enterprise leading to improved nutrition.
9. The cost of irrigated farming will be reduced as there will no pumping of water from the river to the farm. Water will be conveyed by the canal through gravity system.
10. Proliferation of business activities in the area, e.g. food kiosks to supply food to the workers in the farms.
11. Lower food prices making food affordable in most homesteads.
12. Improved infrastructure (roads and telecommunication) and social amenities (schools, mosques, churches and dispensaries) development.
13. Fish farming and trade: The community members informed us that previous experience has shown that there will be more fish in the canal than the river making fish harvesting easier.
14. Improved agricultural extension services.

6.3 Negative impacts and suggested mitigation measures

The community members expressed concern that the canal also posed some negative impacts. The issue of loss of land and graveyard sites featured prominently during the discussions. For every negative impact mentioned, the community members were requested to give possible solutions which are highlighted as the mitigation measures:

Table 6.1 Anticipated Negative Impacts and Their Mitigation Measures

Anticipated negative impact	Proposed mitigation measures
Loss of land and source of livelihoods. The canal has passed in the middle of a village settlement.	A RAP expert was engaged to assess the People Affected by the Project and work out modalities on compensation mechanisms. The PAPs have been compensated for loss of land and structures like houses.
Lack of direct benefit to the community where the canal is passing.	Community members will be allowed to use pumps to draw irrigation water from the canal. The locals should provide labour in digging the canal. The community members should also be given shambas along the canal.
Disposal of earthwork wastes, establishment of working areas and storage of construction materials at the project sites in the area posing a problem because this may potentially cause damage to local vegetation in the area and degrade the topsoil making it loose.	Removed soil should be temporarily stored in designated secure areas and later after completion of construct on activities, be used to reinstate topsoil to its original condition. In areas of no topsoil, construction material will be stored directly on top but soon after the construction, such areas will be turfed and trees planted.

Interference with graveyards, cemeteries and Mosques.	Where possible the canal should be diverted so as not to affect the graveyards. If not possible, a site for reburial of the exhumed bodies should be sourced at NIBs cost. Mosques and schools should be compensated in kind not in cash because they are community facilities.
During the excavation and construction of the canal, there is interruption of transport and blocking of corridors and paths through which livestock and people access river respectively.	Construction of bridges/crossings every 100m to 500m to facilitate human and livestock access to water during and after canal excavation. The bridges should be put up in such a way that every livestock corridor has a bridge.
Interference with shallow well where excavated materials are dumped.	Shallow wells should be dug for the communities to replace the affected ones.
Children and animals falling in the canal and getting injured or even drowning.	People and livestock should use the designated crossing areas.
Deforestation through clearing of natural forest and other vegetation along the canal passage leading to loss of important indigenous species of trees.	Re- forestation and protection of indigenous plant species; where possible trees should be spared during the clearing process. The project should set sites for woodlots and also incorporate agro-forestry as an enterprise.
Interference with wildlife natural habitat as a result of the land clearing	As much as possible canals should not interfere with wildlife routes.
Loss of bees farming due to clearing of vegetation and carbon dioxide generated by vehicle movement.	Avoiding cutting of indigenous bee flora where possible. Fast completion of the project will ensure a reduction in exposure period.
The canal excavation will lead to air pollution due to the dust from the excavation site.	Fast completion of the project will ensure a reduction in exposure period for people and livestock, sprinkling water on access paths or putting murram on the roads to reduce amount of loose soils
Noise from the machinery during construction.	Fast completion of the project will ensure a reduction in the noise exposure period for people and livestock.
Increase of mosquito prevalence and therefore increased incidence of malaria and other water-borne diseases during to prolonged presence of standing water.	Educating the community on preventive and control measures such as spraying and use of treated nets and boiling of drinking water As for the existing health facilities provision of drugs and services should be enhanced. NIB should consider building a community dispensary in the area because the nearest health centre is 18km away. Mobile clinics in the area should be increased.
During operation phase, degradation of soil quality would result mainly from improper use of fertilizers and pesticides intended to boost up agricultural	To mitigate on soil quality degradation and depletion of nutrient levels, the proponent and other relevant government ministries such as Ministry of Agriculture should be co-opted to

production. In addition, the potential depletion of natural level of organic material and the nutrient content in the soil would occur in the operation phase.	provide farmer extension training services.
Diversion of water in laghas to canals leading to drainage of laghas and lack of irrigation water in farms during the wet season. Drainage of wetlands and ox-bow lakes.	The Laghas should not be drained. Culverts should be used to channel canal water under the laghas closings while the laghas water should flow over the canal.
Proliferation of *Prosopis juliflora*	Reclamation of land infested by *P. juliflora.*
Inadequate water for target users at the tail end of the canal.	The design should ensure equitable water sharing to ensure a regular water flow to all the locations. The locals should be provided with water tanks where possible and a borehole in the area that is not in use should be renovated for their use.

6.4 Major Impacts Rating

6.4.1 General overview

The proposed project will have both positive and negative Socio-Economic and Environmental related impacts. These impacts will be experienced from the intake, along the canal passage and irrigation fields. It is anticipated that the project will have varying impacts at different locations along the canal.

6.4.2 Impacts Rating and Mitigation Measures

Several positive and negative impacts have been identified. For the negative impacts, the mitigation measures have been outlined. The mitigation measures proposed ties with the management actions outlined under the Environmental Management plan (EMP). The criteria for rating was adopted as defined below.

A+ /- : Significance positive/negative impact expected

B+ /- : Positive / negative impact is expected to some extent

C+/- : Extent of positive/ negative impact is unknown; further examination is needed as the study continues

Blank/- : No negative impact is expected

Impacts Ranking and Mitigation Measures at the Canal

Table 6.1: Social Economic aspects

No	Aspects	Ranking by Phase			Description	Mitigation Measures
		D& P	C	O		
1.	Local Economy- such as employment and live hood	-	A+	A+	Creation of skilled and unskilled labour to the locals during the construction phase.	No negative impacts
2.	Displacement of people especially the vulnerable groups (young, elderly, widows, the poor and the physically challenged)	-	A-	-	-Displacement of people along the canal and the other irrigation infrastructure.	A Resettlement Action Plan has been developed whereby all the People Affected by the Project have been identified and their assets assessed by a RAP expert. The assets affected and mode of compensation has been worked out and the affected people compensated.
3.	Involuntary settlements	-	A-	A-	The irrigation infrastructure transverses settled villages. In some places the project area covers a whole village. This will lead to both voluntary and involuntary displacement	A Resettlement Action Plan has been developed whereby all the People Affected by the Project have been identified and their assets assessed by a RAP expert. The assets affected and mode of compensation has been worked out and the affected people compensated.
4.	Human and animal access pathways	-	A-	-	-The intake will be within a human settlement zone, the canal conveyance route will pass across animals and people's pathways hindering smooth movement	Construct bridges along the livestock /human corridors, the excavation along the corridors should be done last before completion of the project
5.	Impact of social institutions	-	A-	-	Sites of cultural importance such as cemeteries and mosques have been affected.	As much as possible interference with such places should be avoided. The community indicated that if mosques are affected a replacement in kind should be done. Where

						cemeteries are affected, alternative burial sites should be provided
6.	Land use and Utilization of Local Resources	-	-	A+	-Increased land utilization hence improving the local and national economies.	- No negative Impacts
7.	Water usage or rights & rights of common	-	-	B-	-No disruption to water access during design and planning but this will be affected during construction. -During operation there will be increased water for irrigation and domestic/ livestock use. -During operation there will be decreased water for downstream users and for other local usage.	No negative impacts
8.	Sanitation	-	B-	B-	-Deterioration of sanitary conditions in and around construction site(short-term)	-Appropriate solid and liquid waste management.
9.	Hazards & Diseases	-	B-	B-	-During construction, risks to the safety of the construction workers. -During operation, risks of new cases o f water and vector borne diseases such as malaria, diarrhea, bilharzias etc -During construction, diseases such as HIV/Aids will be common due to inflow of foreigners to the area	-Compliance with Occupational Safety & Health regulation during construction. -Collaboration with other community players on training and sensitization on disease and control during construction & operation phase. --Use of PPE during construction time.

Note: D& P: During Design and Planning, C: Construction, O: During Operation

Table 6.2 Impacts on Natural Environment

No	Environmental aspects	Ranking by Phase			Description	Mitigation Measures
		D& P	C	O		
10.	Topography & Geographical Features	-	B-	-	-The topography area will change i.e. at the intake and the canal route due to excavation. -Disposal sites and deposits of construction sites will pose a significant impact	Establish a comprehensive rehabilitation plan including landscaping and repairs of the intake and the materials disposal sites.
11.	Soil erosion	-	B-	-	A lot of vegetation will be cleared at the intake and along the canal route, leaving soils exposed to agents of soil erosion which could lead to gully erosion	Planting grass and trees along the exposed area should be done.
12.	Ground water	-	-	B-	Ground water may be polluted from the improper use of agro chemicals and fertilizers	Education from the agriculture extension officers of safe use of fertilizers and agro-chemicals
13.	Hydrological Situation	-	B-	-	-A portion of the natural vegetation will be cleared, leaving the soils exposed; this will interfere with natural drainage system of the area. -Diversion of water from Tana River may cause interference with the normal flow of the river. -Downstream users of the river may experience shortage /low supply during the dry season	-Planting of trees environment should be undertaken to in order to stabilize the soils. -Re-a forestation Monitor the flow of the river over time -The water abstracted shall be within the WRMA limits
14.	Fauna & Flora	-	B-		-Plants and animals will be affected through bush clearing. -There will be loss of indigenous plants	- Minimize the number of trees and shrubs being cleared at the intake and along the route

					species at the intake and along the canal route. -A new ecological process due to siltation of the water body, poor light penetration and suffocate may be detrimental to aquatic life	

Note: D& P: During Design and Planning, C: Construction, O: During Operation

Table 6.3: Environmental pollution

No	Environmental aspects	Ranking by Phase			Description	Mitigation Measures
		D& P	C	O		
15	Air pollution		B-		-During construction there will emissions of a lot of dust and hydro carbon and smoke /particulate matter from the construction machinery and vehicles at the construction site and along the access roads	- Have community awareness on the expected dusty conditions -The vehicles being used should be in good working conditions
16	Water Pollution by spills and leakages from the vehicles and machinery.	-	B-	-	-Water may be polluted by oil spills and leakages from vehicles and machinery. -Water turbidity and suspended solids downstream may occur during construction activities-this will affect the river water quality but it's for a short-term.	-Provide spill mitigation equipment such as oil skimmers and foam cover spraying equipment etc. - There should be a waste water disposal mechanism at construction site. - Removal of logs and plants before operation
17	Soil contamination	-	C-	-	- Soil contamination could be caused by spills and leakages during construction	-Avail spill mitigation measures
18.	Waste	-	B-	-	Wastes from construction waste could pose an environmental hazard at the destination points. Waste from camp sites will also be a major hazard	The contractor should have an intergraded waste management system in place.
19	Noise and Vibration	-	B-	-	-Noise and vibration levels are expected to rise from the construction vehicles and machinery	-Limit the construction to day-time only.

