ENVIRONMENTAL IMPACT ASSESMENT
SUMMARY PROJECT REPORT

THE PROPOSED KABORIN-KAPNYANCHAR IRRIGATION PROJECT LOCATED IN CHEPKUM SUB LOCATION, CHESUMAN LOCATION, ARROR WARD, MARAKWET WEST SUB COUNTY, ELGEYO MARAKWET COUNTY.

Latitude: 0°58'47.00"N, Longitude: 35°37'48.00"E

TO BE SUBMITED TO NEMA COUNTY OFFICE, COUNTY GOVERNMENT OF ELGEYO MARAKWET

P.O BOX 467-30700,
ELGEYO MARAKWET

@December, 2021

DECLARATION

CONSULTANT

Befcon Consultants**, P.O Box 1830-3100, ELDORET** hereby submit this Environmental and Social Impact Assessment Summary Project Report (SPR) on the proposed Arror intake for Kaborin-Kapnyanchar Irrigation Scheme. We certify to the best of our knowledge that the information contained in this report is accurate and a truthful representation as forwarded by the client.

Signed by: _Ruto Christopher_____

Designation: _LEAD EXPERT_NO. 6116_____

Contacts:____0727489471_____

Signed:  **Date__2/02/2022_____**

LIST OF PARTICIPATING ENVIRONMENTAL EXPERTS

NAME	
RUTO CHRISTOPHER	EIA/EA expert
AGUI TANUI	EIA/EA expert

CLIENT/PROPONENT

I Philemon Koech Chelang'a the representative of Kaborin-Kapnyanchar Farm committee certifies to the best of my knowledge that the information contained in this report is accurate and a true representation.

Designation: Chairperson

Signed:  …….. Date:02/02/2022

ACKNOWLEDGEMENT

The team of experts involved in this work would like to sincerely thank the County Project Coordinating Unit (CPCU) for the Kenya Climate Smart Agriculture Project (KCSAP) for according us the honor to participate in this exercise and for availing the required documents as well as organizing and participating in the public engagement fora. In this regard, we want to specifically appreciate Mrs. Margaret Kendagor, The Coordinator KCSAP, Elgeyo Marakwet County and Mr. Ben Kibor, The County Environment and Social Safeguard Officer, KCSAP.

We sincerely thank the project engineer Mr. Wilson Chepkong'a for taking his time to highlight the project in details including proposed project designs.

We also want to sincerely appreciate the National Project Coordinating Unit (NPCU) led by Dr. Muthee for guiding and facilitating the process.

Many thanks to the World Bank team for being patient with us and facilitating the engagements including workshops and consultations on capacity building as well as reviewing the reports. To my fellow colleagues, thank you for the hard work and persistence.

To the administration team at the proposed project site, the farmers and the other professionals we interacted with, we say thank you and God bless you.

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LIST OF ACRONYMS

CBD	Convention Biological Diversity
C-EMMP	Contractors Environmental and Social Management and monitoring Plan
CESSCO	County Environmental and Socials Safeguards Officer.
CIDP	County Integrated Development Plan
CPCU	County Project Coordinating Unit
EA	Environmental Audit
EIA	Environmental Impact Assessment
EISR	Environmental Impact Assessment Study Report
EMCA	Environmental Management and Coordination Act
ESMMP	Environmental and Social Management and Monitoring Plan
MOA	Ministry of Agriculture & Irrigation.
FGD	Focused Group Discussion
GOK	Government of Kenya
KCSAP	Kenya Climate Smart Agriculture Project
KWS	Kenya Wildlife Services
KFS	Kenya Forest Service
m.a.s.l.	Metres above Sea Level
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NPCU	National Project Coordinating Unit
PAPs	Persons Affected by Project
PCPB	Pesticides Control Products Board.
PCR	Physical Cultural Resources
PMC	Project Management Committee
PRSP	Poverty Reduction Strategy Paper
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment.
HIV/AIDs	Human Immune Virus/Acquired immune Deficiency Syndrome
STDs	Sexually Transmitted Diseases
GBV	Gender Based Violence
SPR	Summary Project Report
SLM	Sustainable Land Management.
TOR	Terms of Reference
WRA	Water Resource Authority
WRUA	Water Resource Users Association
OPs	Operation procedures.
IPM	Integrated Pest Management.
PPE	Personnel Protective Equipment.
PHO	Public Health Officer
GRM	Grievance Redress Mechanism

EXECUTIVE SUMMARY

The proposed Kaborin-Kapnyanchar Irrigation is located in Chesuman Location, Arror of Elgeyo Marakwet County at GPS Latitude: 0°58'47.00"N, Longitude: 35°37'48.00"E. The community proposed the Kaborin irrigation scheme which is approximately 200 acres. The scheme will be irrigated with water abstracted from Arror River which is to the west of the proposed scheme. The main objective of the proposed project is to increase agricultural production for food and nutritional security, income generation and as an intervention to empower communities to build resilience against the challenges of climate change.

The proposed Project will be implemented through the Kenya Climate Smart Agriculture Project (KCSAP), a Kenya Government initiative funded by the World Bank whose development objectives is increasing productivity and incomes, enhancing resilience to climate change and reduction of Green House Gases (GHGs).

The specific proposed interventions for this project include construction of Arror water intake, construction of a furrow to increase water volume to irrigate 200 acres of farms in the irrigation scheme.

The Environmental and Social Impact Summary Project Report (SPR) has been conducted in compliance with the Environmental regulations, the EMCA, 1999 (Rev 2019) and its subsequent supplements regulating major developments and these include: Water Act, Irrigation Act. Land act etc. including the World Bank Environmental and Social Safeguard Policies. This SPR process involved literature reviews relating to the project, baseline studies of the proposed project area, reviews of relevant legal, institutional, regulatory and policy framework, public consultations and stakeholder engagements through public meetings, focused group discussions and key informants' interviews as well as house hold interviews.

The total number of participants during the public participation meeting conducted on 31st March, 2021 were 54 people. During the public participation meeting, data was also collected using structured questionnaires. A total of 40 questionnaires were distributed out of which 34 questionnaires were filled and returned. Additionally, 8 stakeholders were consulted to obtain more information on the proposed project. The main issues raised during the public participation and stakeholders' consultation include project sustainability, catchment conservation, and provision of water troughs for livestock and equal distribution of water to the irrigation farms. To address these issues the following measures were proposed are: water users paying water user fee to the Project Management Committee (PMC), planting of agroforestry trees in the water catchment on yearly basis, training of PMC on leadership and governance and construction of water troughs for livestock in the scheme.

The potential positive impacts identified included increased employment opportunities, improved infrastructure, improved nutrition, increased household incomes, improved environment due to planting of trees and increased quality of life. The anticipated negative impacts included loss of vegetation, Increase in diseases such as malaria, HIV/AIDS, Covid 19 pandemic, soil erosion, soil compaction, pollution of rivers, gender based violence, sexual exploitation and abuse and occupational and safety hazards. Appropriate mitigation measures have been provided in the Environmental and Social Management Plan (ESMP). The main mitigation measure includes planting of trees, control of soil erosion, Provision of mosquito nets, safe use of agrochemicals, capacity building of the beneficiaries on gender, HIV/AIDs, COVID-19 and climate smart technologies, use of recommended machinery was suggested to reduce soil compaction among others.

The County Project Coordination Unit, KCSAP Elgeyo Marakwet County through the County Environmental and Social Safeguard Officer (CESSCO) will follow up and monitor the implementation of the ESMMP. The Contractor, PMC, supervising engineer and the community will be required to ensure the implementation of the proposed mitigation measures. The estimated cost of implementation of the ESMMP which should be included in the project cost is Kenya shillings 1,660,000. The total cost of the project without the cost of ESMMP is Ksh. 13,830,000. The client is expected to share the ESMMP with the contractor who then is expected to prepare and implement a contractor-specific ESMMP.

Considering the positive and negative impacts, this project will not result to significant or irreversible impacts since all anticipated negative impacts will easily be mitigated through the ESMMP. Therefore, the project is recommended for approval and issuance of license by the National Environmental Management Authority (NEMA).

CHAPTER ONE
INTRODUCTION

1.1 Background Information

The County government of Elgeyo Marakwet recognizes the role of irrigated agriculture in improving agricultural production for food security, poverty alleviation and economic growth. Irrigated agriculture is one of the priority projects in the Elgeyo Marakwet (CIDP 2018-2022) under the department of Agriculture and Irrigation. The proposed Kaborin-Kapnyanchar irrigation scheme which is located in Chesuman location, Arror along Iten - Biretwo – Arror – Chesongoch road is one of such initiatives. The proposed irrigation scheme is aimed at irrigating 200 acres of land mainly under crops such as tomatoes, green grams, beans, sorghum, cassava, finger millet, paw paws, mangoes and assorted vegetables all the year round. This would result in increased crop productivity, increased incomes and food and nutrition security. The overall objectives would include improved community livelihoods and environmental protection which is in line with the core objectives of KCSAP.

1. 2 Project Justification

Establishment of irrigation infrastructure to enhance crop production is considered a priority by the Kenyan government as a way of ensuring food and nutrition security as well as poverty alleviation. The proposed project is also relevant to the KCSAP triple wins which include increasing productivity and income, resilience to climate change and reduction of Green House Gases (GHGs).

Irrigation system of agriculture ensures that crop production is not limited by seasons. Consequently, farmers are assured of steady income and food and nutrition throughout the year. This kind of farming system tend to attract youth and women and is therefore good for employment opportunities.

The steady supply of products from the scheme will also stimulate other business opportunities within the area thus increasing the local economy and revenue for the County.

It was also noted that the proposed project will contribute to enhanced environmental protection in that the agricultural by-products emanating from the scheme will be used to feed livestock thereby improving the carrying capacity of the land. Fodder including grass species and legumes will also be included in crop rotation thus improving livestock feed availability.

1.3 Environmental Social Impact Assessment Summary Project Report

The CPCU, KCSAP Elgeyo Marakwet contracted Befcon Consultants to undertake an Environmental and Social Impact Assessment and prepare a Summary project report based on the recommendation of the County Director of Environment, Elgeyo Marakwet. This followed screening using the Environmental and Social Safeguards Checklist. The SPR was conducted in compliance with the Environmental regulations, the EMCA,1999(Rev 2015) and its subsequent supplements; the Environmental (Impact Assessment and Audit) Regulation, 2003 (Rev. 2009); EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006; the Land Acts, the Water Act 2002 and the Irrigation Act among other pertinent legal and institutional frameworks regulating major development including the World Bank Environmental and Social Safeguard Policies. O.P 4.01 Environmental assessment (EA) of projects proposed, OP 4.09 Pest Management, OP 4.10 Indigenous Peoples, OP 4.11 Physical Cultural Resources and OP 4.12 Involuntary Resettlement. All environmental and social issues related to the proposed project have been considered. The main objective of this report is to ensure that all the potential Environmental and Social Impacts have been identified and appropriate mitigation measures proposed for adoption during project's cycle.

1.4 Objectives of the SPR

The objective of this study was to undertake a SPR of the proposed Kaborin-Kapnyanchar irrigation to establish potential impacts of the project's activities on the environment including social concerns and to identify mitigation measures.
The specific objectives include: -

- To comply with EMCA 1999 and World Bank Safeguard Policies
- To establish the baseline status of the proposed Project site
- To identify the impacts of the proposed project's activities on the environment and social aspects
- To propose mitigation measures for the significant negative environmental and social impacts
- To develop an Environmental and Social Management and Monitoring Plan (ESMMP)

1. 5 SPR Approach and Methodology

1.5.1 Overview

This study adopted an integrated approach which included desk review, field investigations, consultations among experts, interviews and discussions with stakeholders and affected parties. Desk review entailed review of literature of the existing documents regulations and guidelines such as Environmental Management and Co-ordination Act (EMCA) as well as other related statutes and international codes on water use. Reconnaissance surveys including field visits were undertaken for physical evaluation of areas of interest including intake, farms and general infrastructure. The specific focus was 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. Public participation meetings and consultative meetings at the administrative and community levels were held to collect information on the beneficiaries` perceptions on biophysical and socio-economic impacts of project implementation.
The data collected focused on the following:

- Baseline data which included; biodiversity, socio-economic and environmental factors
- 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 assessed the possible impacts of the proposed project to the environment, residents in general and other administrative areas that share resources with the project beneficiaries.

1. 5.2 Site Visits

Information gathering was conducted through two site visits to the project, one transect walk and interview with the key informants of the project which included the area chief, assistant chief, project management committee and opinion leaders. A transect walk was carried out during the field visit to quantify the perceived impacts of project on land use, land conflicts and ownership, areas of insecurity, existing institutions in the area, vegetation cover and ecologically sensitive areas such as underground and surface waters; grazing areas and migration routes. The information gathered also included the existing strategies towards environmental protection.

1.5.3 Public Participation and Stakeholder Consultation

One public participation meeting and administration of questionnaires were conducted in full adherence to the government directive on the COVID-19 pandemic - social distancing, wearing of face masks, use of sanitizers and limiting the number of contact hours. There was a total of 54 participants; 44 men and 10 women in the first stakeholders meeting. The participants during the public consultation are attached together in this report (Annex 3). Focused group discussions were also conducted during the public participation targeting the youth, the women and differently abled persons. A total of 9 stakeholders including county officials in the Departments of Agriculture and irrigation, Department of Water, Department of Livestock, Department of Public Health and Sanitation, National Land Commission and local administrations (area chief and ward administrator). Detailed outcome of the public participation and stakeholder consultation is presented in chapter five of this ESIA project report.

1.6 Organization of the SPR

The report is organized into seven substantive chapters. Chapter one presents the introductory chapter, Chapter 2 gives the Nature of the project, Chapter 3 presents the Location of the project Chapter 4 present public participation and stakeholder consultation. Chapter 5 identifies and discusses the anticipated impacts and mitigation measures of the project, Chapter 6 presents the Environmental and Social Management and Monitoring Plan (ESMMP). Chapter 7 presents the conclusions and recommendation followed by references and appendices.