					-During operation, the impact on noise and vibration on the service roads is negligible due to the small traffic volume	-Notify the local community on the expected unusual noise and vibration levels during construction. -Proper maintenance of vehicles and equipments to minimize the noise levels -Monitor the noise and vibration levels. -Comply with NEMA standard on the levels of noise and vibration emitted from construction site.

Note: D& P: During Design and Planning, C: Construction, O: During Operation

ENVIRONMENTAL MANAGEMENT PLAN

Table 6.4: Environmental management plan

Project phase	Impacts	Cause of Impact	Mitigation Measures	Responsible Parties	Regulations	Estimated Cost
CONSTRUCTION PHASE	Loss of aesthetic value of land	As a result of burrow pits, quarries and stockpiles	-Refilling of all quarries and burrow pits to the original state to avoid creating breeding grounds for mosquito and snails, which are agents of transmitting malaria and bilharzias respectively.	-Contractor	System Design	As per contract
	Interference existing Social infrastructure	Excavation will affect livestock and human being corridors	-Construct bridges along the livestock /human corridors, -Excavation along the animals/human pathways should be done last	Contractor	System design	In developme nt cost
	De-forestation	-Bush and shrubs clearing	-Minimize number of indigenous trees cutting -Re-afforestation	-Local forest associations -Contractor	Forest Act, 2005	200,000
	Interference with Wildlife habitat	Clearing of the natural forest	- Identify and avoid wildlife corridors and migratory paths. -Trees planting -Setting aside woodlands	Contractor/ NIB/ forest Officer	Forest Act, 2005	500,000
	Soil Erosion	Reduction of land cover due to bush clearing and excavation of the canal	-Minimize number of trees cutting -Re-a forestation -Capacity building on how to practice sustainable Land Management such as minimum tillage and zero tillage because the project area is a fragile ecosystem.	-Local forest associations -Contractor -Agriculture extension officers	Forest Act, 2005	200,000

	Water Abstraction		-Obtain the necessary licenses from the Water Resources Management Authority. -Maintain the mandatory 30% river flow at all times and especially during low flow seasons for environmental flow and downstream users.	-NIB. -NIB	Water Act, 2002. Irrigation Act (CAP 347)	50,000/= 1,000,000/=
	Water Logging	Improper use of water, leaving taps running throughout the night.	-- Set up irrigation management teams (WUAs) to maintain the irrigation and drainage system. -Capacity building of irrigation farmers on use of water resource.	NIB and farmers. -Agriculture extension officers	Water quality regulations	300,000/=
	Siltation of water bodies and Increased turbidity	-Exposure of loose soil to agents of soil erosion -Disruption of stream flow.	-Compaction of loose material	Contractor	Water quality regulations	In development cost
	Anaerobic effects	Deposition of organic matter I the canal	- De-silt the canal and clear vegetation in canals.	-NIB and farmers	Water quality regulations	5,000,000
	Water pollution	-Exposure of loose soil to water and wind by transport and construction activities -Oil spills from vehicles maintenance	-Compaction of loose material/soils -All repairs and maintenance should be done at the contractors yard/garage	Contractor	Water quality regulations	In development cost
	Dust Pollution	-Excavation and vehicles movement	-Regulate traffic speed and movement -Apply daily water sprays to suppress dust. -Provide PPE to construction workers.	Contractor	Construction procedures	100,000

	Noise Pollution	Movement of machinery	-Use manual labour as much as possible. -Restriction of activities during daytime -Provide workers with PPE. -No idling of vehicles and machinery if not in use. -Construction to take the shortest time possible.	Contractor	Comply with EMCA (Noise and excessive Vibration Pollution Control Regulations).	100,000
	Interruption of transport channels	Trenches from excavation procedure	-Construct bridges/inverted siphons along the transportation channels/routes - Routes should be excavated as the last stage of construction.	Contractor	Construction procedures	In development cost
IRRIGATION PHASE	Possibility of Increased conflicts	-Human-wildlife Conflict	-Avail drinking points for the wildlife by construction of water pans along the canal -Fencing off the farms using solar power	-Provincial administration -Farmers -Opinion leaders	System operation and maintenance	5,000,000
	Siltation and flooding	-Soil erosion along the canal - Flood water from the river may destroy the intake and the first part of 200 m of the Rahole canal	-Ensure proper design and layout of field to avoid steep gradients. -Ensure appropriate terracing if possible -Ensure water application rate does not exceed soil intake rate. -Construction of water pans along the conveyance route -Protection against flood at the intake.	Farmers/ Contractor NIB/ Contractor NIB/ Contractor	System design	5,000,000
	Water pollution	Discharge of Agrochemicals and pesticide in rivers	-Apply appropriate irrigation procedures -Sensible use of agrochemicals -Adhere to waste discharge regulations	Farmers and District Agricultural Officers	Agriculture Act	No cost
	Waterborne diseases	-Water retained in the field and canals	-Creating community awareness and capacity building on the prevention measures such as spraying and use of treated mosquito nets.	Health Officer Farmers	Public Health Act	300,000

	Increase in pests and diseases	Excess use of agrochemicals/monoculture.	Training on safe use of agrochemicals to avoid resistance	Farmers, Ministry of Water and Irrigation, Ministry of Agriculture	Agriculture Act	200,000
	Aquatic Weeds/eutrophication	Excess use of agrochemicals	- Education on safe use of fertilizers.	-NIB Farmers and District Agricultural Officers.	Agriculture Act	200,000/=
	Salinization/ Leaching	Excess water application	-Avoid water logged conditions, where possible -Add humus to the soils regularly - Capacity building by Agricultural extension officers.	Farmers/ Contractor	System design	1,000,000
	Human-Human conflict.	-Human-Human conflict. Because of crops and livestock	- Capacity building on peace and governance issues. -Avail drinking points for livestock by construction of water pans along the canal.	Farmers, Ministry of Water and Irrigation, Ministry of Agriculture	Agricultural Act	3,000,000

ENVIRONMENTAL MONITORING PLAN

Table 6-1: Environmental monitoring plan

Environmental Issues	Monitoring Required	Time/Frequency	Monitoring and Evaluation Indicator	Applicable regulation	By Whom	Estimated Cost
Ensure EIA recommendations are followed during construction	Regular site inspections and meetings	Monthly	Inspection certificates, minutes of meetings	EMCA /design report	County Environment Officers and -NEMA office	50,000
Soil erosion during construction at the intake site and in the project area	Regular maintenance of the intake and canal	During draft and detailed design	Design code practice	As per the design report	Contractor	2,000,000
Irrigation induced soil erosion	Irrigation water application rates	Quarterly	Volumes of irrigation water used	As specified in design report	District WRMA Officer	10,000 per visit
Surface and groundwater contamination by fertilizers and pesticides	Regular water sampling and testing	After six months	Concentration of pesticides and inorganic fertilizers components	As per specified chemical regulations on administration	SCAO, WRMA	100,000 annually
Conflict over access to land use and land resources	Peoples complaints and disputes	Continuously	Number of complaints filed		Chiefs/ Community leaders	50,000 annually
Conflicts on access to water downstream	Availability to users	During the dry season	Number of complaints filed		WRMA/ Community leaders	20,000 annually
Increase in pests	Crop inspections	Quarterly	Pests /diseases	IPM	Public Health	20,000 annually

and diseases					officer/ Chiefs	
Invasive species	Crop inspections	Quarterly	Presence of weeds		SCAO	30,000 annually

6.5 Compensation Of People Affected By The Project

A Resettlement Action Plan (RAP) expert was sub contracted to identify the people affected by the project, affected assets and work out on modalities of compensation for the same. Several consultative meetings were held between the community and the RAP expert and the PAPs were identified, size of their land, structures and assets were identified. A valuer was engaged to establish the value of land, structures (houses and other improvements on land), crops and trees of the PAPs that would be affected by the construction of the irrigation infrastructure. The valuer was guided by respective village elders and the area Chief. The details of affected property and compensation costs are available and documented in a valuation report. A compensation committee was elected for the exercise (CWAP Report for Rehabilitation of Bura Irrigation and Settlement Scheme, Tana River County 2014).

During the meetings between the RAP expert and the community, it was agreed that the contractor should realign the canal to try as much as possible to ensure that he leaves the graveyards intact. However in case there are any affected graves, no cash compensation would be asked for but NIB as the proponent should ensure that the exhumed remains are reburied by contractor. Graveyard to be affected by dumping of excavated material to be fenced off so that they remain intact. For the affected mosques, the communities wanted compensation in kind whereby the National Irrigation Board would reconstruct the mosques (See Appendices; Minutes 11.3.1).

Disclosure of the compensation figures was done on 12th February 2015. The valuer from Ocra Company Limited disclosed that from research done during the valuation exercise the value of vacant land in the area to be affected by the construction of the new gravity canal was adopted as Kshs. 15,000.00 per acre. He also disclosed that a sum equal to 15% of the market value of the land was to be added as disturbance allowance. The value of land was thus declared as Kshs. 11,623,800 and the disturbance allowance as Kshs. 1,849,100. The total compensation for the land was thus disclosed as Kshs. 13,472,900 (See Appendices; Minutes 11.3.4).

The total number of parcels of land for compensation is 2914 and 2829 households were affected (some households had more than one parcel of land). Total area acquired for the way leave is 753.6 acres. The value for the structures was adopted at between Kshs. 1000 and Kshs. 2000 for temporary structures and between Kshs.2000 and Kshs.4000 for semi-permanent houses. The valuer disclosed a figure of Kshs. 6,112,900 for the structures. An additional 15% disturbance allowance (Kshs. 918,400) was added hence putting the final valuation for structures at Kshs. 7,031,300. Therefore, according to the figure for compensation for land and the structures was disclosed as Kshs. 20,504,200 (Kenya shillings twenty million five hundred and four thousand and two hundred)(See Appendices; Minutes 11.3.5 and CWAP Report for Rehabilitation of Bura Irrigation and Settlement Scheme, Tana River County 2014).

On Disclosure, the community leaders present accepted the list of PAPs as a true reflection of the situation along the area to be affected by the construction of the gravity canal. However, the leaders rejected the figure of Kshs. 15,000 per acre set for compensation indicating it was

very low. They requested the proponent to raise the figure to between Kshs. 40,000 and Kshs. 60,000 per acre for the land but maintain the 15% of the land market value as the disturbance allowance. A consensus of a final figure of Kshs. 40,000 was reached (Appendices; Minutes 11.3.5). Therefore, Grand Total Compensation is estimated at Kshs.80, 600,000

CHAPTER SEVEN

7 .DECOMMISSIONING

Decommissioning refers to the formal process of removing something from the operational status. It requires time in order to properly deal with potential hazards and risks that may be encountered.

Decommissioning an irrigation systems or a section of the systems (as may be applicable) means to set up an “unneeded-for-now” segment so that it does not require maintenance and its potential destruction, both chronic and catastrophic, is eliminated or greatly reduced. The construction investment is preserved, and should we wish to reconstruct, the cost is minimal. Decommissioning impacts are generally the reverse of the positive impacts of a project.

A typical decommissioning of an irrigation system involves water evacuation from the canal and pipeline, securing of irrigation infrastructure, demobilization of irrigation systems, pumps and plant and disconnection of power from mains, removal of unstable fills and configuration for long-term drainage, which includes measures such as out-sloping, water-barring, ditch removal and a variety of other site-specific solutions. It does not include full out-sloping/re-contouring of way leaves sections, unless this is clearly necessary for sediment yield reduction, which is unusual.

Decommissioning being the formal process of removing something from the operational status and being the final phase in the project cycle may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Positive impacts of decommissioning a project include, but are not limited to the following:

- Creation of jobs: For demolition to take place properly and in good time a source of labour is needed and several people will be involved. As a result several employment opportunities will be created for the demolition during the decommissioning phase of the proposed irrigation infrastructure.
- Site restoration: Upon decommissioning of the proposed project, rehabilitation of the project sites will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and revegetation which will lead to improved visual quality of the area. Land scaping of the area may be done.

The main negative impacts at the phase are mainly losses in the irrigation infrastructure. Other notable negative effects include;

- Loss of livelihood and the income earning capacity
- The generation of solid waste
- Noise pollution

- Dust and exhaust emissions hazards
- Occupational hazards

DECOMMISSIONING EMP

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame
Demolition waste	Use of an integrated waste management system for solid wastes through: Reduction; Reuse and Recycling. The other way is by sanitary land filling.	Project Manager and Contractor	Inspection and Observation	One-off
	All structures that will not be used for other purposes must be removed and recycled/reused as far as possible.	Project Manager and Contractor	Inspection and Observation	One-off
	All foundations must be removed, recycled or reused.	Project Manager and Contractor	Inspection and Observation	One-off
	Where recycling or reuse is not possible, the materials should be taken to a licensed waste disposal site.	Project Manager and Contractor	Inspection and Observation	One-off
Vegetation disturbance	Implement appropriate revegetation program to restore the site to its original status.	Project Manager and Contractor	Observation	One-off
	Consider use of indigenous plant species in re-vegetation.	Project Manager and Contractor	Observation	One-off
Increased occupational health and safety risks	Adherence to the Occupational Health and Safety Rules and Regulations stipulated in the Occupational Safety and Health Act, 2007.	Health and Safety Manager	Inspection, meeting and observation	Throughout decommissioning period
	Provision of appropriate personal protective equipment as well as ensuring a safe and healthy environment for demolition workers.	Proponent	Inspection and Observation	Throughout decommissioning period
	Mitigate demolition workers accidents by enforcing adherence to safety procedures and preparing contingency plan for accident	Health and Safety Manager	Meeting and Observation	Throughout decommissioning period

	response.			
Noise and vibration .	Sensitize demolition vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Project Manager and Contractor	Meeting	Throughout demolition period
	Sensitize demolition drivers to avoid hooting especially when passing through sensitive areas such as hospitals and schools.	Project Manager and Contractor	Meeting	Throughout demolition period
	Ensure that demolition machinery is kept in good condition to reduce noise and vibration generation.	Project Manager and Contractor	Inspection	Throughout demolition period
	Ensure that all equipment used are insulated or placed in enclosures.	Project Manager and Contractor	Inspection	Throughout demolition period
	The noisy demolition works will be planned to be done during the day only.	Project Manager and the site foreman	Observation	Throughout demolition period

CHAPTER EIGHT

8 PROJECT ALTERNATIVES

This ESIA study seeks to consider possible alternatives of the inputs and outputs that are to be used throughout the project cycle. These inputs include alternative sites, activities, products, materials, technology and waste management procedures among others. This study has therefore sought to identify and assess alternatives to the proposed developments so as to have the best working models that may not have adverse effects or those that have the least minimal effects. The best alternative is to be selected based on minimal negative impacts and cost benefit analysis.

The alternatives in the proposed Rehabilitation Of Bura Irrigation and Settlement Scheme project are discussed in terms of; no project option and irrigation technology options. The benefits and limitations of each alternative are considered in the choice of the best alternatives.

8.1 No irrigation option

The No irrigation project alternative option as far as the proposed irrigation project is concerned implies that the status quo is maintained. This alternative model helps the proponent and various decision making levels to approximate the impacts of project implementation against the non-implementation thereby making the right decision regarding project implementation.

This option is the most suitable alternative from a conservative environmental perspective as it ensures non-interference with the existing environmental conditions. Under the no project alternative, the National Irrigation Board proposal to rehabilitate and expand Bura Irrigation Canal Project would therefore not receive the necessary approval from NEMA.

As a result, the proposed irrigation project would not be constructed and there would be no expansion of Bura canal, no rehabilitation of the canal and no increase of acreage under irrigated agriculture. This option will however, involve several losses both to the proponent and the farming community as a whole. Food insecurity will persist and continue being a major challenge in Tana River County. The water and land resource would remain underutilized.

The No of project option is the least preferred option socio-economically because:

- Land would remain underutilized
- Increased water losses and wastage in the existing irrigation schemes thereby bringing about water scarcity
- Loss in productivity of the land
- Increased economic activities that are detrimental to the environment such as charcoal burning
- Reduced capital gains from the land
- Increased demand for agricultural inputs such as fertilizer and pesticides so as to promote outputs.
- No employment opportunities will be created
- Reduced economic growth
- Increased poverty levels resulting to crimes
- Discouragement for investors in the irrigated agriculture ventures.

The economic base of Bura Irrigation and Settlement Scheme Project area is low and needs to be improved so as to promote the fiscal outputs of the area. The effect of adopting this model largely

shows there will be huge losses to the local residents and the nation at large since the areas especially around Bura Irrigation Project would be provided for fruits and vegetables from the project. Therefore, from this analysis it is apparent that the No project alternative is no alternative to the people of Bura, Kenyans, and the government of Kenya

8.2 Irrigation technology options

Irrigation methods are the systems how to obtain water for irrigation purposes from its sources. The choice of irrigation methods depend on several factors such as topography, water resources, the plants cultivated, the land tenure systems, the growing seasons and the rain and water regimes. There are several irrigation methods that can be used in the project area. There is an apparent need to choose the most appropriate method that will promote the effectiveness in the water conservation measures. There was a consideration of various methods that would be used in the areas so as to ensure water conservation measures are promoted. Some of the methods include:

8.2.1 Surface irrigation

In this method, water flows to the land by gravity or force of nature, the irrigation water must be available at higher grounds/ levels than the recommended fields. Water is diverted from the main source by the head works and supplied to the field through a network of conveyance and distribution canals or pipes. Water can be supplied directly to the fields using canals, sprinklers or indirectly from a storage reservoir. Storing water in a reservoir or dam allows for more area to be covered but it is more expensive due to the high construction cost of the reservoir. This method is rather convenient to the project area since the water intakes will be set at Nanighi area which is higher in elevation than the other areas. The source of power will be gravity flow which will allow water to flow across the land in order to infiltrate and wet it. The most obvious advantage of gravity irrigation is that it is cheap to develop, and requires minimal investment on the part of the farmer. The method is the preferred irrigation development option for this project because:

- It is easy to maintain
- It has low operation and maintenance cost.

The major disadvantage of gravity irrigation is that it tends to lead to water logging and soil salinity if there are no provisions for adequate drainage

8.2 2 Flood Irrigation

This is a form of gravity irrigation from a river without the need for an intake structure to divert the water. Seasonal rains raise the streams and rivers courses and the flow waters can be used by the farmers to irrigate their fields. Channels can be constructed to maintain the water in the fields for as long as possible, and as the flood recede the residual moisture, is used by the crop. Once the floods and residual moisture have been exhausted the farmer can make use of the shallow water table and construct shallow wells to lift the water by bucket for watering/ irrigating the crops. However, the method could be prohibitive since it requires a significant amount of water to sustain thereby making it rather impracticable in these areas especially bearing in mind that the Bura Irrigation and Settlement Scheme Project lies in an ASAL area:

8.2.3.Sprinkler irrigation

Sprinkler or overhead irrigation is an irrigation system in which water is distributed throughout the field by the aid of high-pressure sprinklers. The idea is to simulate rainfall during dry weather. The advantages of sprinkler irrigation systems include their more even distribution of water when different

soil types are found within one irrigation scheme. Sprinkler irrigation systems are not affected by uneven land distribution. The disadvantage of sprinkler systems is that they are affected by windy conditions which disturb the even distribution of water from the sprinklers. The benefits of Sprinkler irrigation include: System losses (runoff, seepage) substantially reduced, over irrigation is completely eliminated and uniformity of application is high, irrigation water requirement reduced as compared to other methods, no land leveling required in the field and land use for productive purposes can be maximized, fertilizer can be injected in the irrigation water to reach the root zone directly and finally the system allows better weed control.
This option is not considered for Bura Irrigation and Settlement Scheme because:

- Sprinkler system has a high initial capital cost and high operational costs due to high energy requirements.
- Bura experiences dry and hot conditions which would lead to poor uniformity and low application efficiency.
- Crops will be more prone to diseases due to moist environment.
- Water with impurities and sediments may damage the system.

Therefore in conclusion, the sprinkler irrigation technology therefore not recommended as an option for Bura Irrigation and Settlement Scheme since the project is expected to optimize and conserve water among other benefits

8.2.4 Drip Irrigation

Drip irrigation is an irrigation system in which water is delivered at the root of the plant, drop by drop. It is also known as trickle irrigation. The main advantage of drip irrigation is that it is the most water-efficient method of irrigation, leveling off of the field not necessary, ability to irrigate irregular shaped fields, allows safe use of recycled water, moisture within the root zone can be maintained at field capacity, minimized soil erosion, minimized weed growth, uniform distribution of water minimal waste of fertilizers, foliage remains dry thus reducing the risk of disease.. The disadvantages are that it is the most expensive and least aesthetically pleasing method because of all the plastic lines which have to be installed close to each other on the ground. This kind of method is largely sustainable though prohibitive in terms of capital investments and especially when the project is large and diverse. This option is not considered for Bura Irrigation and Settlement Scheme development because:

- The costs for operation and maintenance are prohibitive; the initial cost can be more than overhead systems,
- It is affected by harsh weather conditions e.g. the sun can affect the tubes used for drip irrigation, shortening their usable life.
- If the water is not properly filtered and the equipment not properly maintained, it can result to clogging.
- Drip irrigation might be unsatisfactory if herbicides or top dressed fertilizers need sprinkler irrigation for activation thereby making them less effective.
- Salinity; most drip systems are designed for high efficiency, meaning little or no leaching fraction. Without sufficient leaching, salts applied with the irrigation water may build up in the root zone, usually at the edge of the wetting pattern.
- Drip tape causes extra cleanup costs after harvest. There will be a need to plan for drip tape winding, disposal, recycling or reuse.
- Waste of water, time and harvest may occur if the system is not installed properly.

The drip irrigation technology is not recommended as an option for Bura Irrigation and Settlement Scheme since the project is supposed to reduce operation and maintenance cost while maximizing crop yields. The area also has harsh weather conditions that can affect drip pipes.

CHAPTER NINE

9. CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

This study has been conducted to equip the Government, National Environmental Management Authority (NEMA), the project proponent National irrigation Board (NIB), project beneficiaries and other stakeholders with relevant and sufficient information about the proposed Rehabilitation of Bura Irrigation and Settlement Scheme project. It is hoped that NEMA would use this information to give a go ahead to the project and issue the proponent (NIB) with an Environmental Impact Assessment License.