CHAPTER TWO
NATURE OF THE PROJECT

2.0 Introduction

Kenyan government is implementing Kenya Climate Smart Agriculture project. The project promotes use of modern irrigation technologies among its technologies, innovations and management practices. Kaborin-Kapnyanchar irrigation scheme is one of the identified sub-projects in Elgeyo Marakwet County for implementation.

The major Project Activities

The major activities of the project will include:

- Construction of a furrow
- Fencing of the farm land
- Creation of division boxes in the farm
- Canal lining to minimize water wastage

2.1 Project Activities for the proposed Project

a) Preliminary activities

This include activities conducted before the actual works for the proposed project commences

b) Initial Site Meeting

This will entail initial site meeting to introduce the contractor to the site and to the project management committee by the KCSAP CPCU and the supervising engineer.

c) Mobilization of plants and machinery

This will involve assembling all the machines and equipment required for the planned activities for the proposed project

d) Erection of Signboard

This will involve putting up a signboard for the proposed project with all the necessary information as prescribed in the contract. This will go a long way to increase project visibility and disclosure of the project to the public.

2.2 Construction of Weir and intake works

This will involve construction of an intake and weir across Arror river to divert water into a concrete lined furrow leading to Kaborin-Kanyanchar irrigation scheme.

2.3. Conveyance system

The main conveyance system comprises of a concrete lined water furrow which covers approximately 7 km in length to the base of the escarpment. Another 5 km of unlined furrow takes the irrigation water to the farm. This furrow is expected to convey about 1.187m^3/s litres of water which is expected to irrigate 200 acres of land

2.4 Materials and Equipment

- **Materials**

The materials required for the proposed project include cement, sand, stones and timber for slab support. Also barbed wires of gauge 30, chain links and metal posts will be required to fence the farm.

- **Equipment**

The equipment required for the proposed project include excavation equipment, concrete mixer and assorted masonry tools.

2.5 Project Design

Kaborin-Kapnyanchar scheme will adopt Surface Irrigation-this is where water is applied and distributed over the soil surface by gravity. It is by far the most common form of irrigation throughout the world and has been practiced in many areas virtually unchanged for thousands of years.

The project gets its water from Arror River. The water is first conveyed through a shared main furrow/canal for a distance of about 2.5 kilometers from the intake. Thereafter it is conveyed a partially constructed furrow about 5kilometres before the water is emptied into a seasonal stream and eventually it is re-abstracted again and conveyed to the farm through a pipeline.

2.6 Project Output

The project outputs will include increased water volumes for irrigation in the irrigation system, increased land under irrigation technology to 200 acres. Other outputs are increased agricultural productivity and farm incomes from farming activities that will accrue from the agricultural value chain. There will be increased agricultural knowledge and skills, project sustainability due to trainings that will be conducted to the project beneficiaries and project management committee.

2.7 Project Cost

The estimated costs of Kaborin-Kapnyanchar Irrigation project including implementation of ESMMP is Kenya shillings 15,490,000.

CHAPTER THREE.
THE LOCATION OF THE PROJECT

3.1 Introduction.

This section provides the project location, land ownership, conformity to land use plan and supportive environmental and social management infrastructure.

3.2 Project Location

The proposed Kaborin-Kapnyanchar irrigation Project is located in Chepkum sub-location, Chesuman location, Arror ward, Marakwet West Sub-County of Elgeyo Marakwet County at GPS coordinates: Latitude: 0°58'47.00"N, Longitude: 35°37'48.00"E. It is located approximately 84Km from Iten town and is accessible via the Iten - Biretwo – Arror – Chesongoch road or the newly opened Iten – Kapsowar – Sisiya - Arror road.

Kaborin-Kapnyanchar Irrigation project is being undertaken by Elgeyo Marakwet County through the Kenya Climate Smart Agriculture Project to boost food security and wealth creation. About 200 acres of land will be put under irrigation.

Plate 1: Location of the proposed Site

3.3 Land Ownership

The land ownership in the area is communal(public). The beneficiaries of this project have through the department of Agriculture have been allowed to utilize the land within the scheme from the Department of Lands, Water, Environment & Natural Resources. (refer to Annex1 & Annex 10). The average land holding of an individual farmer is 0.5acres and with the project being implemented, the parcel of land will be utilized under agricultural production.

3.4 Supportive Infrastructure for Environmental and Social Management

3.4.1 Transportation

The area is accessible via the Iten - Biretwo – Arror – Chesongoch road or the newly opened Iten – Kapsowar – Sisiya - Arror road. The transport services in the area is provided by

lorries, public service vehicles and motor cycles. The motor cycle sector offers major transport services to the community. This is important to allow transportation of solid and liquid waste from the project site to designated sites away from the project site.

3.4.2 Telecommunication

The project area is served by two network providers, namely Safaricom and Airtel. This is necessary to enable communication to seek support in case of emergencies such as injuries during the project cycle.

3.4.3 Health facilities

There is a health center at Arror that serves the community. This is the main health facility in the area. Common diseases affecting the population include: Malaria, typhoid, cholera and malnutrition diseases. The institutions in the area include Chepkum primary school, Barsumbat primary, Barsumbat Secondary school and Arror health centre.

3.4.4 Demographics

Chesuman location has a population of 4000 people and approximately 600 households. Chepkum sub location where the project is located has 270 households and population of 1,400 people and among these males are 825 and females are 575 and these are direct project beneficiaries. The rest are indirect beneficiaries the location. Within this population, there are vulnerable and marginalized groups(VMGs) and they include the youth, elderly, widows and orphans who form a minority group. The VMGs are organized into groups and will be targeted in the project in management, beneficiary groups and overall project implementation so as to bring them onboard for social inclusion and development in the area.

3.4.5 Waste management system

Many households have pit latrines to manage human waste. Other wastes at household level are either dumped in compost pits or burned in shallow pits. Livestock wastes are used as organic manure to improve soil fertility.

3.5 Conformity to land use plan

The land tenure in the area is communal, (refer Annex1). The implementation of the proposed project is in line with the land use plan since the project site land is designated for agricultural irrigation scheme. The average size of farm sizes within the irrigation scheme is 0.5 acres.

CHAPTER FOUR
PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATIONS

4.1 Introduction

Public Participation and stakeholder consultation was conducted as stipulated in the Kenya constitution 2010, County Government Act and Environmental Impact Assessment and Audit Regulations of 2003 (amendment 2019). However, due to the government restrictions and World Bank guidelines following Covid-19 pandemic, the number of those consulted was minimized to a representative number as guided and led by the area chief and those living close to the proposed project site. During all public participation meetings, COVID-19 guidelines on social distancing, wearing of face masks, use of hand sanitizers as well as limiting the number of people during the meetings were followed.

4.2 The Objective of Public Participation and Stakeholders Consultation

The objectives of the public participation and stakeholder consultations were to get the scope of the SPR, to probe for possible environmental and social impacts of the proposed project and how to mitigate against any negative impacts as well as the baseline information of the project area.

4.3 Stakeholders identification

During the ESIA exercise, relevant stakeholders were identified. Each stakeholder was consulted on specific aspects of the projects ranging from the design, views on benefits, likely negative impacts and involvement at all stages of implementation. A total of 8 stakeholders were consulted and their views, issues and suggestions were documented. (See Annex 4).

4.4 Methodology of Public Participation and Stakeholder Consultations

The first stake holders' participation was held on 31st March, 2021 to gather information on environmental, social and economic issues relating to the project through focused group discussions. There were a total of 54 participants; 44 men and 10 women in the first stakeholders meeting (Refer Annex 3) A simple household questionnaire was used to collect information from the public. Key informant interviews and focused group discussions were also used. The stakeholders and the community were informed that the copy ESIA report will be given to the PMC so that anyone can access it. Also a public meeting will be conducted to give feedback to the community once NEMA approves the SPR.

4.5 Summary of issues raised by the community and stakeholders and responses

During public consultations, members of the community mainly concentrated on the direct benefits of irrigating farms including, availability of water for irrigation and scarcity of water during dry season. Other positive impacts raised included reduction in poverty levels of many households as a result of increased incomes from sale of produce, creation of employment opportunities in form of farm labor and related input and output activities, diversification of farm enterprise leading to improved nutrition, reduction of labor and cost of irrigated farming which currently uses pumps to abstract water from the river to the farm. The community did not dwell much on negative impacts but the consultant's team assessed the site and came up with possible negative impacts arising from the project.

During the consultative meetings, the following areas of interest were discussed;

- **Economic activities in the area.** The public indicated that these activities will be improved during implementation, for example labor and employment opportunities for the youth, women and orphans. This will be addressed by advising the contractor to employ and source materials from the local area during construction phase of the project and should give equal opportunities to men and women so that they benefit from the project.

- **Land use and management in the area**. The public were notified that the area will be under irrigation for crops and pasture for livestock. The public suggested that fodder should be established along the terraces and the acacia trees be conserved in the scheme. This concern will be addressed during land clearing and during soil and water conservation trainings by the agriculture staff as in ESMMP.
- **Socio-economic and environmental challenges in the area.** The socio-economic and environmental challenges during project implementation were raised by the public. The public were concerned about social issues like provision of labor and building materials during construction. The leaders form the area said there was need to inform the contractor to source materials and labor as much as possible and also avoid child abuse by employing them as workers. The CESSCO informed the meeting that contractor will be advised to have labor policy to avoid employing the under age. Also issue of reducing vegetation during land clearing. This issue has been addressed in the ESMMP on conservation of soil and environment. Also farmers will be leaving some acacia trees in the scheme to conserve the environment.
- **Flora and fauna may be destroyed during construction**. The public expressed the need of minimizing clearing of trees. This issue will be addressed by the ESMMP on conservation of biodiversity.
- **Community Conflicts**. This concern was raised due to water use in the farm. This concern will be addressed through project management committee and public meetings suggested that two water troughs to be constructed to provide drinking points for livestock in the scheme. The community will set a conflict resolution sub-committee within the water users association. A GRM register and complaint or suggestion box was suggested to be provided as a way to understand complains from the community. The public were informed that grievances redress process will start from lower level of PMC and when they are not solved, they are escalated to KCSAP offices as well as the donor, The World Bank.
- Gender based Violence: The area assistant chief and ward administrator informed the public that when projects come, issues of gender based violence may increase. The CESSCO responded that the community will be sensitized on GBV/SEA/SH and spread of STDs before the project commence and informed the public that the issues will be captured in ESMMP which the contractor will be given to follow during project construction as well as PMC.

Plate 2: Public meeting at the site. (Ward administrator addressing the public)

CHAPTER FIVE.
ANTICIPATED IMPACTS AND MITIGATION MEASURES

5.1 Introduction

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed Kaborin-Kapnyanchar irrigation. The anticipated impacts are discussed in three phases namely construction, operational and decommissioning phases

5.2 Anticipated Impacts during Construction Phase

5.2.1 Positive Impacts during Construction

- Employment Opportunities

There is anticipated increase in job opportunities through; recruitment of unskilled and skilled labor from the locals, service provision to the construction workers in terms of meeting their food, accommodation and transport requirements.

- Improved Infrastructure

The access roads that will be improved to enable the construction works machinery to reach the proposed site will contribute to improvement of the transport system to access both the input and output markets.

- Increased Incomes

The construction works will provide a market for the locally available materials while the services required by the construction workers will boost the local businesses.

5.2.2 Anticipated Negative Impacts and Mitigation measures during Construction phase

The negative impacts during the construction phase will be short lived but may pose a great danger to the environment. Lack of effective maintenance of the construction site environment is likely to impact on the project area and its environment adversely. Some of the negative impacts include; -

1. **Vegetation and wild life Loss**

There is anticipated increase in clearing of vegetation during to the laying of water pipes for water conveyance leading to loss of biodiversity of flora and fauna. The area is also a home to many bird species and wild animals that may migrate as well indigenous trees that have cultural and medicinal values to the local community.

Mitigation Measures
Limited clearing of vegetation and avoidance of construction within key habitats especially along the wetlands where such clearing occurs the land should be landscaped and planted with indigenous trees will be done to restore the lost biodiversity. Future modification of the irrigation pipes routes should ensure an ecological survey is done

2. **Soil Erosion**

An increase in soil erosion may result from loosening of the soil during construction works and vegetation clearing. In addition, some of the loose soils accumulated in the area will be swept away by winds and rainwater leading to siltation and affecting the aquatic life.

Mitigation Measures

- Soil erosion control and conservation measures will be undertaken to avoid erosion in sensitive and stockpiled areas
- The topsoil should not be utilized during the construction activities
- Rehabilitation of degraded environment should be undertaken to stabilize the soil and therefore reduce rate of soil erosion and siltation.
- The excavation works should be compacted

3. **Soil Compaction**

The high traffic especially of machineries and the construction workforce within the project area is likely to lead to compaction of the soil structure further leading to reduced capacity of the water to infiltrate into the soil thereby affecting the soil-water balance and the hydrological cycle largely.

Mitigation Measures

- Machines need to be operated on the existing roads or tracks as much as possible
- Unnecessary vehicle movement should be avoided
- Compaction during stockpiling should be avoided by working the soil in its dry state
- Re-vegetation should be enhanced to reduce run off

Pollution of Rivers and Wetlands

The construction of the intake water conveyance systems if not well controlled could deposit resultant construction wastes such as sediments from the earthworks, oils and fuels into the rivers and also through surface run offs. This may lead to potential pollution of the water especially for downstream users and also affect the aquatic life.

Mitigation measures

1. Regular checks on the equipment in use to ensure they are well maintained and in good working condition to prevent leaking oils and fuels. Refueling should be done in safe locations where there is no likelihood of spillages,
2. Access roads should not venture into the sensitive areas such as wetlands around the project area
3. Apply sediment control procedures to prevent sediment returning into the rivers
4. Ensuring all construction equipment and machineries are clean and mud free

4. **Dust and Noise pollution**

There is meant to be an increased traffic flow into the project area to include heavy, light and fast vehicles ferrying construction materials. The access roads that are largely earthen roads could result in increased dust and consequent increased traffic especially at the daily onset and offset of the construction works. This is likely to affect the health of the residents and the aesthetic value of the areas.