The Rehabilitation of Bura Irrigation Scheme Project proposes to use a gravity fed system which will greatly reduce the operation and maintenance cost. The scheme was previously using pump fed irrigation system which has proved to be too expensive to the farmers.

The hectare covered by the project will increase from 2500ha of land registered under 2245 farmers to 6700ha of land covering 5150 families. This will enhance food security in the area which is in line with Vision 2030 where one of the key strategies is to increase agricultural productivity in Kenya and open up idle land to agriculture leading to improved agricultural activities.

The key positive socio-economic benefits of rehabilitating and expanding the Bura Irrigation and Settlement Scheme are enormous and will address persistent problems of irrigation water shortage that has affected the communities for a long time and expand the acreage of land under agriculture. There will also be improvement of food security for the targeted population.
The project will lead to availability of water both for domestic use, livestock, bees and other purpose during the wet and dry seasons.

The canal will ensure a reduction in the distance between the various households and the water collection points as compared to the long distances initially covered from the homesteads to the river.

There will be diversification of farming enterprise leading to improved nutrition in the area reducing malnourishment. Lower food prices will make food more affordable in most homesteads. The increase in agricultural related activities will open up the area and there will be improved infrastructure (roads and telecommunication) and social amenities (schools, mosques, churches and dispensaries).

There will also be an increase in economic activities in the area leading to an increase in employment to those working directly in the farms and to those working in other related sub sectors i.e. agro-inputs supply, processing and marketing of the farm produce. This will lead to a reduction in poverty levels of many households and improvement of living standards of the locals. It is anticipated that the proposed development project would bring substantial economic benefits not only to the local communities within the project area, but to the entire nation as a whole.
Field surveys and consultative public participation have indicated that there are a few negative socio-economic impacts during the operation and some disruption of public services during construction. Adequate mitigation measures have been suggested in the Environmental Management Plan and mitigation measures proposed to ensure that the impacts pose no threat to the environment and communities. However, the main negative impact of the project highlighted is displacement of people. A RAP (Resettlement Action Plan) has been conducted and ascertained the number of people affected

by the project. Compensation mechanisms have been worked out and the affected people have been duly compensated.

Overall, negative environmental impacts due to the rehabilitation of the Bura Irrigation and Settlement Scheme Project are deemed to be largely outweighed by the improved quality of life of the population through its implementation. If the project is not executed, food insecurity would continue being a major challenge in the area leading to low socio-economic status and high poverty levels.

9.2 Recommendations

Compensation: The people who were compensated for their losses by the project should be guided on wise investment and resettlement opportunities through capacity building mechanisms.
Implementation: It is recommended that the proposed rehabilitation of the Bura Irrigation and Settlement Scheme Project be implemented in compliance with all the relevant legislation and planning requirements of Kenya. In line with this, the proponent (NIB) and the contractor must take the legislative framework provided in this report into consideration, during and after the implementation of the project, as will be appropriate.
Adherence to Environmental Management Plan: In addressing the environmental issues, the contractor and/proponent/or NIB must follow the mitigation guidelines provided under the EMP. This will ensure the environmental and safety of farmers and the neighboring communities.

Annual Environmental Monitoring and Audit: During construction phase the consultant and the contractor is required to undertake Environmental Monitoring to ensure that the construction is done in compliance with the provisions of the ESIA license and during Operations NIB should undertake an environmental audit (EA) of the project, as required by the NEMA. This will ensure that the project does not lose track of its good environmental management record achieved during construction.

Involvement of relevant line ministries: It is important that during the implementation, relevant line ministries should be actively involved to address some of the cross cutting issues such as health (water borne diseases), WRMA (water resource use) among others stakeholders. This will ensure that emerging issues are tackled as they come. Water borne diseases that may occur include malaria, bilharzias and typhoid as the canals may act as breeding sites for mosquitoes and other bacteria causing vectors. Therefore, there is need for creation of awareness to the public on prevention and control of the diseases and expansion and equipping of existing health facilities to better cope with any outbreaks. Any investment in healthcare in the area is always welcomed in the community now and in the future.

CHAPTER TEN

10. REFERENCES

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CHAPTER ELEVEN

11. APPENDICES

11.1 Household Questionnaire

OCRA COMPANY LTD

BURA IRRIGATION AND SETTLEMENT SCHEME

Environmental and Social Impact Assessment Study

("We are part of a team from Ocra Consultants, who are conducting a social and environmental impact assessment study on the proposed Bura Irrigation and Settlement Scheme project. Your participation in answering these questions is very much appreciated and will be handled with utmost CONFIDENTIALITY.")

SECTION A: IDENTIFICATION & GENERAL INFORMATION

IDENTIFICATION

Name of Interviewer:……..
Date of Interview:……..
Name of Respondent:……..
Contact: address/Tel:……..
Position in the Household:……..
Name of Sub-County:……
Name of the Location……
Name of Sub – Location:……
Name of Village:……..

SECTION B: SOCIO-ECONOMIC ASPECTS

1. Type of housing

(i) Roofing:

1) Thatched 2) Corrugated Iron Sheets. 3) Tiles 4) other *(specify)* _____

(ii) Walls:

(1) Mud (2) Stone (3) Bricks (4) Timber/ wood
(5) Other *(specify)* _____

(iii) Floors:

(1)soil/mud (2) Cemented (3) Other (*specify*) _____

2. Details of household members starting with household head (HHs)

	Name	Age (years)	Sex (M/F)	Educ Level	Relation-ship to the Head	Source of Income	Profession	Working on farm Full Time/Part time
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Sex: 1=Male 2=Female: Educ Level: 0=None 1=Prim 2=Sec 3=Tertiary 4=University:
Relation: 1=Head 2=Spouse 3=Child 4=Relatives 5=others: Working: 1=Full time 2=Part time

3. How many household members fall into these categories live in your household?

	Children Under 15 years	
	Disabled Persons	
	Elderly (over 60 years)	
	Orphans	

4. What is the primary economic activity for the family?
Crop Farming 2) Fishing/ fish farming 3) Livestock rearing
4) Business 5) other *(specify)*……
5. What is your major source of income? 1. Farming 2.salary. 3. Business 4. Other *(specify)*……
6. If salaried, what is your profession? 1. Civil servant 2.Teacher 3.doctor 4.lawyer. 5. Engineer. 6. Other *(specify)*……
7. How else do you get incomes? 1. Salary 2.casual labour 3.business. 4. No off-farm income 5. Remittances

8. **Household Expenditures**

	Item	Weekly	Monthly	Annual
01	Cereals (sorghum, Millet, Maize etc)			
02	Pulses (Beans, cowpeas, Pigeon peas etc)			
03	Vegetables			
04	Roots/Tubers (Potatoes)			
05	Fish/Meat			
06	Cooking fat			
07	Milk			
08	Sugar			
09	Others			

Non-Food Items

	Item	Weekly	Monthly	Annual
10	Fuel (Cooking/lighting)			
11	School fees			
12	Clothing			
13	Transport Expenses			
15	Medical Expenses			
16	Repairs and Maintenance			
17	Communication			

SOCIAL AMENITIES

9. What health facilities do you have in the area?
   1. Hospital 2. Dispensary 3. Health Clinics 4.Private hospital
   5. Other *(specify)*……
10. At what distance is the nearest health facility that you use?

    1. Less than 1 hour walking (one way) 2. 1 to 3 hours walking (one way)
    3. Over 3 hours walking (one way) 4. My HH never use a health facility
11. Are you satisfied with the health facilities in your area? 1) Yes 2) No
12. If not why ……
    ……
    ……

13. At what distance from your house is the domestic water source?
    1. Own compound 2. Less than 1 hour walking (one way)
    3. 1 to 3 hours walking (one way) 4. Over 3 hours walking
14. How is the water quality? 1). Good 2). Fair 3) .Bad
15. For the last 5 years, what were the most common diseases in your household?

(Write "1" in front of most common disease, "2" in front of 2nd most common, etc.)

A. Malaria B. Diarrhoea C. Amoeba D. Typhoid E. Cholera
F. Skin diseases G. Others (specify)……

16. Do you have the following organizations in your area? *(Please name them)*
    a. Community organizations
    b. Cultural groups
    c. Non-governmental organizations (NGOs)
    d. Farmers organizations

e. Other (specify)

17. Are there any farmer's organizations in the areas? a. Yes { } b. No { }

(a) If yes, which ones?

ii) ……

iii) ……

iv) ……

v) ……

(b) Please list their roles and responsibilities?

vi) ……

vii) ……

viii) ……

18. How can you rate the standards of roads in your area?

(1) Very Good (2) Good (3) Average (4) Poor (5) Very poor

19. What are the main means of transport in your area?

(1). Bicycles (2) Matatus (3).Buses (4).Taxis (5) Pick-ups (6) Motor cycles

(5) Walking (6) others (specify)……

20. What do you use these means of transports for?

(1). To transport goods to the market (2). To go to the market (3). Carrying the sick to the hospitals (4). For income generating activities (5). Others……

SECTION C: AGRICULTURE AND AGRO-ECONOMY

21. What size of land do you own in the area which is being acquired for the construction of the gravity canal? …….. acres

22. What are your main land uses in terms of importance?

Land use	**Area (acres)**	**Rank/importance (rank 1 is most important)**
Food Crops		
(i)……	…….	…….
(ii) ……	…….	……
(iii)…….	…….	……
(iv) ……	…….	…….
Cash crops		
(i)……	…….	…….
(ii) ……	…….	…….
(iii)…….	…….	……
Pasture	……	……
Fallow	……	……
Trees	…….	…….
Other (specify)	……	……

23. How do you think the construction of the new gravity canal for the Rehabilitation of Bura Irrigation and Settlement Scheme Project will impact on your land use? (Tick appropriate)

Land use	Increase	Decrease
Food Crops		
Cash crops		
Pasture		
Fallow		

24. What type of livestock do you keep on your farm?

Type	Cattle	Goats	Sheep	Poultry	Other (specify)
No.					

25. Rank the following types of family labour according to their contribution in the farm (2010).
Women ____ men_____ Children_____
Code: 1=highly 2=Moderate 3=Least 99=Not used

26. Which tools or equipment do you use? (Tick appropriate section)

	Tool	Owned	Hired
1	Hand tool (Jembe/Fork)		
2	Plough(Oxen)		
2	Tractor		

27. Do you borrow/take credit? (1) Yes (2) No
If yes, where do you source credit/cash (1). Commercial banks (2). MFI (3). Groups (4). Others ……

28. Do you have contact with agricultural extension agents? (1). No (2). Yes
If yes, which ones
i. Government officers
ii. NGO
iii. Private
iv. Any other (specify) ……

29. **Marketing Information**

01	Where do you source your seed?	1. Stockiest 2. Cooperative 3. Own seed 4. Others (specify)	
02	Where do you source your pesticides?	1. Stockiest 2. Cooperative 3. Do not use 4. Others (specify) ----------	
03	Do you usually have surplus produce for sale?	1. Yes	2. No
04	Where/ to whom do you sell your produce?	1. Farmer groups 2. Local markets 3. Regional/urban markets 4.brokers/ middlemen 5. Big agro-processing companies 6. Others (specify)	
05	With the construction of the gravity canal, through who would you sell your produce?	1. Farmer group/groups 2. local markets 3. Cooperative societies 4. Brokers/ middlemen 5. Big agro-processing companies 6. Others (specify)	
06	Do you face challenges in marketing?	1. Yes	2. No
07	If yes, (in 06), list the challenges in order of priority?	i.	
		ii.	
		iii.	
		iv.	

30. Incomes currently realized from farming and other activities per annum

Source		(Kshs)	Source	(Kshs)
1.	Employment			
2.	Business			
3.	Crop income			
4.	Milk			

5.	Remittance			
6.	Other livestock			

SECTION D: ENVIRONMENTAL ASPECTS

31. Do you have a latrine/toilet in your homestead? 1. Yes 2. No
32. How do you dispose solid wastes from your homestead?

    a) Compost pit
    b) Burning
    c) Open land
    d) Others (specify)……..
33. How do you dispose waste water from your homestead?
    a) Sewer system
    b) Open ditches
    c) Open land
34. Which are the most common tree species on your land?
    a)
    b)
    c)
    d)
    e)
35. How do you use the trees on your land?
    a) Fruit trees/ food
    b) Sale of timber
    c) Fetch firewood
    d) Medicinal values
    e) Ornamental values
    f) Other (specify)…….
36. Are there any notable sensitive habitats in the area? (Forests, wetlands, sites of special cultural or scientific interest, dams, sloppy lands, etc.)? If any, briefly describe each.

Name	Description

37. Do you experience soil erosion in your farm? 1. Yes 2. No
38. If yes, how do you control soil erosion? (*Please explain)*
    1. Ditches/ cut offs
    2. Terracing
    3. Trash lining
    4. Planting grass/ cover crops
    5. Conservation agriculture
    6. Mulching

SECTION E: PROJECT AWARENESS AND PARTICIPATION

39. Are you aware of the proposed construction of the gravity canal for the Rehabilitation of Bura Irrigation and Settlement Scheme project in this area?

(1)Yes (2) No

40. If yes, how did you get that information? THROUGH: (1) Extension Service/MOALF 2) Chief's Baraza (3) Friends/Neighbours (4) Mass media (5)Other (specify)……..

41. Do you support the project? YES (ii) NO

42. Do you expect the proposed construction of the gravity canal and rehabilitation of Bura Irrigation and Settlement Scheme project to have any **<u>environmental impacts</u>**?

(i) Yes (ii) No

If yes, list them below;

Negative impacts

(i)……

(ii)……

(iii)……

(iv)……

Positive impacts

(i)……

(ii)……

(iii)……

(iv)……

43. How do you expect to be affected by the project*?(Please explain)*

1) Positive
2) Negative
3) Dont know
4) Others

44. What are the prime positive effects of the project?

1) A boost in food security
2) Water will be available for Irrigation in dry season
3) Increased incomes
4) Increased employment

45. What are the negative effects of the project?

1) Displacement of persons
2) Increase in waterborne diseases
3) Influx of people leading to social vices
4) others

46. How do you think these negative effects can be mitigated?

a. Enough land for resettlement

b. Health/social education

c. Others

47. If the canal passes by your land, are you willing to contribute the land?

1. Yes 2. No

THANK YOU

11.2 Letter Authorizing a Full ESIA Study

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Tel: (254-020)-6005522 / 3 / 6 / 7, 6001945, 6008767
Mobile line: 0724 253 398, 0723 363 010, 0735 013 046, 0735 010 237
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P. O. Box 67839 - 00200
Popo Road, Nairobi, Kenya
E-mail: dgnema@nema.go.ke
website: www.nema.go.ke

NEMA/PR/5/2/13,175

6th February, 2015

National Irrigation Board
P.O. Box 30372-00100
NAIROBI

RE: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY REQUIREMENT FOR THE PROPOSED REHABILITATION OF BURA IRRIGATION SCHEME, TANA RIVER COUNTY.

Initial review of the Project Report for the above mentioned development has revealed that the magnitude and the social risks associated with the proposed project demands wider public consultation and indepth coverage of the foreseen impacts and mitigation measures.

Pursuant to Section 58 of the Environmental Management and Coordination Act, 1999 and Regulation 10 of the Environmental (Impact Assessment and Audit) Regulations, 2003 Legal Notice No. 101, you are hereby asked to initiate an Environmental Impact Assessment Study to facilitate indepth evaluation of potential impacts associated with the proposed project and to materialize harmony with the affected and interested stakeholders.

Please liaise with your EIA experts for further guidance on the same and develop Terms of Reference for approval by the Authority.

KODIA D. BISIA
For: DIRECTOR GENERAL

11.3 Minutes of various Meeting and Workshop

11.3.1. Minutes Of Meeting With Bura Deputy County Commissioner On ESIA and CWAP For The Rehabilitation Of Bura Irrigation And Settlement Scheme, Tana River County Held

VENUE: **NIB HALL**

TIME: **11.00 AM**

DATE: **19th February 2014**

IN ATTENDANCE

NAME	DESIGNATION	CONTACT
Nyawira Kithinji	Social Development Officer, NIB	0722391456
Grace Ndungu	Environmentalist, NIB	0711884773
Reuben B. Loyotoman	Deputy County Commissioner-Bura	0722378359
Josiah Gathuni	Irrigation Engineer, NIB	0723867298
Jackson Lekonon	Assistant County Commissioner	072574375
Muhamed Bakuli	D/OCPD Bura	0725408955
Mohamed A. Osman	DAPC Bura	0726586788
Dennis Mwenda	Intern,NIB	0720677423
Eng. Bernard Maina	Ocra Company Ltd, Director	0722397440
Dr Rebecca Karanja	Ocra Consultants, Environmental Expert	
David N. Kiiru	Ocra Company Ltd, Sociologist	0721265590
Jacob Omondi	Sociologist, RAP Expert	0721371616

MIN 1: Preliminaries

Meeting started with prayers. Nyawira thanked the leaders for setting time to attend the meeting. She pointed out that the issue of compensation has affected the acquisition of the way-leave for the construction of the new canal. She told the meeting that NIB has finally brought on board the consultant to undertake ESIA and CWAP. She requested the leaders to look support the ESIA and CWAP study by urging their communities to provide the consulting team with the right information. This, she said would eliminate challenges during the implementation of the compensation plan.

Eng. Maina thanked the leaders for attending the meeting and requested them to support the ESIA and CWAP study team to ensure it accomplishes the task effectively.

MIN 2: Opening remarks by the Deputy County Commissioner

The Deputy County Commissioner started by welcoming all leaders to the meeting. He commented that the ESIA and the CWAP were long awaited by the community. He asked the leaders present to support ESIA and CWAP study so that the issue of compensation is dealt with and construction of the new gravity canal is implemented.

MIN 3: Project Briefs

Engineer Riyad from the resident consulting engineer for the Rehabilitation of Bura Irrigation Scheme Project said the new gravity canal would stretch for 26.325km. The canal would have a discharge of 11m3 per second. The infrastructure project would also cater for foot bridges for animals and people at an interval of 1km. Watering points for the animals would be provided at 500m intervals. The second phase of the project would involve the rehabilitation 57km of existing canals, bridges, workshops and houses. He urged the leaders to give the implementation of the project as it would greatly improve the standard of living of the people in Tana River County and Kenya. .

Jacob started by thanking the leaders for attending the meeting. He requested for the leaders support the ESIA and CWAP study as they are the ones with all the information and data of those to be affected. He then gave a description on how the process will be undertaken. During the visit the team was to hold meetings with leaders at different levels, hold meeting with community leaders from the 19 villages affected by the canal construction and come up with a schedule of activities for engagement with the community. During the second stage the team will hold meetings in all the 19 villages affected. The team will engage youth who will carry out a census of those affected and assets which will be lost or destroyed during the canal construction. A valuer will be brought on board to the cost to land and other properties affected during the project implementation. A sociologist will undertake the socio-economic survey. The team will then prepare the ESIA and CWAP study report.

MIN 4: Issues and Comments from the community

The meeting raised the following issues:

1. **Support to the ESIA and CWAP Study**

Mr. Komora told the meeting that he supported the ESIA and CWAP study. He also said that they were talking with their communities to ensure they cooperated with the consultancy team during the study. Other leaders in the meeting appreciated the consultation process and expressed their support to the study so that the persons affected by the way-leave acquisition are compensated.

2. **Cemeteries**

The leaders brought out the issue of cemeteries affected during the gravity canal excavation.

Response:

Nyawira commented that the government do not compensate for graves and cemeteries affected. However, funds can be available to perform any ceremony or ritual to appease the dead.

3. **Flooding at the Intake**

The leaders pointed out that the people at the intake who use the land along the river for crop production would be affected by flooding due to the weir construction. They enquired if these people could also be compensated as they will lose their sources of livelihood.

4. Absentee Land Owners

Some leaders brought out the issue of persons who migrated from the area where the way-leave for gravity canal is being acquired.

Response:

It was resolved that the local community leaders and elders would be the one to identify the owners of the affected pieces of land for compensation..

5. Community Requests

Corporate Social Responsibility

The leaders asked if the National irrigation Board (NIB) could build schools and dispensaries as part of its corporate social responsibility.

Minor Irrigation Schemes

The leaders requested if the NIB could allow the community along the new canal implement minor irrigation scheme.

Tree Planting

One leader requested for the involvement of NEMA in selecting trees to be planted along the canals.

MIN 5: Closing remarks

He DCC reiterated the need for the leaders to support the ESIA and CWAP team so that accomplishes the study as scheduled.

The schedule of meeting is to be pinned at the DCC's and Chiefs offices. The schedules will be displayed two weeks before the meeting. The Chief and assistant Chiefs will work together with the local community, headmen and elders to identify those to be compensated. The meeting ended at 3.15pm and was closed by a word of prayer.

ESIA AND CWAP FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RVER COUNTY

STAKEHOLDER CONSULTATION

ACTIVITY MEETING WITH SUB- COUNTY COMMISSIONER VENUE SUB-COUNTY COMMISSIONER'S OFFICE DATE 17/02/2014

NAME	ORGANIZATION / VILLAGE	TELEPHONE NO.	SIGNATURE
REUBEN B. LOTOTOMAN	COOP/COORDINATION	0722378359	
JACKSON LEKONDON	COOP/COORDINATION	0725574375	
Nyawira Kithinji	NIB	0722391456	
MOHAMED BAKULI	D/DCPO	0725408955	
MOHAMED A. OSMAN	D/Pk. BURA	0726586788	
Bernard Maina	Consultant-OCPA	0722387440	
JOSIAH GATHUNJI	NIB - BURA PROJECT	0723867298	
Grace Nduruju	NIB-	0711884773	
Dennis Mwendo	N.I.B	0720677423	
David N. Kiiru	OCPA COORDINATION UNIT	0721265590	
Jacob Omondi	"	0721371616	

11.3.2 Minutes Of Meeting With Deputy Governor Tana River County Government On ESIAAnd CWAP For The Rehabilitation Of Bura Irrigation And Settlement Scheme

VENUE: TANA RIVER COUNTY GOVERNOR'S OFFICE

TIME: 11.30 AM

DATE 18th February 2014

IN ATTENDANCE

NAME	DESIGNATION	CONTACT
Jire Siyat Mohamed	Deputy Governor, TRCG	0725889006
Nyawira Kithinji	Social Development Officer, NIB	0722391456
Grace Ndungu	Environmentalist, NIB	0711884773
Reuben B. Loyotoman	Deputy County Commissioner	0722378359
Josiah Gathuni	Irrigation Engineer, NIB	0723867298
Dennis Mwenda	Intern,NIB	0720677423
Eng. Bernard Maina	Ocra CompanyLtd, Director	0722397440
Dr Rebecca Karanja	Ocra CompanyLtd, Environmental Expert	0722601849
David N. Kiiru	Ocra CompanyLtd, Sociologist	0721265590
Jacob Omondi	Sociologist, RAP Expert	0721371616

MIN 1: Preliminaries

Nyawira thanked the Deputy Governor for making time for the team. She told the meeting that the visit was to introduce the consultancy firm which is to undertake the ESIA and CWAP study. She informed the meeting the CWAP is key to the issue of compensation which was one of three issue agreed upon during the meeting theld in Nairobi between Tana River County leaders, the NIB and the Ministry of Agriculture, Livestock and Fisheries. The other two issues were labour and sub-contracting of services which were being implemented. She also said leaders at all levels were key to the success of the study hence the need to inform them and to seek their support. The Deputy County Commissioner also thanked the Deputy Governor for receiving the team.