Mitigation Measures

- The contractor should ensure there is regular watering of dusty roads and maintenance during this stage,

- Damaged roads as a result of heavy vehicles should be repaired adequately and without delay
- After the construction works, the temporary access roads should be rehabilitated to their former state

5. Pollution; Dust and Air Quality Concerns

The construction activities mostly the excavation will generate a significant amount of dust which may be blown by the wind and construction vehicles. This is likely to affect the workers and the residents of the project area and its environs. Through inhalation of significant amount of dust, it may lead to respiratory problems. Construction vehicles and other plant on site may generate a lot of smoke from the diesel engines leading to air pollution. When the fumes are inhaled in considerable amounts just like the dust it could lead to adverse effects on the respiratory system especially to young children Spilled oils and grease from the construction vehicles and other machinery have the potential to pollute soil and other water sources and also the vegetation. Noise pollution emanating from construction vehicles, other machinery and workers will have a great significant negative impact to livestock, and wild animals.

Mitigation Measures

- The vehicles transporting raw materials especially soil should be well covered to reduce dust emissions
- Requisite PPEs such as dust masks should be provided to the workers on dust prone areas
- The speed of the construction machineries should be controlled and other vehicles
- The removal of vegetation should be avoided with the exposed surfaces being adequately re-vegetated
- Installation and maintaining appropriate silencers on noisy machineries
- There should be appropriate selection of construction machinery
- The amount of blasting in the quarries should be controlled where necessary.
- Sprinkling of water in construction yards, road and soil heaps to keep down the dust produced.
- Construction to take the shortest time possible, in addition, the activities generating dust should be carried out in calm weather.
- The noise levels should be kept at the minimum acceptable levels and the construction activities be confined to the normal 8 am to 5pm working hours

6. Extraction of Construction Materials

There is a heavy demand for construction materials in bulk such as sand, gravel and rocks. These will be extracted from the local sources. The extraction and transport of these materials is likely to result in the distortion of the ground structure, vegetation loss, dust emission, oil spills, noise and potential for accidents. Further, the quarries and barrow pits associated with extraction of materials may result to water that will become suitable breeding grounds for mosquitoes and other diseases vectors, leading to increase of water borne diseases.

Mitigation Measures

- The materials should be sourced from an approved site
- There should be adequate re-use of the excavated waste materials
- The proposed site for quarries and barrow pits/rehabilitation plans should be indicated in the construction plan and approved by the local authorities as well as done appropriately to minimize impacts on various land uses.

- There should be adequate landscaping, backfilling and draining of the depressed areas to prevent breeding grounds for disease vectors
- An advance notice should be given to the nearby communities on the Intended excavation where there is potential for blasting within the quarries, adequate mitigation measures should be implemented to include; Valid authorization from the department of mines, prior notification at least within 24 hrs. in writing to the emergency services of potential blasting activities , use of appropriate pre-blast monitoring records and supervision by a qualified and registered blaster, adequate prior warning to the local communities prior to the blasting exercises with clear signals and use blast mats for cover material during the blasting. The topsoil should not be used as a blast cover.

7. Solid wastes

The construction activities will ultimately lead to the production of solid wastes primarily the soil excavated and rock debris, metal cut offs and plastics, cardboards, paper, wood and waste concrete among several others. The effects of improperly managed wastes could be far reaching and may include aspects of environmental pollution, nuisance to the local communities, and increased vermin among other undesirable effects. These could lead to loss of the lands and potential for sedimentation of the drainage patterns.

Mitigation

- The contractor should promote the reuse, recycling and reduction of wastes
- There should be adequate litter collection facilities
- Waste disposal should be in locations approved by NEMA in accordance with the waste management regulations
- The chemical and hazardous wastes should to be disposed in dug pits.

8. Liquid Wastes

Liquid wastes including oil spills, during storage and refueling of machines, grey and black water, concrete washing, run off from workshop areas and various liquid wastes from the washing of construction vehicles and equipment will be generated during construction works. These wastes are likely to cause imminent threats to the groundwater quality and other aquatic bodies.

Mitigation Measures

- The grey water runoff from the working areas should be contained and properly channeled and be reused.
- Water containing pollutants such as cement, concrete, lime, chemicals and fuels should be discharged into a conservancy tank for removal from the site
- Potential pollutants should be stored, kept and used in such a manner that any escape can be contained to avoid degrading the water table
- Any pollution incidents on site should be resolved immediately
- The maintenance of vehicles and other machineries should be on designated locations where potential pollution is unlikely such as on concrete platforms
- There should be regular maintenance of machineries to ensure they are in good working conditions and are free from leaks
- There should be fast oil spill containment and clean-up of equipment at the requisite places

There should be adequate operator training to adopt measures that are preventive in use of such machineries

9. Occupational hazards and Health risks.

The construction activities will likely employ several persons and therefore expose them to various safety and health risks such as accidents, injuries or illnesses. These include exposure to food related diseases as most of the workers will be feed at the work site.

Mitigation Measures

- There should be a comprehensive Health and safety policy to safeguard the health of the workers
- There should be compliance to all health and safety standards in place
- All workers should be provided with full protective gear and there should be proper use of PPEs. These include working boots, overalls, helmets, goggles, earmuffs, dust masks, gloves among others to safeguard their safety
- There should be proper hoarding of the site to control movement of the public into the area
- The project site should be well sprinkled with water so as to reduce dust
- Establish an assembly area for all workers in case of an accident and maintain a record of all works at the site at each particular time. In addition, workers should be sensitized on construction safety measures
- Equipped first aid kits should be provided at the site and first aid training given to the supervisors for handling potential casualties
- The contractor should have workmen's compensation cover to avoid liability in cases of serious accidents
- Clean sanitary facilities and clean drinking water should be provided at the site
- Lunch breaks shall be provided; food is set to be served at the site
- Warning signs should be erected to warn of construction activities and heavy machinery at site
- Risky areas such as deep pits should be covered or fenced off to avoid accidents

10. Gender Based Violence (GBV) and increased spread of STDS/HIV/ AIDs

Sexual relationships between community members and the construction workers may result to GBV and spread of STDS/HIV/AIDS in the area.

Mitigation Measures

- Awareness creation and sensitization of workers and the local communities on the associated dangers and preventive measures
- There should be provision of adequate prevention measures such as condoms
- Establishment of grievance redress mechanisms

11. Increased risk of spread of covid-19 pandemic.

Covid-19 pandemic spread among people during construction may occur in the project area. The human interactions may increase the risk of spread of the pandemic.

Mitigation measures.

- Sensitizing the public on covid-19 government of Kenya regulations to reduce risk of the spread.
- Providing a container with a tap and running water and soap for public to wash their hands.
- Provide hand sanitizers in construction site for people to sanitizes their hands

12.Sexual Exploitation and Abuse (SEA).

SEA is a negative social impact that can occur during construction phase. This can be perpetrated by the management of the company and other workers against the less fortunate

Mitigation measures.

The management and the community in general should be sensitized on SEA including the consequences of the offence. Proper procedures of handling such cases should be well explained.

13.Child abuse

This can happen in cases where children are used to provide labor during construction. The contractor should be conversant with the regulations of child labor.

14. Conflicts

This are expected to occur among workers during this phase of construction.

Mitigation measures.

- The contractor should put in place mechanisms to address the conflicts and grievances.
- This includes a team to receive complains and resolve as soon as possible.
- Conflicts not resolved within should be advanced to a higher level. Complains and suggestion boxes should be placed strategically to receive these complains and compliments.

5.3 Anticipated Impacts during Operation Phase

5.3.1 Positive Impacts at the Operation Phase

1) Food Security

There is set to be an increase in agricultural production once the project is operationalized and farmers take up irrigated farming. This will increase food security both at the individual household and national level. Diversification in crop production will also be achieved contributing to nutritional security.

2) Increased Agricultural Activities and Economic Growth

The proposed development project will avail adequate irrigation water to lands previously not well served Leading to increased productivity for crops as well as livestock from the increased fodder. This alongside the related input and output markets will boost the economy of the area and beyond.

3) Income Generation Opportunities

The project will directly create employment for those members of the community who will be hired as construction workers and also income generation opportunities for those who will be offering services such as food provision and transport services.

4) Improved Infrastructure

The establishment of the irrigation project will trigger infrastructural developments within the area such as the expansion of the roads, markets and others recreational facilities. The improved productivity will also attract more business people to the urban centers leading to improved housing both for accommodation and recreational facilities.

5) Opportunities for Skills Acquisition

The implementation of the project activities will trigger increased demand for skill improvement such as agricultural extension services and marketing skills.

5.3.2 Anticipated Negative Impacts and Mitigation Measure during Operation

1) Water Quality Degradation

The quality of water may be affected by intensified use of pesticides and fertilizers leading to ground water pollution and the eutrophication of the water bodies. The disposal of containers used to pack agrochemicals if not properly disposed can also find their way into nearby water bodies, leading to pollution and probable poisoning of the aquatic life.

Mitigation Measures

- The use of the local agricultural officers' services to train farmers on fertilizer use and the safe use of agro chemicals as well as use of integrated pest management
- Waste management should be adequately streamlined to prevent the release of effluents into the environment

2) Water-Logging, Soil Salinization, and sedimentation and Nutrient Leaching

The uncontrolled use of fertilizers and pesticides may lead to increased soil salinity. The excessive use of irrigation water is likely to change both the soil's physical and chemical attributes as well as to water logging and leaching of water-soluble nutrients to levels where they are no longer available for use by plants.

Mitigation Measures

- The use of fertilizer should be regulated and should be as is recommended by the Agricultural officer
- The promotion of organic manure in place of fertilizers should be intensified
- Project to incorporate a component on irrigation water management training, coupled with installation of water use control and regulation meters to curtail over-irrigation
- Control of the amount of water abstracted from the river through appropriate design of the intake to include facilities for regulating irrigation pipe's discharge
- Installation of appropriate drainage channels to drain any excess water from the farms and to carry away excess agro-chemicals
- There should be adequate and frequent monitoring of soil salinity through analysis of soil carried out before project implementation and with every annual audit
- Afforestation and vegetation growth should be encouraged especially along the river banks
- The maintenance and operation of the irrigation infrastructure should be maintained regularly to ensure that localized irrigation does not occur
- Cultivation limits to the river systems should be identified and adhered to strictly.

3) Irrigation Related Diseases

The most common diseases in the area (as reported by the Health officer) include malaria and upper respiratory tract infections. Malaria is common because of water pools and the vegetation. Increased incidences of respiratory diseases are due goats and sheep kept close to humans.

Other diseases such as bilharzia, may come in but currently not experienced in the area. Water borne diseases have reduced due to piped water, as explained by the Public Health Officer.

Mitigation Measures

The members of the community should be sensitized on preventive and control measures to include spraying and use of treated nets for malaria control and water treatment through boiling or use of chlorine and construction of pit latrines within the farms.

The county government should establish additional health facilities as well, equipping and manning the existing ones to deal with the new cases
The Ministry of public health should ensure there is regular spraying within the project area to control mosquitoes as well as regular flushing of stagnated water to destroy breeding grounds.

4) Interference with the Movements Paths

The excavation today irrigation pipes will interrupt the movement patterns of the livestock as they seek to graze. The establishment of farms in the area could go a long way in hindering the free movement of domestic animals thereby precipitating the occurrence of man and livestock conflict especially if animals are grazed in the farms. There is also potential for blocking of transport routes in the area by blocking the pathways through which the animals access water from the river and also the locals' movement. Introduction of irrigation will result in increase of farmland, thereby reducing the communal grazing land. This conversion of more land into predominantly irrigated land will reduce available pasture grounds for families keeping livestock that roam freely in the land. This could lead to conflict between irrigating farmers and those keeping livestock

Mitigation Measures

- There should be boundary setting for livestock grazing land and agricultural land

5) Human –Livestock- Wildlife Conflict

If livestock are left unattended to, they may stray into the farms and damage the crops through illegal grazing and encroachment and in search of drinking water. Crops grown on farms may attract wild animals such as gazelles, monkeys which will lead to human- wildlife conflict and farmers-wildlife conflict.

Mitigation Measures

- Sensitization to herders and the general community
- Fencing of farms to minimize conflicts between farmers, livestock and wildlife
- Livestock watering toughs must be located away from the farmlands to avoid animals straying into the farms
- Appropriate timing of cropping season to coincide with periods of adequate pasture for wildlife within the parks.

6) Pests and Crop Diseases

Increased acreage of irrigated land may create a more conducive environment that is favorable for the increase of agricultural pests and plant diseases triggering increased use of pesticides

Mitigation Measures

- The farmers should be trained on pest and disease control and management, especially integrated pest management
- Practice of pest and disease surveillance to monitor prevalence of both existing and new pests and diseases

7) Gender Based Violence (GBV) and Increased spread of STDS/HIV/ AIDs

Sexual relationships between community members and the immigrants to include farm workers and traders may result to GBV and spread of STDS/HIV/AIDS in the area.

Mitigation Measures

Awareness creation and sensitization of workers and the local communities on the associated dangers and preventive measures

There should be provision of adequate prevention measures such as condoms Establishment of a grievance redress mechanisms.

8)Sexual Exploitation and Abuse (SEA)

This can be perpetrated by the management of the company and other workers against the less fortunate during operational phase of the project.

Mitigation

The management and the community in general should be sensitized on SEA including the consequences of the offence. Proper procedures of handling such cases should be well explained.

9)Child abuse

This can happen in cases where children are used to provide labor during construction phase. The contractor should be conversant with the regulations of child labor.

10) Conflicts

This are expected to occur among workers during this phase of construction.

Mitigation measures

The contractor should put in place mechanisms to address the conflicts and grievances.