MIN 2: Opening remarks by the Deputy Governor.

The Deputy Governor thanked the team for using the right entry approach to the community. He pointed that the Tana River County Government supported the Bura Rehabilitation Project. He said that leaders and administration understand the policy issues of compensation while most of the leaders at the grassroot level may not have all the facts. He said it was important to engage all leaders can communicate with their communities so that the ESIA and CWAP are completed and compensation paid.

MIN 3: Project Brief

Josiah Gathuni gave the technical aspects of the Bura Rehabilitation Project. He told the meeting that the gravity canal project has been funded by the Kuwait and Kenya Governments. He said that there were three sections in the infrastructure development. This sections are a weir at Sala, the 26 kms canal from the intake to Nanighi (where it join the old canal) and the new canal to take water to Masabubu. He informed the meeting that the canal with will be 12 meters and 4 meters deep. The way-leave for the canal was 100m wide. He said the project will provide livestock watering points at every 500m, footbridges at 1 km intervals.

Jacob started by indicating that the team visit was a part of the inception of the ESIA and CWAP study. The activities study activities entail undertaking the ESIA and CWAP study, mapping and carrying out consultations with the stakeholders, socio-economic baseline surveys and preparation of the ESIA and CWAP study report.

The meeting resolved that the community leaders needed to communicate to their communities that the study was for the purpose of compensation and mitigation of environment and social impacts.

MIN 4: Issues and Comments

The meeting raised the following issues:

Consultancy Period and Compensation

The Deputy Governor raised concern on the period to be taken to produce the report. This he said would affect the period for payments for compensation. He noted that the compensation issue could delay the completion of the project.

Response:

Nyawira informed the meeting that the ESIA and CWAP final report is to be completed by the end of April 2014. Thereafter the NIB will immediately initiate the process of getting funds to undertake the compensation.

6. Political Support

The Deputy Governor said that the Tana River County Government will full support all aspect of the implementation of the Bura Rehabilitation Project. The County Government is supporting farmers in the old Bura Irrigation with money for loans.

MIN 5: Closing remarks

The Deputy Governor requested for the team to make sure communication about project where MPs and MCAs are to participate is sent early. He pointed out that this would ensure their participation and hence support for the project.

The meeting ended at 12.30pm.

ESIA AND CWAP FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RVER COUNTY

STAKEHOLDER CONSULTATION

ACTIVITY CONSULTATION WITH **VENUE** GOVERNOR'S OFFICE **DATE** 13/02/14
GOVERNOR TANA RIVER

	NAME	ORGANIZATION / VILLAGE	TELEPHONE NO.	SIGNATURE
1	JIRE SIYAT MOHAMED	DEPUTY GOVERNOR (TRC)	0725889006	
2	R.B. LOYOTOMBA	DCC TANA NORTH	0722 328 358	
3	NYAWIRA KITHINJI	NIB HQs	0722391456	
4	Grace Ndungu	"	0711884713	
5	Bernard Maina	OCK Co Ltd	0722 397440	
6	Dennis Mwenda	N.I.B	0720677823	
7	David N. Kiiru	Ocra Consultancy Ltd	0721 265590	
8	JOSIAH GATHUNJI MBURU	NIB – Bura Project	0723867298	

11.3.3 Minutes of meeting with local community leaders on ESIA and CWAP for the rehabilitation of Bura irrigation and settlement scheme

VENUE: **BURA REHABILITATION PROJECT CONTRACTOR'S SITE, SALA**

TIME: **11.25 AM**

DATE **20th February 2014**

MIN 1: Preliminaries

Meeting started with prayers. The Assistant Deputy Commissioner Mr. Lekonon recognized the important roles the leaders were performing of providing information and linkage between the communities, the NIB, the contractor and all other stakeholders involved in the Bura Rehabilitation Project.

Nyawira thanked all the local leaders and elders from the 19 villages to be affected by the new gravity canal. She urged them to assist the team carrying out the ESIA and CWAP. She said their support in mobilizing their communities and providing the right information to the study team is of great importance in minimizing conflicts and challenges during the compensation exercise.

Eng. Maina thanked the leaders for attending the meeting and requested them to support the ESIA and CWAP study team to ensure it accomplishes the task effectively.

MIN 2: Opening remarks by the Deputy County Commissioner

The Deputy County Commissioner started by welcoming all present to the meeting. The DCC emphasized that the meeting should focus mainly on the carrying out of the ESIA and CWAP study. He pointed out that to accomplish the payment of compensation the local leaders will be key in identifying those affected by the project. He therefore urged the leaders to be guided by justice throughout the ESIA and CWAP study.

He also noted that some members of the community were putting up new structure along the area where the new canal was to be built. He said those new structures will not be compensated. He therefore asked all the leaders present to support ESIA and CWAP study so that the issue of compensation is dealt with and construction of the new gravity canal is implemented.

MIN 3: Project Briefs

Jacob started by thanking all attending the meeting. He reiterated that the support of all leaders and especially those at the community level is crucial to the success of the ESIA and CWAP study. The leaders at the community had information on the ownership of the properties which will be affected during the construction of the new gravity canal.

He then gave a description on how the process will be undertaken. The first stage of the field activities will involve holding meeting in all the 19 villages. During the meeting the team will explain to the community on the process of carrying the ESIA and CWAP study. The team will also explain to the community of how they will collaborate with the team to accomplish the study.

In the second phase of the field activities the team will look at what will be affected along the 26km way-leave. The team will engage enumerators who will carry out a census of all the persons affected and

assets which will be lost or destroyed during the canal construction. During the A valuer will be part of the team who will cost the value of land and other properties affected during the new gravity canal construction. A sociologist will undertake the socio-economic survey. The team will then prepare the ESIA and CWAP study report.

Jacob then read the schedule of meetings to be held from 10th March 2014 to 13th March 2014. The schedule of meeting was to be pinned at the DCC's and Chiefs offices for two weeks.

MIN 4: Issues and Comments from the community

The meeting raised the following issues:

Committees at Community Level

Mr. Komora told the meeting that the leader's meeting held in Bura on 19th February 2014 agreed that the villages form committees to vet those affected by the construction of the gravity canal. The committee would be composed of the chiefs, assistant chiefs and headmen and 2 elders. He emphasized that the decisions of the committees were the only ones to be used by the ESIA and CWAP study. He and other leaders urged the committee to be just in their decisions so that the genuine persons affected by the way-leave acquisition are compensated.

Cemeteries

The leaders brought out the issue of cemeteries affected during the gravity canal excavation.

Response:

Jacob told the leaders that they ensure the cemeteries were captured by the enumerators during the census.

Nyawira commented that the government does not compensate for graves and cemeteries affected. However, funds can be available to perform any ceremony or ritual to appease the dead.

7. Effect of New Gravity Canal

The leaders were concerned after the new gravity canal become operational there will be no flooding downstream on land they use for crop production. This would affect the livelihoods of the farmers. They enquired if these people could also be compensated as they will lose their sources of livelihood.

Footbridges, Animal Crossing , Watering Point

Some leaders wanted to be reassured about accessing the river and other resources on both sides of the new gravity canal.

Response:

Gathuni reassured the community leaders that the designs provide for footbridges and animal crossing at an interval of 1km and animal watering point at intervals of 500m along the 26km canal.

Environmental Concerns

One leader told the meeting that the excavation and works were producing a lot of dust . He was also concerned with the way the contractor was dumping the excavated materials.

Response:

Jacob pointed out that the environmental issues were being covered under the ESIA and CWAP study. He said appropriate mitigation measures will be recommended and carried throughout the construction.

Community Requests

Corporate Social Responsibility

The leaders asked if the National irrigation Board (NIB) could build schools and dispensaries as part of its corporate social responsibility.

Minor Irrigation Schemes

The leaders requested if the NIB could allow the community along the ne w canal implement minor irrigation scheme.

Response:

Nyawira told the leaders that she would take their request to the NIB headquarters for their action.

MIN 5: Closing remarks

The DCC reiterated the need for the leaders to support the ESIA and CWAP team so that it accomplishes the study as scheduled.

The meeting ended at 1.05pm with a word of prayer.

(1)

ESIA AND CWAP FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RVER COUNTY

STAKEHOLDER CONSULTATION

ACTIVITY: Meeting with community leaders VENUE: B.C.C DATE: 14/02/14

NAME	ORGANIZATION / VILLAGE	TELEPHONE NO.	SIGNATURE
Allan G. Yidonyi	Agriculture	0721945282	[signature]
Mohamed Dhadho	Munyoya C.E.	0710454807	[signature]
Osman Diramna	Asst Chief Sala	0718415628	[signature]
Abdi B. Shure	Chief Sala	0710680025	[signature]
Callistus I. Thoya	Water	0721148840	[signature]
Mohamed R. Hiribae	Chief Nanighi	0729870358	[signature]
Jones M. Mwantala	NIS Field Officer Bura	0720599915	[signature]
Mahmud Balacha	Chief Bura	0719475801	[signature]
Abdi Waticho Jilo	Youth Leader	0705722202	[signature]
Omar Adhan Ganad	A/Chief Bisiruka	0727073192	[signature]
Hassan Guro	Chief Hirimani	0713870467	[signature]
Suleiman Abdi Hussein	Faith Leader	0713354355	[signature]
Issa Haji Elmi	A/Chief	0701483199	[signature]
Abdullah Godana	PE	0704047312	[signature]
Yussuf Doya	Ag. Sec.	0718382904	[signature]
Abdurehman Hassan	Envo. / Reddy Nema	0725492023	[signature]
Osman Jarso	Nurk / Hosp	0703750350	[signature]

(3)