- This includes a team to receive complains and resolve as soon as possible.
- Conflicts not resolved within should be advanced to a higher level.

Complains and suggestion boxes should be placed strategically to receive these complains and compliments

11) Water related Conflicts

The following water related conflicts are likely to occur as identified during public participation:

- Water for irrigation versus livestock needs:
- Scramble for water during dry season

It was established that the area experiences a dry spell from December to March. This is the period when water is inadequate for the users and may result in conflicts.

Mitigation measures

- Currently, the Management of the scheme use rationing as a way of sharing the resource during the dry season. However, some members suggested that rationing should be fair to all.
- As a way of reducing scarcity of water, it was also suggested that the users should be trained on water use and conservation.
- The users should also invest in water storage containers to conserve water.
- The members should also adhere to their by-laws related water use to reduce wastage
- Members of the community living near the intake should also benefit from the project as raised during public participation. The project has met this need by including an 8-inch pipe in the design to supply tap water to these homesteads.

5.3.3 Anticipated Impacts during Decommissioning

The project is expected to last for some years and therefore decommissioning may not be anticipated to happen in the near future thereby reversing the positive impacts identified. The

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

1) Loss of livelihood and the income earning capacity

Mitigation measures.

- Sensitize the public on how to cope up with loss of livelihoods
- Sensitize the farmers on need to do diversification livelihood enterprises.

2) The generation of solid waste

Mitigation measures

- The wastes produced should either be reduced reused or recycled
- Provide waste disposal bins at appropriate sites
- Waste disposal sites should be located away from the water sources to prevent the possibility of potential run off into the water system

3) Noise pollution

Mitigation measures.

- Put off idle machinery to reduce noise pollution.
- Use of machinery that are designed to produce low decibels.
- Use of ear muffs by workers to reduce effect of excess noise.
- Control the speed of running machines
- Sprinkle water to the ground surface to reduce dust emissions

Positive impacts at decommissioning include;

- Land rehabilitation
- Employment opportunities

CHAPTER SIX.

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

6.1 Introduction

The ESMMP is meant to provide guidelines for concerns identified so as to promote the mitigation of identified adverse effects throughout the design, construction, operation and decommissioning phases so as to promote the positive effects. The proponent should acquire the technical assistance and training in environmental management practices for operation of the proposed project.

6.2 Auditing the ESMMP

The managers of the project should conduct annual audits to ensure the systems are operating effectively. The audit needs to ensure that the auditing procedure is in place to ensure that: -

1. The ESMMP being used is up to date,
2. Variations to the ESMMP and non-compliance and corrective actions are documented
3. The appropriate environmental training for personnel is undertaken
4. Emergency procedures are in place and effectively communicated to the personnel
5. A register of major accidents is in place and other documentation related to the ESMP
6. The appropriate corrective and preventive action is taken by the contractor once instructions have been issued.

The environmental management of the proposed project should strengthen the mobilization of the beneficiary communities with regard to environmental and health aspects and render the proposed irrigation project sustainable.

6.3 Responsibilities

The ESMMP has various components with the respective stakeholders involved towards the implementation of the corrective actions. Various persons and organizations are to be involved in the project. The following should be involved in the implementation of the ESMMP;

1. The contractors
2. Line ministries
3. NEMA
4. Various farmer organizations
5. The local administration
6. Lands Office
7. KWS
8. KFS
9. The consultants

6.4 Training and Awareness Raising

The raising of awareness is a crucial element in the implementation of the ESMMP. All the stakeholders involved in the ESMP need to undergo environmental awareness training to familiarize with ways to handle the resultant effects of the project. Training of all personnel allocated with various responsibilities should be completed before the implementation of the project activities commencement. Training should be aimed at practical aspects of environmental monitoring and management.

6.5 ESMP Monitoring

There should be continuous monitoring and follow-up on the project activities to ensure that the ESMP is implemented and that its objectives are achieved. The implementing staff, the community, and the contractor should ensure that the mitigation measures are put in place as outlined in the EMP. The monitoring guidelines are based on the following parameters:

1. Improved vegetation cover
2. Increased potential of the various water springs,
3. Preservation of species in synergy with the water springs
4. Level of coli form and other bacteria in the sampled water not to forget the ppm solid elements
5. Severity watershed encroachment
6. Public safety and health awareness
7. Malaria and other social disease prevention and control systems in place
8. Livestock – wildlife -human conflicts management
9. Safety of equipment and property
10. Capacity building and skills improvement of water use

6.6 Environmental and Social Management and Monitoring Plan (ESMMP)

6.6.1 Environmental and Social Management and Monitoring Plan during Construction phase

Environmental and Social Impact	Proposed Mitigation Measures	Monitoring Indicators	Responsibility	Means of Verification	Time Frame	Est. Cost (KShs.)
Environmental Impacts						
Loss of Flora	• Avoid cutting indigenous trees and vegetation within the survey area path of the water conveyance • Avoid excessive bush clearing; where possible adopt re-vegetation around the water intakes • Minimize number of indigenous trees cut • A forestation and reforestation programs in certain parts of farmlands • Preserve certain sections for grazing purposes • The integrity of the forest resources should be well guarded from the spillover effects of the project' activities so as to maintain their functionalities • Encourage planting of fruit trees along the escarpment	• % of vegetation cover • No. of trees within the project areas • No of fruit trees planted along the escarpment • % of bush cover around the water intake	Contractor Community Local forest Associations KFS County Government	Baseline Report Site Report	6 Months	200,000
Destruction of Wildlife habitats	• The habitats diversity should be retained and protected by conserving them	• The extent of habitat diversity retained • Incidences of invasive	-County Government -Contractor	Incidence Report Attendance list	1 month	50,000

	• There should be no cultivation on riparian sections since they serve as habitats for several animal species • Woodlands should be adequately established • Sensitize the public on wild life, importance and conservation	species • No. of sensitization meetings on the importance of wildlife conservation	-Farmers -KFS -KWS	Photos		
Air and Dust Pollution	• The contractor to provide dust masks to workers • The contractor to ensure sprinkling of water on the soil during excavation and land filling; • The contactor to ensure that speed of working machinery is controlled • The contractor to train workers on pollution and control	• No. of workers provided with dust mask • No. of times water is sprinkled during excavation • No. of trainings conducted	Contractor Supervising Engineer	Work Progress Report	1 Month	50,000
Noise Pollution	• Reduce noise by sensitizing drivers in the project • Use manual labor as much as possible. • Restriction of activities to daytime • Workers within the vicinity of high level noise to be provided with adequate PPE. • No idling of vehicles and machinery if not in use, they	• No of cases reported on noise disturbance • No of PPEs distributed to workers on site • No of machines with noise insulators	Contractor Supervising Engineer	Register Case Report Site Report	3 Months	30,000

	should be switched off. • Control speed and noise of construction machinery; • Insulate noisy machines and activities during construction to minimize noise impact to neighboring communities • Avoid unnecessary hooting					
Pollution of rivers and wetlands.	• Keeping all equipment and machinery free from mud • Having workable standard operating procedures while working along water resources • Train workers on waste discharge regulations • Compaction of loose material/soils • All repairs and maintenance work should be done at the contractors site not close to rivers or stream	• No of water test done • No of training conducted on waste management •	Contractor Supervising Engineer	Water test report Attendance list Site report	1 week	30,000

Soil Erosion	• There should be erosion control measures on areas prone to erosion especially steep slopes by installing soil erosion control structures • The topsoil should not be used during the construction phase • There should be intensive re-vegetation on bare grounds after construction • Provide fruit trees to farmers along slopes	No. of soil conservation structures established Length of soil conservation structures	Contractor Supervising Engineer Farmers	Soil and land management plan and Report	4 Months	150,000
Soil compaction	• The excavation works should be backfilled and compacted • The quarries and barrow pits should be rehabilitated after activities	• Reduced Erosion • Reduced suspended dust	Contractor. Supervising Engineer and farmers	Site supervision report	1 week	20,000
Solid waste	• The wastes produced should either be reduced reused or recycled • Provide waste disposal bins at appropriate sites • Waste disposal sites should be located away from the water sources to prevent the possibility of potential run off into the water system • Burning of chemical or hazardous wastes should not be done on site • Train the beneficiaries on	• No. of litter bins • Waste disposal site • Licensed waste handler in place • No of beneficiaries trained on waste disposal	Contractor Supervising Engineer	Site supervision report	4 months	20,000

	waste disposal methods including composting • Proper containment and disposal of solid waste at all project phases					
Waste water and liquid effluent	• All grey water run-off or discharges should be contained and properly channeled away from water sources • Water containing cement, lime or concrete should not be discharged on site • Wash areas should be provided with soak away pits • Pollution incidences such as oil spills and chemical spills should be acted upon speedily with the recommendation of NEMA officers	Waste effluent incidences	Contractor, farmers, Public Health Officers, NEMA	Site Report	4 months	50,000
Social Impacts						
Competition for employment opportunities	• Both skilled and non-skilled labor as much as possible to be accessed locally • Equal opportunities to gender and youth; Engage local stakeholders in such issues	• No of skilled and non-skilled employees from local community	Contractor Supervising Engineer Local community	Daily register of employees	4 Months	0
Increased social diseases (STDs)	• Implement awareness creation of eminent social evils such as HIV/AIDS and other STDs • Organizing community sensitization drives on the	• No. of awareness meetings held • No. of incidences	Contractor Workers Community Public Health Officers	Register Attendance list Incidence report	3 months	50,000

	prevention and management of the HIV/AIDS • Liaising with the local NGOs and CBOs for the training and education on the right prevention mechanisms • Contraceptives should be provided at acceptable locations • Opening up of VCTs in the local health facilities should be enhanced					
Occupational safety and health	• The contractor should have a comprehensive health and safety policy • Ensure there is compliance to various health and safety regulations • Carry out regular risk assessments of the workplace • Establish a standard code of practice for the project workers including drivers and suppliers so as to promote safety of the public during the construction activities • Install fully equipped first Aid Kits at strategic points at the working areas • Ensure there is adequate sanitation facilities on sites	• No of accidents reported • No of fully equipped first AID Kits at strategic points at working area • No of workers with insurance cover • No of PPES provided to workers	Contractor Supervising Engineer	Incidence Report Site Report	4 months	40,000

	• Warning signs/bumps to be erected and/or placed at risky points • Provide insurance cover to the workers under the workman's compensation Act • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff • Install firefighting equipment at strategic points					
Increased risk of spread of COVID-19 at construction site	• Sensitizing the public on covid-19 government of Kenya regulations to reduce risk of the spread. • Providing a container with a tap and running water and soap for public to wash their hands. • Provide hand sanitizers in construction site for people to sanitizes their hand	• The number of Covid -19 measures implemented on site. • No. of Covid-19 cases. • PPE procured	Incidence report Purchase orders/receipts Photos	4 Months		50,000
Sexual exploitation, child abuse	• Sensitize workesrs and employees on sexual exploitation and use of child labor.	• The number of SEA and child abuse cases	The management	Incidences report	Continuous	30,000
Gender based violence	• Training the project beneficiaries on human rights and consequences of gender based violence • Sensitize the community of	• No of beneficiaries trained • Cases of gender based violence reported to local chief	Social services officer Agriculture staff	Incidence Report Attendance list Site Report	Operation phase	50,000

	importance of sharing resources in the family to reduce tension • Awareness creation and sensitization of workers and the local communities on the associated dangers and preventive measures					

6.6.2 Environmental and Social Management and Monitoring Plan during Operation phase.

Environmental and Social Impact	Proposed Mitigation Measures	Monitoring Indicators	Responsibility	Means of Verification	Time Frame	Est. Cost (KShs.)
Environmental Impacts						
Increased pests and use of agrochemicals	• Develop a training program for farmers especially on integrated pest management • Field sanitation should be adequately maintained • Encourage business people to operate agro-chemical stores within the area	• No of scouting conducted • Pest incidences recorded • No of farmers trained on IPM	PHO. Agricultural officer, business community	Scouting Report Pest Incidence report Attendance list of farmers trained on IPM	The entire project cycle	50,000
Soil erosion	• There should be erosion control measures on areas prone to erosion especially steep slopes by installing soil erosion control	• No. of Sensitization meetings held • No. of soil	Agriculture officers. Farmers	Soil and Land Conservation Plan and Report	During and after construction	100,000

	structures • There should be intensive re-vegetation on bare grounds after construction • Provide fruit trees to farmers along slopes	conservation structures established				
Changes in Land use	• Sensitizing the community on the new farming systems so that they can be fully involved in the transition process • Encourage the growing of indigenous crops where possible because they more adapted to the area.	• No. of sensitization meetings held • No of indigenous crops grown	MoA Farmers	Land use report Attendance list	Operation phase	50,000
Siltation and farm flooding	• Ensure there is appropriate terracing where possible • Ensure water application does not exceed soil intake rate, over- irrigation • Construction of water pans along the conveyance route to act as silt traps	• No. of check dams constructed along the inlet water course • Acreage of land under catchment management and conservation through SLM • No. of	Farmers and agricultural officers	Site report Attendance list SLM intervention report	Operation cycle phase	50,000

		trainings trained on SLM practices				
Soil salinization and water logging	• The use of fertilizer should be regulated and should be as is recommended by the Agricultural officer • The promotion of organic manure in place of fertilizers should be intensified • Control of the amount of water abstracted from the river through appropriate design of the intake to include facilities for regulating irrigation pipe's discharge • Installation of appropriate drainage channels to drain any excess water from the farms and to carry away excess agro-chemicals.	• No. of farmers sensitized on organic manure, water use in irrigation scheme and recommended fertilizers	Community Agricultural officers	Number of farmers trained on good water use and fertilizer in the scheme	Operation cycle	40,000
Water contamination and degradation	• Keeping all equipment and machinery free from mud • Having workable standard operating procedures while working along water	No. of water testing done	Farmers Agricultural officers	Water testing report	Operation life of the project	50,000

	resources • Apply appropriate irrigation procedures to prevent contamination • Sensible use of agrochemicals to prevent deposition into rivers • Adhere to waste discharge regulations • Compaction of loose material/soils					
Water borne diseases	• Awareness creation to the local community • Adequate provision of mosquito nets • Better equipped health centers closer to the people with trained personnel • Boiling and treatment of drinking water if collected from water pools; • Regular surveillance to ensure water does not stagnate	No of incidences reported No of mosquito nets distributed No of surveillances conducted No of farmers boiling and treating water from water pools	Community PHO	Incidence Report Surveillance Report Report of domestic water use	- Project Implementation	40,000
Social impacts						

Social diseases like HIV/AIDS spread	• Implement awareness creation of eminent social evils such as HIV/AIDS and other STDs • Organizing community sensitization drives on the prevention and management of the HIV/AIDS • Liaising with the local NGOs and CBOs for the training and education on the right prevention mechanisms • Contraceptives should be provided at acceptable location.	• No of awareness meetings held • No. of incidences reported • No of contraceptive distributed	-Workers -Community -PHOs -KCSAP	Incidence Report Attendance list	During construction and operation phase.	50,000
Irrigation related diseases for example Malaria and Typhoid	• Equip the available health center to deal with common diseases in the area • There should regular spraying of homes to control the presence of mosquitoes • Mosquito nets should be adequately supplied at subsidized prices	• No of incidences reported • No of times spraying of homes to control mosquitoes • No. of mosquitoes nets	PHO	Incidence Report	Entire project cycle	30,000 per year

	• Water for drinking should be treated or boiled to reduce water borne diseases • Discourage stagnant water because they provide breeding grounds for mosquitoes • Train the public on public health issues, especially water borne diseases, STDs	distributed				
Water related conflicts.	• Develop a water monitoring strategy and a rotation programme for water distribution • Ensure Total Environment Flow as per WRA regulation is adhered to	Number of complaints registered	Community Agricultural officer PMC	Register Water use report	Project operation time	20,000
Possibility of increased human-livestock conflict.	• Avail drinking points for the livestock • Fencing off the farms to prevent crop damage by animals. • Regular communal discussions and dialogue should be facilitated	Number of cases reported in the community.	Local administration -Farmers -PMC -Livestock extension Officers	Reports on resolved cases	Operation and maintenance phase	100,000

	between to bring about mutual agreements between various land users • Intensive systems of livestock keeping such as zero-grazing and semi-zero grazing should be encouraged to reduce conflicts • Fodder production can be done on irrigated land to reduce the pressure on the pastoral land especially during dry seasons and droughts • Ensure 30%- 40% of River water allowed to flow downstream					
Population pressure due influx of workers	• Monitor the trend in migration to the area during the project implementation and increase the requisite facilities • Develop an efficient water and sewer system in the project areas in conjunction with the area	Number of new migrants to project area	County Water Officers Public Health Officers	Report on the migration patterns in the project area	The entire project cycle	50,000

	water officers					
Gender based violence	• Training the project beneficiaries on human rights and consequences of gender based violence • Sensitize the community of importance of sharing resources in the family to reduce tension • Awareness creation and sensitization of workers and the local communities on the associated dangers and preventive measures	• No of sensitization meetings • No of trainings on GBV • Cases of gender based violence reported to local chief or administration .	Social services officer Agriculture staff Local administration. Community.	Incidence Report Attendance list	Operation phase	50,000
Sexual exploitation, child abuse	• Sensitize workesrs and employees on sexual exploitation and use of child labor.	• The number of SEA and child abuse cases	The management	Incidences report	Continuous	30,000

6.3 Environmental and Social Management and Monitoring Plan during decommissioning phase

Environmental and Social Impact	Proposed Mitigation Measures	Monitoring Indicators	Responsibility	Means of Verification	Time Frame	Est. Cost (KShs.)
Environmental impacts						
Generation of solid waste	• The wastes produced should either be reduced reused or recycled • Provide waste disposal bins at appropriate sites • Waste disposal sites should be located away from the water sources to prevent the possibility of potential run off into the water system • Train the beneficiaries on waste disposal methods including composting	Quantity of solid waste in the scheme during decommissioning.	Contractor	Site Report	1 Month	30,000
Noise pollution	• Reduce noise by sensitizing drivers in the project • Use manual labor as much as possible. • Restriction of activities to daytime • Workers within the vicinity	• No of sensitization meetings • No. of PPE procured	Contractor	Sensitization Report Attendance list	1 Month	30,000

	of high level noise to be provided with adequate PPE. • No idling of vehicles and machinery if not in use, they should be switched off.					
Social Impacts						
Loss of livelihoods and incomes	• Sensitize and train farmers on livelihood diversification of enterprises.	No. of people who have suffered lost livelihood and income	Contractor	Livelihood profile report	1 Month	40,000
Sexual exploitation, child abuse	• Sensitize workesrs and employees on sexual exploitation and use of child labor	Incidences reported	Management	Sensitization report	At decommissioning	20,000
Total Cost						**1,660,000**

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This study has been conducted to equip the Government, National Environmental Management Authority (NEMA), the project proponent, Kenya Climate Smart Agriculture Project, project beneficiaries and other stakeholders with relevant and sufficient information about the proposed Irrigation project. It is hoped that NEMA would use this information to give a go ahead to the project by issuing the proponent with a permit. The Irrigation Project proposes to use a gravity fed system which will greatly reduce the operation and maintenance cost. Once the water has been supplied through gravity, the farmers will use sprinkler irrigation to irrigate their farms.

7.2 Conclusions

The study established that positive impacts will accrues as a result of the implementation of Kaborin-kapnyanchar irrigation. The project 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 identified include diversification of farming enterprises leading to improved food security and nutrition in the area ultimately reducing malnourishment. Local production of food will lower prices at the local level therefore making food more available to the people. 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 along the value chain such as agro-inputs supply, transport, 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 minimal disruption of public services during construction. Adequate Acts, policies and regulations provided in the Environmental Management Plan and mitigation measures proposed will ensure that the impacts pose no threat to the environment and communities.

7.3 Recommendations

The results from the study showed that there are more positive social and environmental impacts due to the establishment of Kaborin-Kapnyanchar irrigation. These positive impacts largely outweigh the potential negative impacts and is therefore recommended for approval and issuance of license by NEMA on condition that all the proposed mitigation measures are implemented throughout the project life cycle.

REFERENCES

1. Dougherty, T.C., Hall, A.W. and Wallingford, H.R. 1995. Environmental Impact Assessment of Irrigation and Drainage Projects. Irrigation and Drainage Paper 53, Food and Agriculture Organization of the United Nations, Rome.
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11. Water Resources Planning Organization (WARPO), 2001. Guidelines for Environmental Assessment of Flood Control, Drainage and Irrigation Projects.
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13. Public Health Act Chapter 242 Laws of Kenya. Government printer, Nairobi.
14. Water Act Law of Kenya. Kenya Gazette supplements no. 107 (Acts No 9) Nairobi October, 2002
15. Kenya gazette supplement number 56. Environmental Impact Assessment and Audit Regulations2003. Government printer,
16. Physical and land use Planning Act, 2019. Laws of Kenya.
17. Land Acts 2011 Laws of Kenya
18. County Government Act, 2012.

ANNEXES

Annex 1: Land ownership

ELGEYO MARAKWET COUNTY GOVERNMENT

LANDS, WATER, ENVIRONMENT & NATURAL RESOURCES

All Correspondence to be address to: CECM, LWECC

emcounty2013@gmail.com
P.O.BOX 220-30700

Our Ref: EMC/LWPP/CECM/VOL.1 (089)

Date: 1st December, 2021

The CECM Agriculture and Irrigation,
Elgeyo Marakwet County,
P.O.Box 220-30700,
Iten.

Dear Hon. Anne Kibosia

RE: KABORIN-KAPYANJAR IRRIGATION SCHEME UTILIZATION FOR AGRICULTURAL PRODUCTION

Reference is made to your letter **EMC/AGRIC/CEC/OTHERDPT/ VOL.II/39,** dated 19TH November 2021 and a letter from the community requesting to be allowed to utilize the above land for Agricultural Production.

This land is community land and as such the County holds it in trust of the community and to this the request is granted.

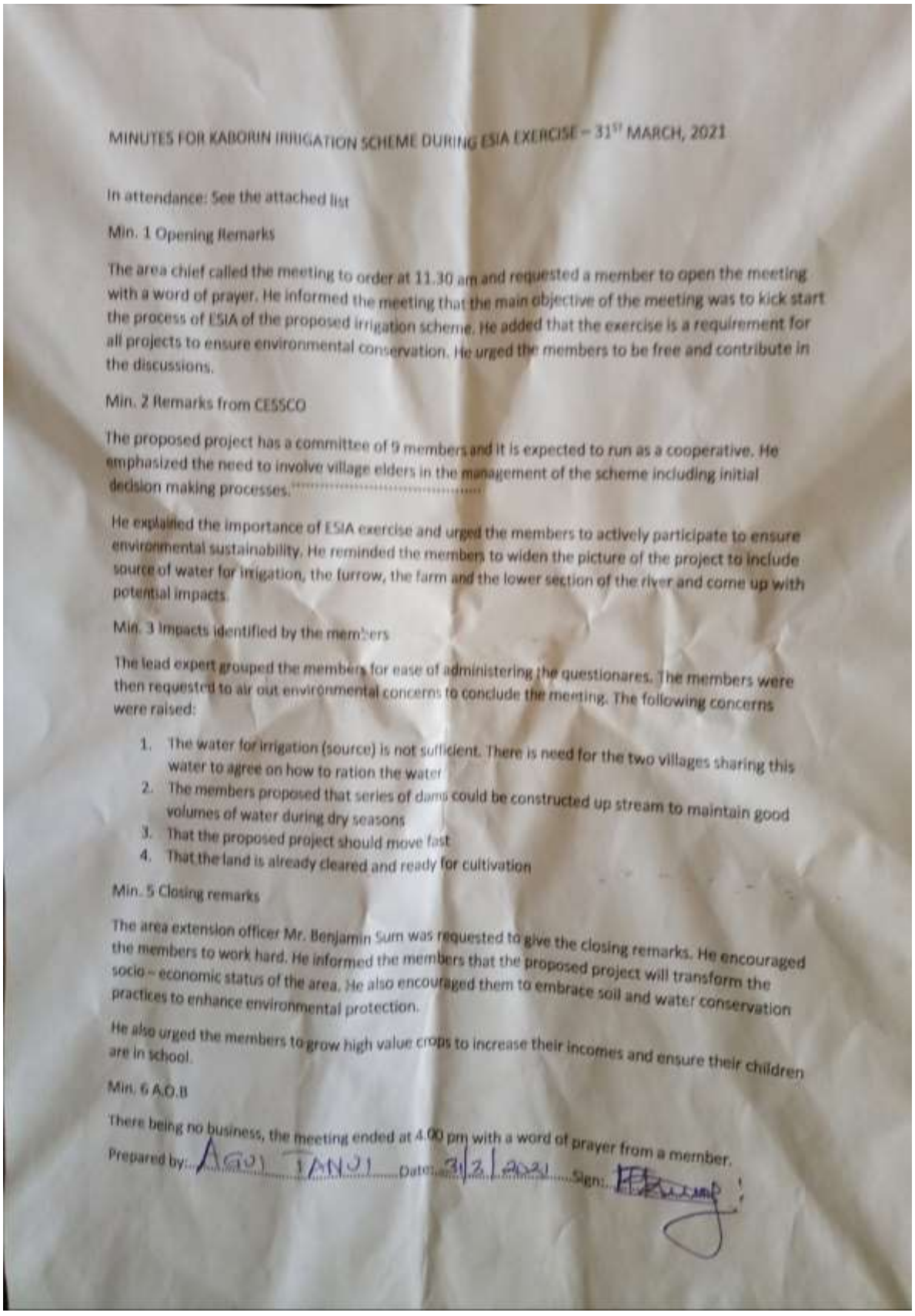
Yours faithfully,

ELGEYO MARAKWET COUNTY
P. O. Box 220-30700 ITEN
Tel: 053-42277

Abraham k. Barsosio

CECM – Lands, Water, Environment and Climate Change

Annex 2: Minutes of the meeting proceedings.



MINUTES FOR KABORIN IRRIGATION SCHEME DURING ESIA EXERCISE – 31ST MARCH, 2021

In attendance: See the attached list

Min. 1 Opening Remarks

The area chief called the meeting to order at 11.30 am and requested a member to open the meeting with a word of prayer. He informed the meeting that the main objective of the meeting was to kick start the process of ESIA of the proposed irrigation scheme. He added that the exercise is a requirement for all projects to ensure environmental conservation. He urged the members to be free and contribute in the discussions.

Min. 2 Remarks from CESSCO

The proposed project has a committee of 9 members and it is expected to run as a cooperative. He emphasized the need to involve village elders in the management of the scheme including initial decision making processes.

He explained the importance of ESIA exercise and urged the members to actively participate to ensure environmental sustainability. He reminded the members to widen the picture of the project to include source of water for irrigation, the furrow, the farm and the lower section of the river and come up with potential impacts.

Min. 3 Impacts identified by the members

The lead expert grouped the members for ease of administering the questionares. The members were then requested to air out environmental concerns to conclude the meeting. The following concerns were raised:

1. The water for irrigation (source) is not sufficient. There is need for the two villages sharing this water to agree on how to ration the water
2. The members proposed that series of dams could be constructed up stream to maintain good volumes of water during dry seasons
3. That the proposed project should move fast
4. That the land is already cleared and ready for cultivation

Min. 5 Closing remarks

The area extension officer Mr. Benjamin Sum was requested to give the closing remarks. He encouraged the members to work hard. He informed the members that the proposed project will transform the socio – economic status of the area. He also encouraged them to embrace soil and water conservation practices to enhance environmental protection.

He also urged the members to grow high value crops to increase their incomes and ensure their children are in school.

Min. 6 A.O.B

There being no business, the meeting ended at 4.00 pm with a word of prayer from a member.