ESIA AND CWAP FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RVER COUNTY

STAKEHOLDER CONSULTATION

ACTIVITY: Meeting with Community Leaders VENUE: B.C.C DATE: 19/02/14

NAME	ORGANIZATION / VILLAGE	TELEPHONE NO.	SIGNATURE
R. B. Lowi Tonka	Sec-T/Bwk	0722 378 378	[signature]
Eng. Abdelbasset Rewal	Sabbour/CoS Consultant	0714444026	[signature]
Hon David Galgalo	MCA	0717336898	[signature]
Mohamed Bawl	B/DCPD	0725408955	[signature]
Eng. Bernard Mainn	OCK Consultants	0722 397446	[signature]
Jackson Lekuon	ACC Bura HMD	0725574375	[signature]
Josiah Mathuni	NIB - Bura Project	0723867298	[signature]
Mohamed A. Ismail	DAPC Bura	0726586788	[signature]
David N' Kiiru	OCK Consultants Ltd	0721 265590	[signature]
Dennis Mwenda	N.I.B	0720677423	[signature]
Abdi Burale	Community leader Bura	0733291104	[signature]

(2)

ESIA AND CWAP FOR REHABILITATION OF BURA IRRIGATION AND SETTLEMENT SCHEME, TANA RVER COUNTY

STAKEHOLDER CONSULTATION

ACTIVITY: Meeting with Community Leaders VENUE: B.C.C DATE: 19/02/14

NAME	ORGANIZATION / VILLAGE	TELEPHONE NO.	SIGNATURE
Allan G. Vidonyi	Agriculture	0721949282	[signature]
Mohamed Dhadho	Munyoyaya C.E.	0710454801	[signature]
Osman Dalana	Asst Chief Sala	0718415628	[signature]
Abdi Shure Buto	Chief Sala	0710800025	[signature]
Abdi Abdullahi Mud	Kiongozi Vijana	0717408791	[signature]
Adhan Mohamed	Muzee Wan	0736818849	[signature]
Yahya Romadha	Community ELD	0710269301	[signature]
Hon. Harun Hassan	MCA Tana River	0713931736	[signature]
Hon Sadick D. Karani	MCA Tana R.	0723575144	[signature]
Hon Abdi E. Gobu	M.C.A Tana River	0724043430	[signature]
Malim Farah	Ibrahim	0728456725	[signature]
David Mwauri	Administration police	0729877106	[signature]
Dominic Mbuvi	Administration police	0715211104	[signature]
Grace Ndungu	NIB	0711884713	[signature]
Mwige Kitaka	NIB	0711756124	[signature]
Jillah A. Khamisi	Driver	0726066321	[signature]

11.3.4 Minutes Of Meeting With The Compensation Committee On Disclosure Of Compensation For The Canal Way leave Acquisition Plan (CWAP) For The Rehabilitation Of Bura Irrigation And Settlement Scheme,

VENUE:BURA COUNTY CLUB

TIME: 9.30 AMDATE 12th February 2015

IN ATTENDANCE

NAME	DESIGNATION	CONTACT
Nyawira Kithinji	Social Development Officer, NIB	0722391456
Reuben B. Loyotoman	Deputy County Commissioner-Bura	0722378359
Josiah Gathuni	Irrigation Engineer, NIB	0723867298
Jackson Lekonon	Assistant Deputy County Commissioner	072574375
Muhamed Bakuli	D/OCPD Bura	0725408955
David N. Kiiru	Sociologist, Ocra Company Limited	0721265590
Rebecca Karanja	Environmentalist, Ocra Company Ltd	0722601849
Nicholas Kimanthi	Valuer, Sociologist, Ocra Company Ltd	0727741501

MIN 1: Preliminaries

Meeting started with prayers. The Assistant Deputy County Commissioner (ADCC) Mr. Lekonon invited all the participants to the meeting. The ADCC then requested all the participants to introduce themselves.Nyawira thanked all the local leaders and elders from the 19 villages traversed by the new gravity canal. She urged them to pass the correct information on the amount of money agreed upon for the compensation to their village and communities. She commented that this is important in minimizing anxiety and challenges during the payments for compensation.

Kiiru on behalf of the Ocra Company Limited thanked the leaders for the support in providing information both to the communities and the consultants during the CWAP exercise. Kiiru commented that their continued support would ensure the issue of compensation payment would be finalized as scheduled during the March 2015.

MIN 2: Opening remarks by the Deputy County Commissioner

The Deputy County Commissioner Mr. Loyotoman started by welcoming all present to the meeting. The Deputy Count Commissioner reiterated the important roles the leaders were performing in the CWAP exercise by providing information and linkage between the communities, the NIB, the contractor and all other stakeholders involved in the Rehabilitation of Bura Irrigation and Settlement Project.

The DCC emphasized that the meeting should focus mainly on the finalizing the compensation of the Persons affected by the Project (PAPs). He urged the leaders to be open during the discussion on the proposed rates and figures to be disclosed during the meeting. He reminded the leaders of the importance and huge economic benefits to the sub county, county and the country the project will have when finished and operational. He therefore requested the leaders to provide leadership to their communities so that the project is accomplished as scheduled.

MIN 3: The CWAP Exercise Briefs

Kiiru started by thanking all the participants for attending the meeting. He reiterated that the support of all leaders and especially those at the community level is crucial to the success of the CWAP exercise.

He then gave a description on how the CWAP exercise was undertaken. The first stage of the CWAP involved involve d holding meeting in all the 19 villages. During the meetings the team provided information on how the CWAP was to be carried out.In the second phase of the CWAP exercise the team looked at who and what was being affected by the project along the 26km way-leave which was targeted for acquisition by the NIB to for the gravity canal for the Rehabilitation of Bura Irrigation and Settlement Project. The team trained and engaged enumerators from the communities where the gravity canal will pass. The enumerators carried out the census of all the Persons Affected by the Project (PAPs), their properties and assets which will be lost or destroyed during the gravity canal construction.

The valuer then came on board to establish the value of land, structures (houses and other improvements on land), crops and trees of the PAPs that would be affected by the construction of the irrigation infrastructure. The valuer was guided by respective village elders and the area Chief.

Kiiru told the meeting that the details of affected property and compensation costs were available and documented in Volume III– Valuation Report.

MIN 4: Disclosure of the compensation figures

Nicholas thanked all those present for the information and support they provided during the valuation phase of the CWAP. He then presented the valuation report to the meeting.

The valuer from Ocra Company Limited disclosed that from research done during the valuation exercise the value of vacant land in the area to be affected by the construction of the new gravity canal was adopted as Kshs. 15,000.00 per acre. He also disclosed that a sum equal to 15% of the market value of the land was added as disturbance allowance. The value of land was thus declared as Kshs. 11,623,800/= and the disturbance allowance as Kshs. 1,849,100/=. The total compensation for the land was thus disclosed as Kshs. 13,472,900/=.

The value for the structures was adopted at between Kshs. 1000 – Kshs. 2000 for temporary structures and between Kshs.2000 – Kshs.4000 for semi-permanent houses. The valuer disclosed a figure of Kshs. 6,112,900/= for the structures. An additional 15% disturbance allowance (kshs. 918,400/=) was added hence putting the final valuation for structures at Kshs. 7,031,300/=. Therefore, according to the figure for compensation for land and the structures was disclosed as Kshs. 20,504,200/= (Kenya shillings twenty million five hundred and four thousand and two hundred)

Nicholas then told the meeting that the figures would change as there were adjustments to the area the NIB was to acquire for the gravity canal construction. The additional area he said was to cater for dumping of materials during construction. The areas were to be adjusted as follows; in the first 5 kilometers (0-5km) the width would increase from 120m to 150m and from the 5-26.3km the increase will be from 120m to 130m. A continuous dumping site of 70m on both side from 0-5km and 45m both sides from 5-26.3km will be included in the compensation.

MIN 5: Issues and Comments from the community leaders

The meeting raised the following issues:

8. Valuation of the land

The leaders present accepted the list of PAPs as a true reflection of the situation along the area to be affected by the construction of the gravity canal. However, the leaders told the meeting that the figure of Kshs. 15,000.00 per acre set for compensation is very low and might not be accepted by the PAPs. They asked the NIB to at least provide between Kshs. 40,000.00 to Kshs. 60,000.00 per acre for the land.

Response:

Nyawira told the leaders that after consulting through the phone to NIB management; they had proposed to adjust the figure to Kshs. 40,000.00 per acre and also maintained the 15% adjustment for disturbance.

Nyawira then requested the Ocra Company Limited to take one week to adjust the report and present the final CWAP report to the compensation committee for adoption and subsequent implementation.

9. Community Requests

Corporate Social Responsibility

The leaders asked the National irrigation Board (NIB) to consider build schools and dispensaries as part of its corporate social responsibility.

Minor Irrigation Schemes

The leaders requested if the NIB could allow the community along the new gravity canal to implement minor irrigation scheme to boost their food security and incomes.

Response:

Nyawira told the leaders that she forward their request to the NIB headquarters for their action.

MIN 5: Closing remarks

The DCC reiterated the need for the leaders to pass the correct information from the deliberation of the meeting so that the compensation is finally finished and the project implantation could begin.

The meeting ended at 2.05pm with a word of prayer.

NATIONAL IRRIGATION BOARD

Ocra Company Limited

Activity: COMPENSATION COMMITTEE MEETING ON DISCLOSURE

Venue: BURA COUNTY CLUB (BCC)

Date: 12/02/2015

Serial No.	Name	Village/community	ID/No.	Signature
1.	Abdirahman Jillo	Bahama	4467782	[illegible]
2.	Ali H. Homa	Tula	8266018	[illegible]
3.	Ramadhan Ghara	Gale	20662459	Radhan
4.	Juma Ali	Darbolo	5444013	Judi.
5.	Yusuf Bulo	Bishemo	31130 31	Yusuf
6	Mohamed Godana	Medelkohs	23666229	[illegible]
7	Mohamed Shiko	Dhida	26507846	Kamo
8	Kaum Mohamed	Kaludhe	20273008	[illegible]
9	Mohamed Dabolo	Dharme	3922847	[illegible]
10	Ghabulu Ashako		14608011	Ghabulu
11	Ali Osman	Mahibale	27622462	O.Ali
12	Isak O. Jillo	Kamudhe Chum	219440	Jillo
13	Guthuma Hubara	Nanighi Centre	8267138	[illegible]
14	Ali Hubare	Zajmo	11893255	Ali Hubare
15	Abdikarim Mogo	Nanighi Jua	9768681	[illegible]
16	Gabol K. Omar	Nanighi Jua	5445330	Kamoro
17	Yusuf Homa	Milwaki	21495827	[illegible]
18	Shebe Ali	Dubai	26811404	Ali
19	Jarso Gube	Sala	5454437 24	[illegible]
20	BATIKA MOHAMED	ASST. CHIEF NANIGHI	11892674	[illegible]
21				

NATIONAL IRRIGATION BOARD

Ocra Company Limited

Activity: Compensation Committee Meeting on Misclosure Issues

Venue: Buna County Club (BCC)

Date: 12/02/2015

Name	Village/community	ID/No.	Signature
Yakuby M. Kamare	Orme	3458702	[signature]
Hamedu B'Sine	Wilwana	18401604 82	[signature]
Mohamed Wako	Muyajaye	3168 97	[signature]
Daudi Shure	Wata	31:20 311	[signature]
Abdi M. Somene	Wardei	1304445	[signature]

11.3.5 Minutes Of Meeting With The Compensation Commitee On Disclosure Of Compensation For The Canal Way leave Acquisation Plan (CWAP) For The Rehabilitation Of Bura Irrigation And Settlement Scheme

VENUE: BURA COUNTY CLUB

TIME: 10.00 AM

DATE: 27th February 2015

IN ATTENDANCE

NAME	DESIGNATION	CONTACT
Nyawira Kithinji	Social Development Officer, NIB	0722391456
Reuben B. Loyotoman	Deputy County Commissioner-Bura	0722378359
Josiah Gathuni	Irrigation Engineer, NIB	0723867298
Muhamed Bakuli	D/OCPD Bura	0725408955
David N. Kiiru	Sociologist, Ocra Company Limited	0721265590
Rebecca Karanja	Environmentalist, Ocra Company Ltd	0722601849
Nicholas Kimanthi	Valuer, Sociologist, Ocra Company Ltd	0727741501

MIN 1: Preliminaries

Meeting started with prayers. The Deputy County Commissioner (DCC) Mr. Loyotoman invited all the participants to the meeting and requested all those present to introduce themselves. Nyawira thanked the compensation committee for their commitment and support which were crucial in the final stage of the compensation exercise.