Prepared by: AGU JANJI Date: 31/3/2021 Sign:

Annex 3: Public participation attendance list

Kenya Climate Smart Agriculture Project(KCSAP)
ELGEYO MARAKWET COUNTY

ATTENDANCE LIST

ACTIVITY: PUBLIC PARTICIPATION ON SPR + ESIA DEVELOPMENT FOR KABORIN-KAPTACHAR IRRIGATION.

DATE: 31/03/2021 VENUE: KABORIN - KAPTACHAR IRRIGATION SCHEME - CHEPKUM

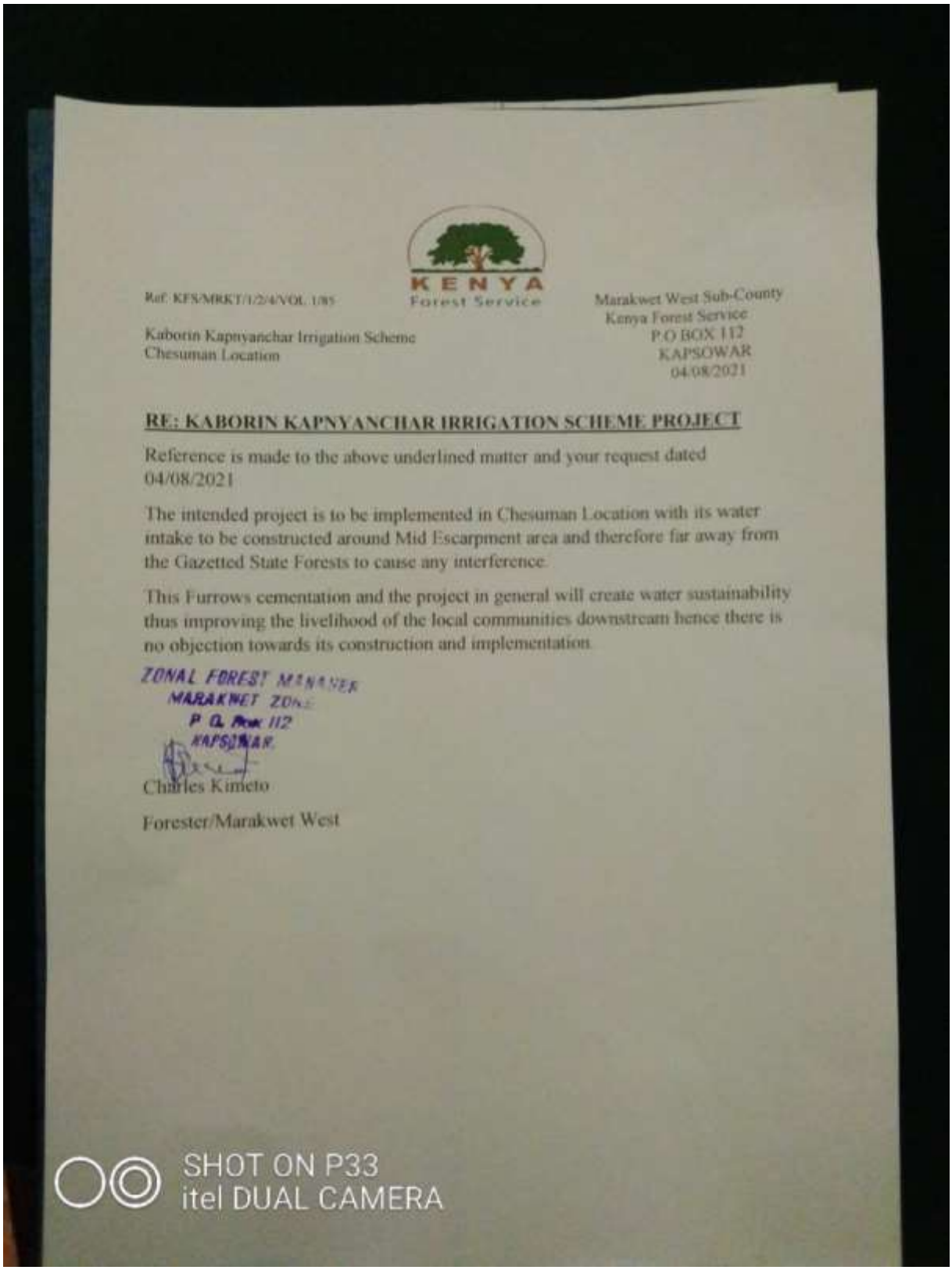
S/No	NAME	MOBILE No.	ORGANIZATION	STATION	EMAIL	SIGN
1	Edinah Chebo.	0724339832	Agriculture	Arror	[illegible]@gmail.com	[illegible]
2	SIMION K. SUTER	0716409503	CHIEF	CHESUMAN		[illegible]
3	JOSEPH K. EGO	0727 854 065	EMC	ARROR	[illegible]@gmail.com	[illegible]
4	BARNABA M. CHESEREM	0721169835	A/chief	CHEPKUM	[illegible]	[illegible]
5.	VINCENT K. CHERUIYOT	0726711110	A/chief	Kapchemutwa	—	[illegible]
6	DAVID MOSOP	0724375514	PHO	ARROR	[illegible]	[illegible]
7	BERNARD KIPSANG	0722469813	MEMBER	CHEPKUM	—	[illegible]
8.	Solomon CHELIMO	0713217164	RESIDENT	CHEPKUM	[illegible]	[illegible]
9	ERNEST K. KOITO	0743816751	RESIDENT	CHEPKUM	—	[illegible]

S/No	NAME	MOBILE No.	ORGANIZATION	STATION	EMAIL	SIGN
10	Sammy Korir	0728836103	RESIDENT	CHEPKUM		[illegible]
11	JUSTIN CHESIRGEN	0726152522	"	KAPCHEMUTWA	Kiptelien[illegible]	[illegible]
12	STANLEY TEGO	0758418066	"	CHEPKUM		[illegible]
13.	Simion K. Cheboi	0728472[illegible]	"	"		[illegible]
14	Benjamin K. Chepkole	0712760363	NDC	Chepkum		[illegible]
15	Joseph Kipserem		Resident	Chepkum		[illegible]
16	Philip Kiprang		Resident	Chepkum		[illegible]
17	Lawrence Korgei	0790 978210	"	Chepkum		[illegible]
18	Joseph Rotich	0710 308432	"	"		[illegible]
19	CHRISTOPHER MOSOP	0722 561902	" "	" "	[illegible]	[illegible]
20.	John K chebet	0790 491832	Resident	"		[illegible]
21	Juliana cherop	0796 580897	"	Chepkum		[illegible]
22	Edwin Biwott	0796100583	"	"		[illegible]
23	Milly J Yano	"	"	"		[illegible]
24	Margret J Kilken	0795 324130	"	"		[illegible]
25	Gilbert Kisang	0728 949722	"	"		[illegible]
26	Kelvin Kibiwott	0769 676757	"	"		[illegible]

S/No	NAME	MOBILE No.	ORGANIZATION	STATION	EMAIL	SIGN
27	Thomas Kiptoo	0724380816	Resident	Chepkum	N/A	[illegible]
28	Joktan Rutto	0704331880	〃	〃	[illegible]	[illegible]
29	Elind Kiprono	0725329081	〃	〃		[illegible]
30	Joseph Maiyo	0758018796	〃	〃		[illegible]
31	Enock Kibet	0790947538	〃	〃		[illegible]
32	Duncan Kiring	0796172257	〃	〃		[illegible]
33	Isaiah Yego	0721203269	〃	〃		[illegible]
34	Julius Jano	N/A	〃	〃		[illegible]
35	Oscar Kiprono	0718764213				[illegible]
36	Raphael Komen		Resident	Chepkum		[illegible]
37	Festus Chelimo	0790370397	〃	〃		[illegible]
38	Teresia Kaino	0700912736	〃	〃		[illegible]
39	Valentine Cheserek	0713219218	〃	〃		[illegible]
40	Rosetta Koech	0726049625	〃	〃		[illegible]
41	Tabl christine Kelion		〃	〃		[illegible]
42.	Paul Chelimo		〃	〃		[illegible]
43	Kenneth Kipkurch	0720203580	〃	〃		[illegible]

S/No	NAME	MOBILE No.	ORGANIZATION	STATION	EMAIL	SIGN
44	Vincent Bowett		Resident	Chepkum		[illegible]
45	Michael Kitum	0	〃	〃		[illegible]
46	Stanley Yego	0758491386	〃	〃		[illegible]
47	John Kendo		〃			
48	Slyvester Chebii		〃			
49	Lagia Sokomo		〃			
50	Soti Emmion		〃			
51	Purity Chebichi	0718102593	〃			
52	Sammy Korir	0728836108	〃			
53	Christopher Rutto	0727489471	E14 Lead	Iten	[illegible]@yahoo.com	[illegible]
54	BEN KIBOR	0725622898	CERCO KEAP	Iten	[illegible]@gmail.com	[illegible]

Annex 4: Letter of no objection from Kenya Forest Service



KENYA
Forest Service

Ref: KFS/MRKT/1/2/4/VOL 1/85

Marakwet West Sub-County
Kenya Forest Service
P.O BOX 112
KAPSOWAR
04/08/2021

Kaborin Kapnyanchar Irrigation Scheme
Chesuman Location

RE: KABORIN KAPNYANCHAR IRRIGATION SCHEME PROJECT

Reference is made to the above underlined matter and your request dated 04/08/2021

The intended project is to be implemented in Chesuman Location with its water intake to be constructed around Mid Escarpment area and therefore far away from the Gazetted State Forests to cause any interference.

This Furrows cementation and the project in general will create water sustainability thus improving the livelihood of the local communities downstream hence there is no objection towards its construction and implementation.

ZONAL FOREST MANAGER
MARAKWET ZONE
P. O. Box 112
KAPSOWAR

Charles Kimeto

Forester/Marakwet West

SHOT ON P33
itel DUAL CAMERA

Annex 5: List of stakeholders consulted.

1. Project Management Committee
2. Community/Project beneficiaries
3. Department of Agriculture & Irrigation.
4. Local administration (chiefs &ward leadership)
5. NEMA office
6. KCSAP-CPCU Elgeyo Marakwet County.
7. Department of Lands, water and climate change
8. Kenya Forest Service
9.The National Land Commission(EMC)

Annex 6: Practicing License

FORM 7 (r.15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/15135

Application Reference No: NEMA/EIA/EL/20075

M/S **CHRISTOPHER KIPTANUI RUTO**
(individual or firm) of address

P.O. Box 111, KAPSOWAR

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**

registration number **6116**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **5/24/2021** Expiry Date: **12/31/2021**

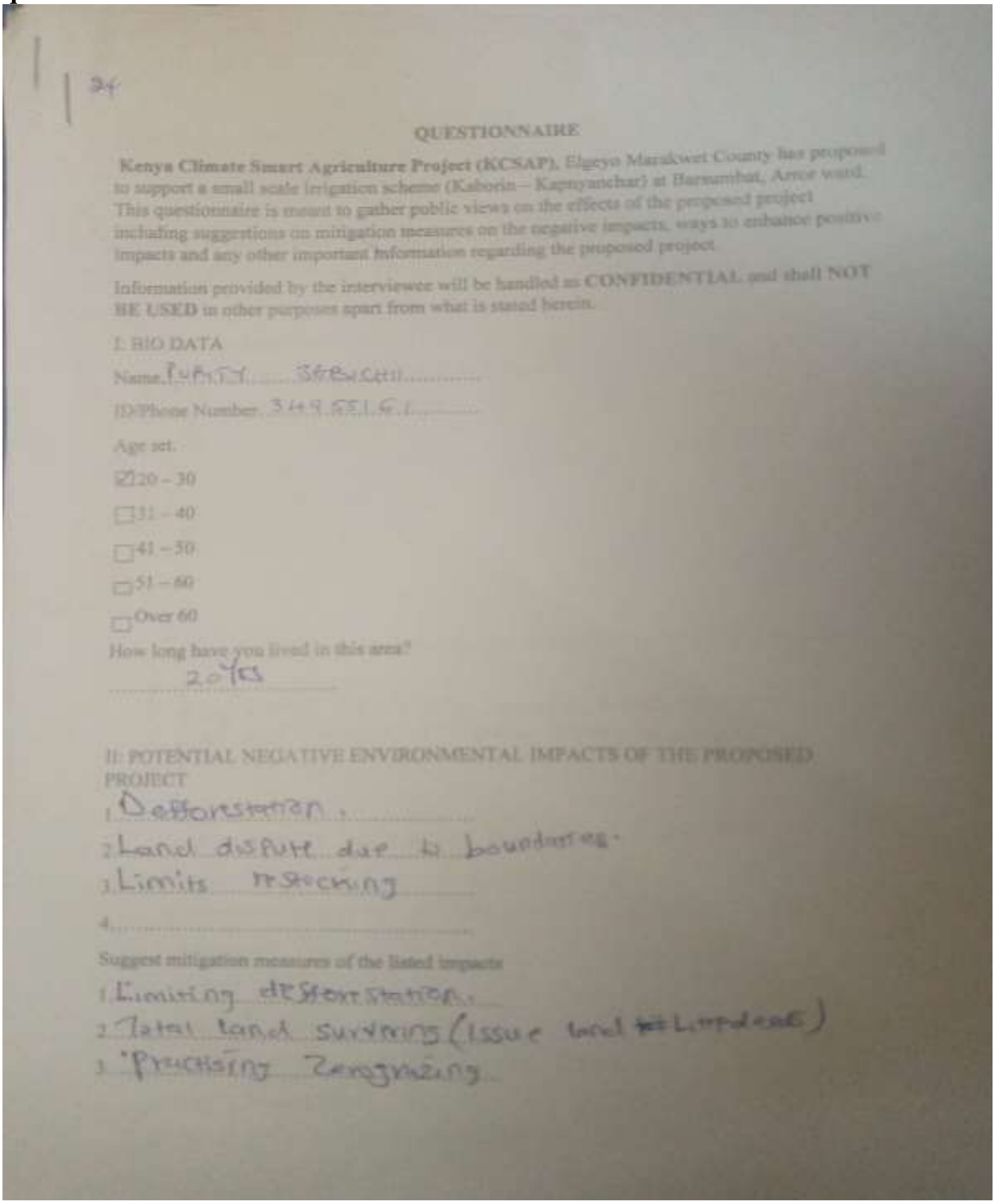
Signature…..

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2015 Certified

Annex 7: Sampled filled questionnaires



24

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP). Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

Information provided by the interviewee will be handled as **CONFIDENTIAL** and shall **NOT BE USED** in other purposes apart from what is stated herein.

I: BIO DATA

Name: PURITY SEREMCHI

ID/Phone Number: 3449551 G I

Age set.

☑ 20 – 30

☐ 31 – 40

☐ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

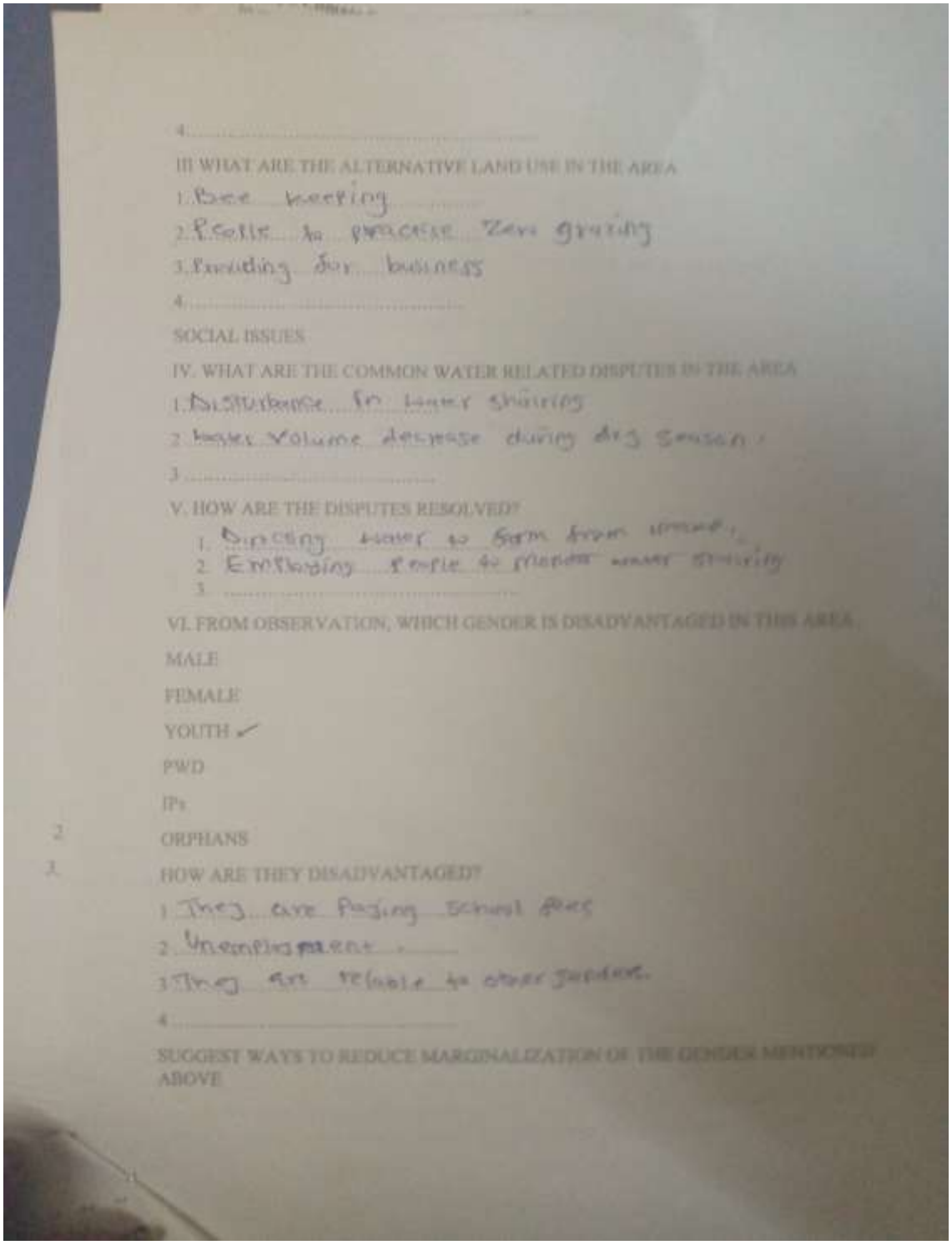
20 yrs

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Deforestation.
2. Land dispute due to boundaries.
3. Limits restocking
4.

Suggest mitigation measures of the listed impacts

1. Limiting deforestation.
2. Total land surveying (Issue land to Landless)
3. Practising Zerograzing



4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee keeping
2. People to practise Zero grazing
3. Providing for business
4.....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Distribution of water sharing
2. Water volume decrease during dry season
3.....

V. HOW ARE THE DISPUTES RESOLVED?

1. Digging water to farm from water.
2. Employing people to manage water sharing
3.....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA.

MALE

FEMALE

YOUTH ✓

PWD

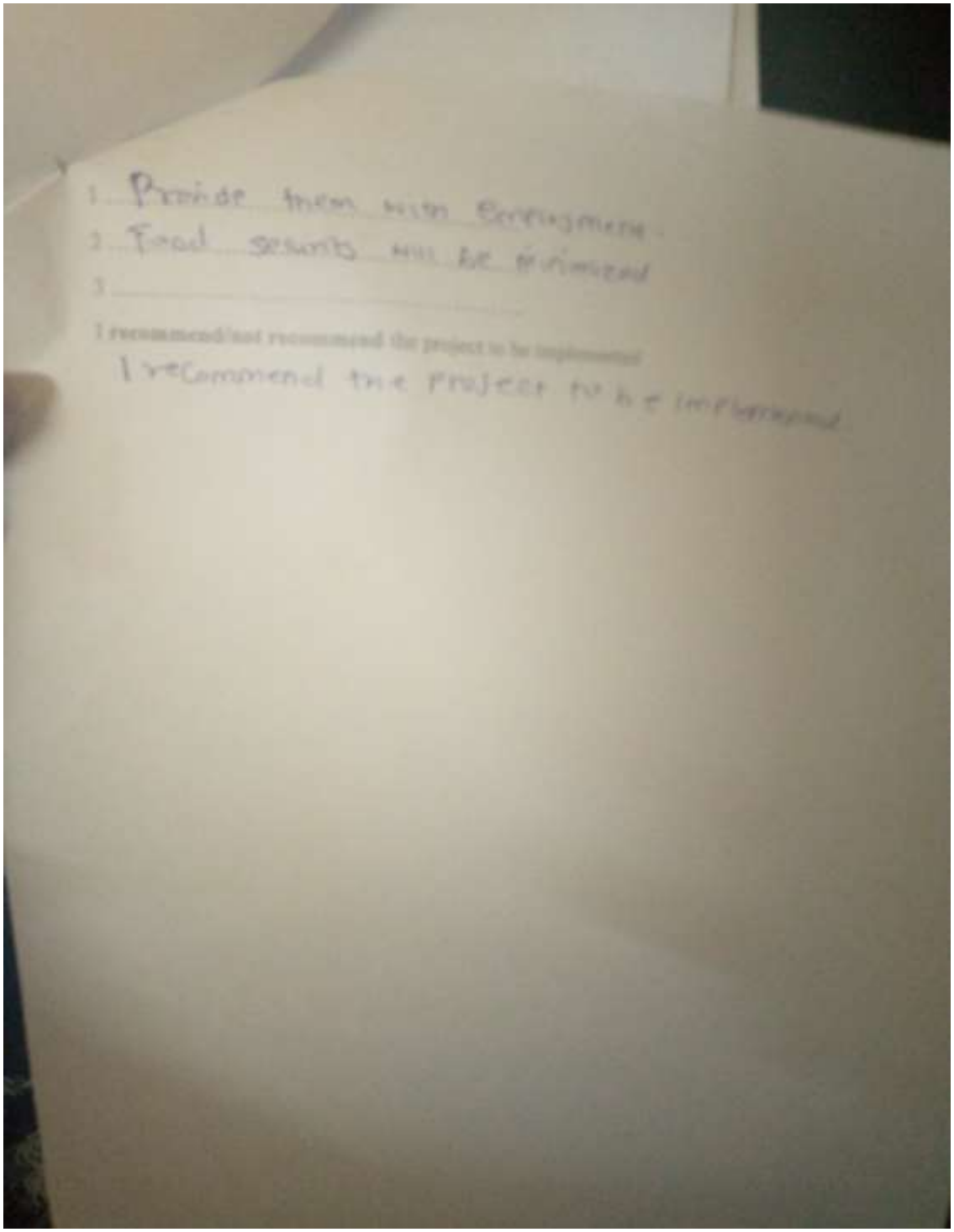
IPs

2 ORPHANS

3. HOW ARE THEY DISADVANTAGED?

1. They are paying school fees
2. Unemployment
3. They are reliable to other genders.
4.....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE


1. Provide them with Employment.
2. Food security will be promoted
3.
I recommend/not recommend the project to be implemented
I recommend the Project to be implemented

12

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP). Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name... Isiah Kosgei Yeera.....

ID/Phone Number... 2H20.9.80.....

Age set.

☐ 20 – 30

☑ 31 – 40

☐ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

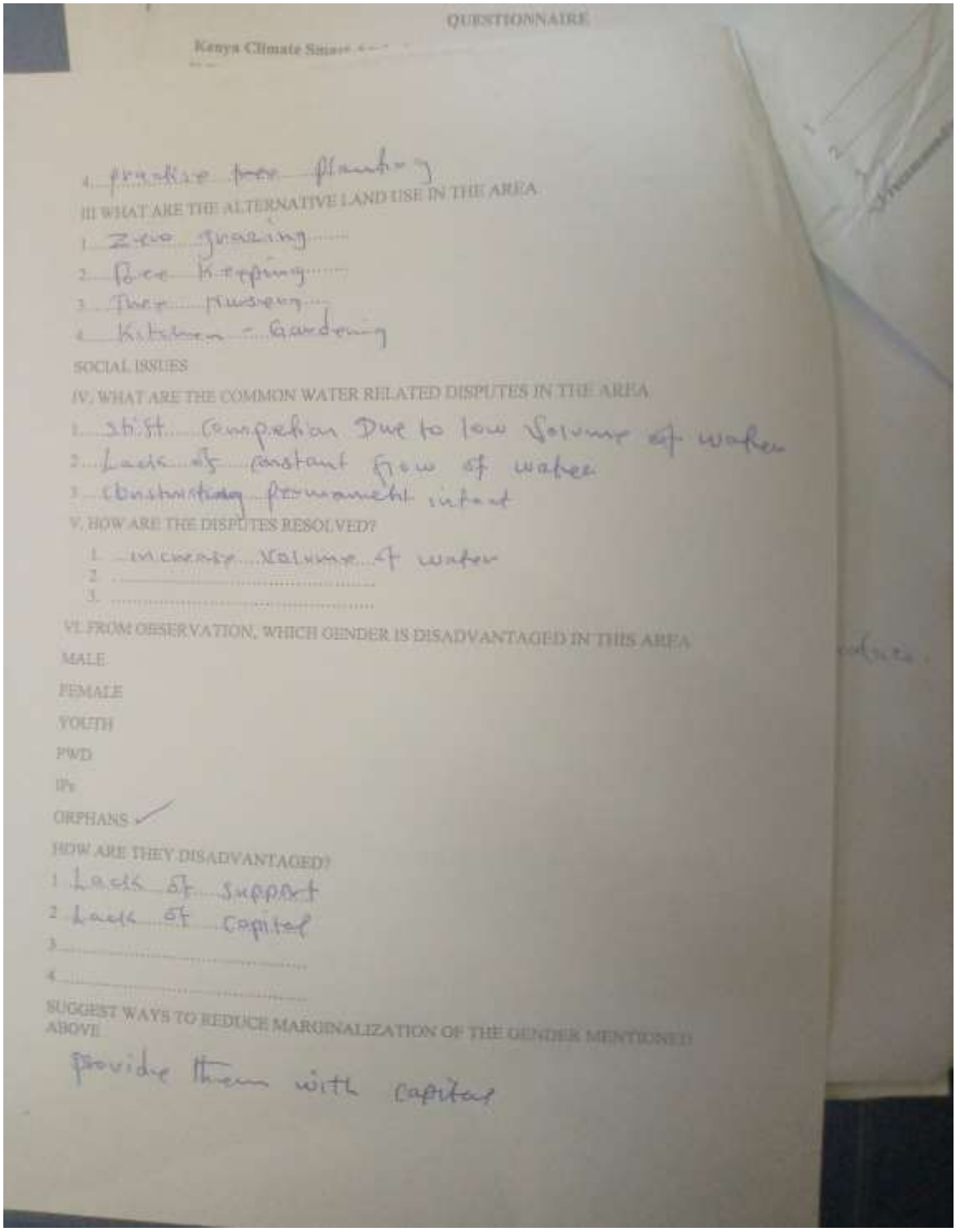
.....38 YEARS.....

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Deforestation.....
2. Encreased water flume may cause stagnant
3. may cause soil erosion
4. .....

Suggest mitigation measures of the listed impacts

1. planting of trees
2. Construction of furrows
3. Provide them with mosquito nets



QUESTIONNAIRE

Kenya Climate Smart ...

4. practise tree planting

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Zero grazing
2. Bee keeping
3. Tree nursery
4. Kitchen - Gardening

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. 1st st... Completion Due to low volume of water
2. Lack of constant flow of water
3. Constructing permanent intake

V. HOW ARE THE DISPUTES RESOLVED?

1. increase volume of water
2. .....
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE

YOUTH

PWD

IPs

ORPHANS ✓

HOW ARE THEY DISADVANTAGED?