She asked the leaders to be focused so that all issue which could derail the process are dealt with in the meeting. Kiiru on behalf of the consultant company thanked the compensation committee for all the support and dedication they have shown during the entire process of the CWAP. He commented that he was sure to finish the work as schedule with the support of the compensation committee.

MIN 2: Opening remarks by the Deputy County Commissioner

The Deputy County Commissioner Mr. Loyotoman started by welcoming all present to the meeting. The Deputy County Commissioner expressed his satisfaction at the way the compensation issue was progressing. He told the committee he was confident that finally the PAPs will be compensated and the other components of the project implementation could commence.

He informed the committee that the security in the area was good and the communities were supportive to the compensation process.

MIN 4: Disclosure of the Adjusted CWAP Report

Nicholas thanked all those present for the support and patience they have show during the whole period of the CWAP exercise. He told the meeting that he had done the adjustment to valuation report as requested in the last compensation meeting. He then gave the revised figures for the land and structures.

Revised Valuation of Land and Structure

The valuation of land and structures after the adjustment of rate per acre from Kshs. 15,000/= to Kshs. 40,000/= is as follows:

Summary for land value estimates

Value of land	Kshs. 61,217,371/=15%- Disturbance Allowance Kshs. 9182609/=
Sub-Total	**Kshs.70,400,000/=**

Summary for structures value estimates

Value of structures Kshs. 8,869565/=

15%- Disturbance Allowance Kshs. 1,330435/=
Sub-Total Kshs.10,200,00/=
Therefore, Grand Total Compensation is estimated at **Kshs.80,600,000/=(Read, Kenya Shillings Eighty Million Six Hundred Thousand).**

MIN 5: Issues and Comments from the community leader

The meeting raised the following issues:

10. Payment of the Compensation money

The compensation members wanted to know when the PAPs would be compensated. They also wanted to know the mode of payments as most of the PAPs do not have bank accounts.

Response:

Nyawira told the meeting that the NIB would like to finalize the payment as soon as possible as the reports from Ocra Company Limited had been finalized and accepted by the board. She then told the

meeting that the NIB would consider their concern on the lack of bank accounts when making the final decision on how to pay the money to the PAPs.

Community Requests

Corporate Social Responsibility

The leaders requested Nyawira to respond to the issues they raised in the last meeting on the corporate social responsibility.

Response:

Nyawira told the leaders that she forwarded their request to the NIB headquarters as she promised. However, she told the meeting those are issue to be dealt with during the carrying out of the Environmental and Social Impact Assessment (ESIA) for the project.

MIN 5: Closing remarks
The DCC reiterated the need for the leaders to pass the correct information from the deliberation of the meeting so that the compensation is finally finished and the project implantation could begin.
The meeting ended at 3.30pm with a word of prayer.

NATIONAL IRRIGATION BOARD

Ocra Company Limited

Activity: Meeting of Compensation Committee on Payment of Compensation

Venue: Bura County Club (BCC)

Date: 27/02/2018

Serial No.	Name	Village/community	ID/No.	Signature
	Jambo Guye	Sala	54543724	[signature]
	Shebe Ali	Sala	26811404	[signature]
	Yusuf Homa	Ilwamdhe	21495827	Hamaya
	Gabei K omar	Nanighi Jua	5445380	Karubono
	Abdikarim Mogo	Nanighi Juu	9768681	[signature]
	Ali Hidaro	Jejaro	11893255	Ali Hidaro
	Gathumo hidaro	Nanighi Centre	8267138	[signature]
	Isach O. Jillo	Kamudhe ehiru	219440	[signature]
	Ali Osman	Mahi baba	27622462	O Ali
	Ghabule Ablako	Dharime	14608011	Ghabulu
	Mohamed Babolo	Dharime	3922847	[signature]
	Kaum Mohamed	Kamudhe	20273008	[signature]
	Mohamed Shiko	Dhida	20507846	Kaume
	Mohamed Godana	Medeleche	3112031	Mohamed
	Yusuf Dulo	Onshembo	5444013	Yusuf
	Juma Ali	Babolo	20162459	[signature]
	Ramadhan Ghobo	Gale	8266018	Radhaa
	Ali H. Homa	Tula	4407732	[signature]
	Abdirahman Jillo	Bahana	11889636	[signature]
	Mohamed K Hiribae	Chief Nanighi	9769820	Nakibe

NATIONAL IRRIGATION BOARD

Ocra Company Limited

Activity: MEETING OF COMPENSATION COMMITTEE ON PAYMENT OF COMPENSATION

Venue: BURA COUNTY CLUB (BCC)

Date: 27/02/2015

Serial No.	Name	Village/community	ID/No.	Signature
	Yakubu M. Kamora	Orma	3458702	YKamora
	Hamadi Bisine	Wilwana	1840164 82	[signature]
	Mohamed Wako	Muyogaye	816897	Mohad
	Daudi Shure	Waté	3130311	[signature]
	Abdi M. Somene	Wardel	1304445	[signature]

11.4 Sample of Way Leaves Acquisition Agreements

WAYLEAVE AGREEMENT. Serial 0001.....

THIS WAYLEAVE AGREEMENT is made this 9th day of DEC 2014 between AHMED MADOWE MAALIM of P.O. Box 1 and the holder of **ID** 22779592 0 **of** MANIGA Sub-location,.....Location .....District in the Republic of Kenya (here in after referred to as ***"the Owner/Vendor"*** which expression shall, where the context so admits include any occupiers, assigns, heirs or any other person claiming under his/her name of the one part **and The National Irrigation Board** of P.O. Box 30372-00100 Nairobi in the Republic of Kenya hereinafter referred to as ***"the Purchaser"*** which expression shall where the context admits include its successors and assigns on the other part.

NOW THE PARTIES HERE TO agree and covenant as follows:-

1. The Owner/Vendor has agreed to sell and the Purchaser has agreed to purchase ..... of the said parcel of land. The consideration for the part of the land sold by the Vendor/Owner and purchased by the Purchaser shall be Kenya Shillings TWENTY TWO Thousand five hundred (22,500/=)

2. Upon execution of this Agreement the Vendor/Owner hereby agrees as follows:-

    a) To allow the Purchaser, it's servants and/or agents at all reasonable times to enter and to carry out any works and make any excavations necessary for the purpose of irrigation within Bura irrigation development scheme along the determined line within the said land and The Vendor/Owner undertakes not to transfer, sell, pledge, mortgage or otherwise deal with the purchased land with any other Third Party upon the signing of this Agreement.

3. The vendor/Owner will give immediate free and vacant possession of the purchased land upon execution of this Agreement and undertake to sign

and execute all documents and Deeds as may be required to effect transfer of the purchased land to the Purchaser.

4. Breach of this Agreement by any party will attract a 30% penalty on the consideration price, and in the event of breach by the Vendor/owner, he/she shall be liable to refund all monies paid out together with interest at commercial rates.

IN WITNESS WHEREOF the parties hereto have placed their hands and seals on the date and year hereinabove mentioned

SIGNED BY THE VENDOR)

NAME. AHMED MADOWE MAALIM Sign..... Date. 9/12/2014

IN THE PRESENCE OF

NAME. BAJILA S. MOHAMED ID. 11892674 Sign.....

SIGNED ON BEHALF OF THE PURCHASER)

NAME: .....Sign.....Date.....

IN THE PRESENCE OF

NAME. Eng. Bernard Maina Sign..... Date. 9/12/14

Drawn by

Ocra Company Limited

Lonak Building – Thika Road P. O Box 60972(00200) Nairobi- Kenya

Director

WAYLEAVE AGREEMENT. Serial 5003.....

THIS WAYLEAVE AGREEMENT is made this.....day of.....2014 between .DUKIA HASSAN ALI..**of** P.O. Box ..... and the holder of **ID**.....29694415 0 **of**.....Sub-location,.....Location .....District in the Republic of Kenya (here in after referred to as ***"the Owner/Vendor"*** which expression shall, where the context so admits include any occupiers, assigns, heirs or any other person claiming under his/her name of the one part **and The National Irrigation Board** of P.O. Box 30372-00100 Nairobi in the Republic of Kenya hereinafter referred to as ***"the Purchaser"*** which expression shall where the context admits include its successors and assigns on the other part.

NOW THE PARTIES HERE TO agree and covenant as follows:-

1. The Owner/Vendor has agreed to sell and the Purchaser has agreed to purchase ..... of the said parcel of land. The consideration for the part of the land sold by the Vendor/Owner and purchased by the Purchaser shall be Kenya Shillings .TWELVE THOUSAND ONE HUNDRED (12,100).....

2. Upon execution of this Agreement the Vendor/Owner hereby agrees as follows:-

    a) To allow the Purchaser, it's servants and/or agents at all reasonable times to enter and to carry out any works and make any excavations necessary for the purpose of irrigation within Bura irrigation development scheme along the determined line within the said land and The Vendor/Owner undertakes not to transfer, sell, pledge, mortgage or otherwise deal with the purchased land with any other Third Party upon the signing of this Agreement.

3. The vendor/Owner will give immediate free and vacant possession of the purchased land upon execution of this Agreement and undertake to sign

and execute all documents and Deeds as may be required to effect transfer of the purchased land to the Purchaser.

4. Breach of this Agreement by any party will attract a 30% penalty on the consideration price, and in the event of breach by the Vendor/owner, he/she shall be liable to refund all monies paid out together with interest at commercial rates.

IN WITNESS WHEREOF the parties hereto have placed their hands and seals on the date and year hereinabove mentioned

SIGNED BY THE VENDOR)

NAME..RUKIA HASSAN ALI.....Sign.....Date..9/1/2019

IN THE PRESENCE OF

BASILA S. MOHAMED 11892674

NAME..~~RUKIA HASSAN ALI~~.....ID..~~29[illegible]15~~..Sign.....

SIGNED ON BEHALF OF THE PURCHASER)

ASSISTANT CHIEF
VANIGHI SUB-LOCATION
BURA "A" TANA

NAME: .....Sign.....Date.....

IN THE PRESENCE OF

NAME..Grace Bernard Maina.....Sign.....Date..9/1/2019

Drawn by

Ocra Company Limited

Lonak Building – Thika Road P. O Box 60972(00200) Nairobi- Kenya

Director