1 Lack of support
2 Lack of capital
3 .....
4 .....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE

provide them with capital

19

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapuyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name. Benjamin K. Chebase

ID/Phone Number [illegible]

Age set.

☐ 20 – 30

☐ 31 – 40

☑ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

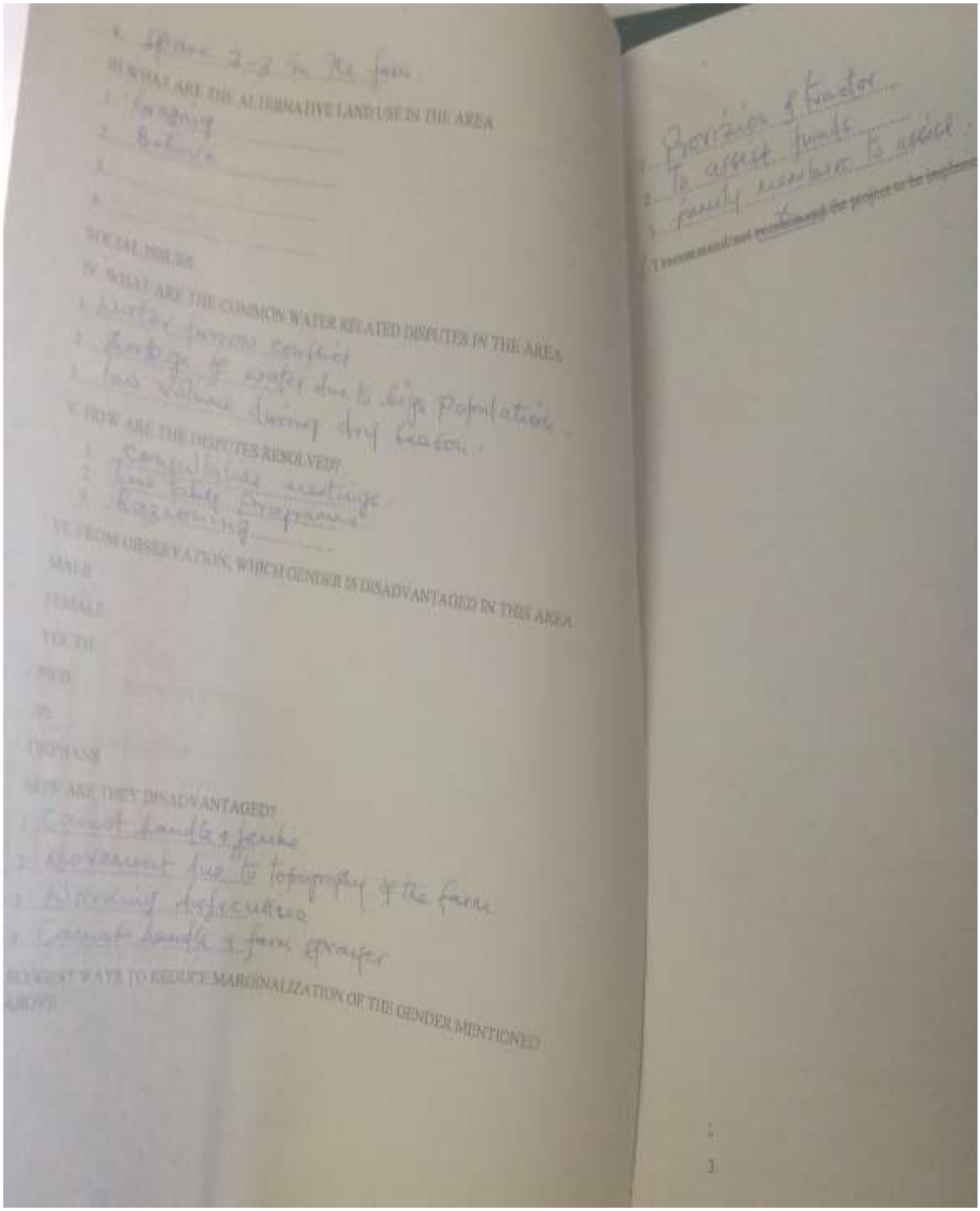
50 yrs

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Overcrowded trees weakens production of the farm produce.
2. Felling trees completely in the farm
3. Soil erosion
4. Enlargement of the furrow channels

Suggest mitigation measures of the listed impacts

1. Reduce the crowded trees
2. Create awareness of conserving soil erosion
3. Water rationing



20

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name: Duncan Kimeng

ID/Phone Number: 7374040

Age set.

☐ 20 – 30

☐ 31 – 40

☐ 41 – 50

☑ 51 – 60

☐ Over 60

How long have you lived in this area?

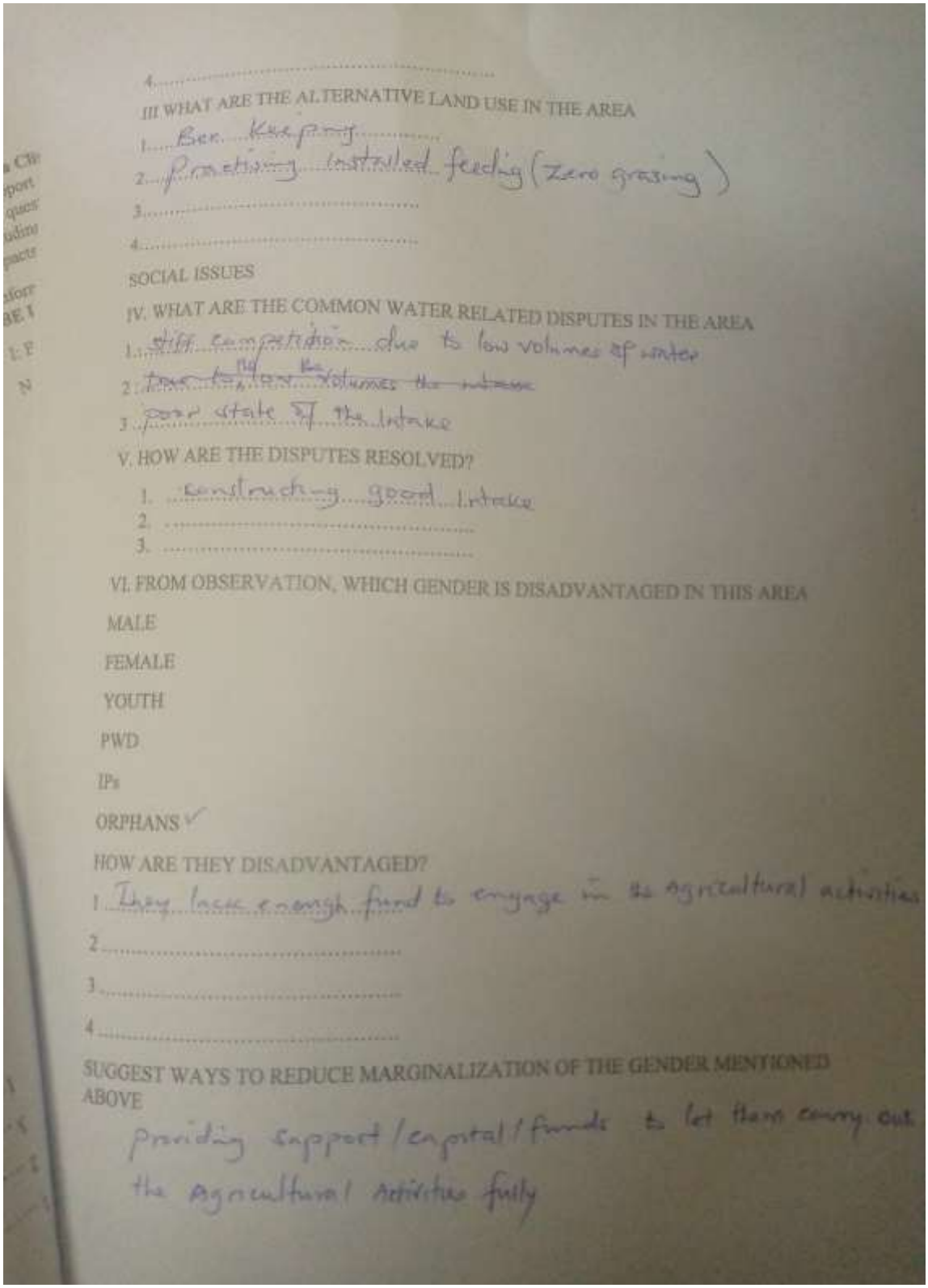
56 Tons

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. - Deffo restation
2. soil erosion because of the Topography
3. Disease spread
4. .....

Suggest mitigation measures of the listed impacts

1. Planting trees in the land
2. Proper construction of the furrow
3. provision of chemicals to kill the Vectors causing the diseases



4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee Keeping
2. Practising Installed feeding (Zero grazing)
3. .....
4. .....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. stiff competition due to low volumes of water
2. ~~Poor location of the intake~~
3. poor state of the intake

V. HOW ARE THE DISPUTES RESOLVED?

1. constructing good intake
2. .....
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE

YOUTH

PWD

IPs

ORPHANS ✓

HOW ARE THEY DISADVANTAGED?

1. They lack enough fund to engage in the agricultural activities
2. .....
3. .....
4. .....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE

Providing support / capital / funds to let them carry out the agricultural activities fully

- 22 -

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP). Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name: Lawrence Kerer

ID/Phone Number: 0780 988810

Age set.

☐ 20 – 30

☑ 31 – 40

☐ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

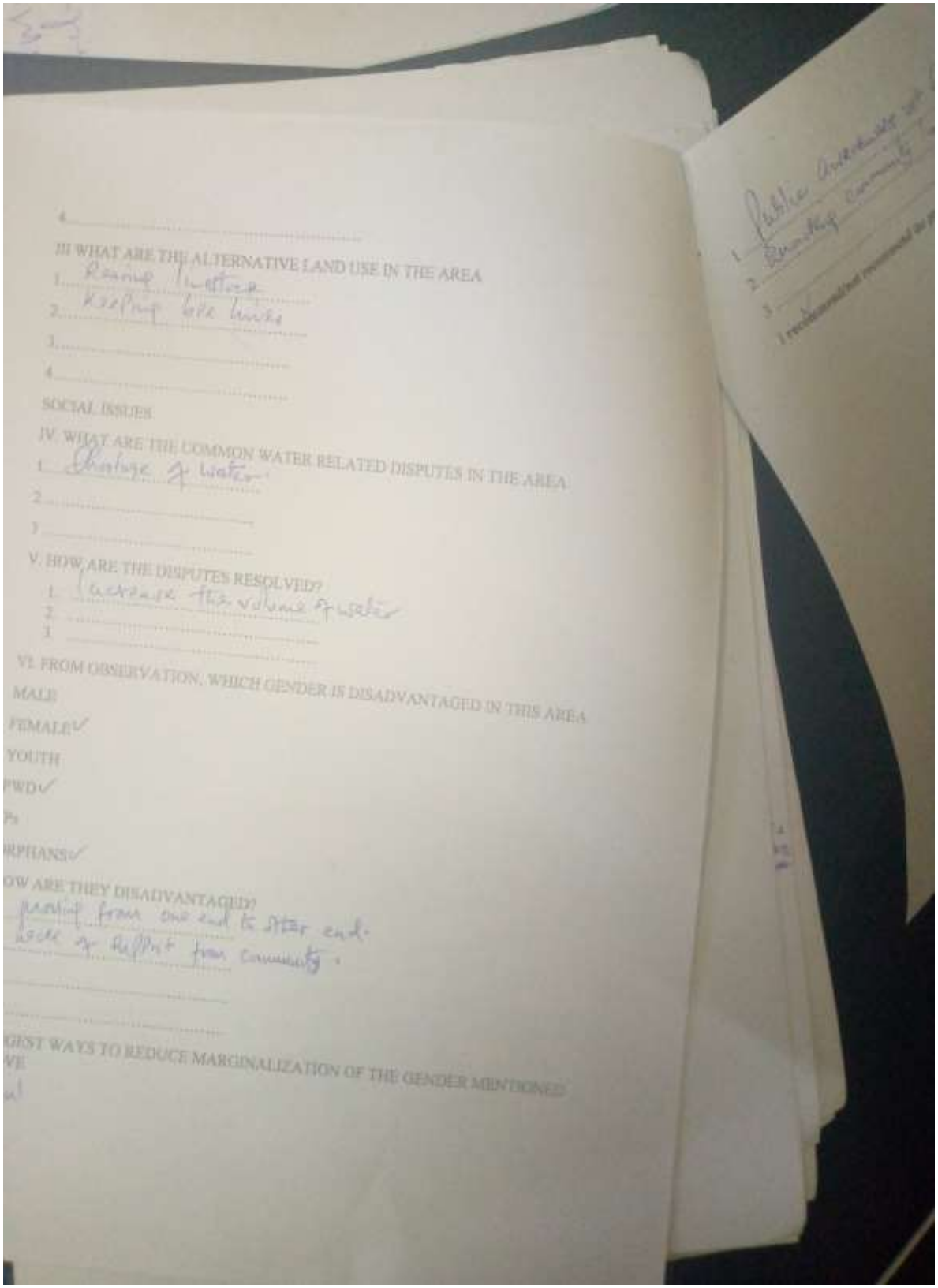
36 years

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Soil erosion
2. Felling down of trees
3. ....
4. ....

Suggest mitigation measures of the listed impacts

1. Controlling soil erosion
2. Reducing cutting of trees
3. ....



4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Rearing livestock
2. Keeping bee hives
3.....
4.....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Shortage of water
2.....
3.....

V. HOW ARE THE DISPUTES RESOLVED?

1. Increase the volume of water
2. .....
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE✓

YOUTH

PWD✓

Ps

RPHANS✓

OW ARE THEY DISADVANTAGED?

Planting from one end to other end.
Lack of support from community.

GIST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED

VE

1. Public awareness
2. Training community
3.

-3-

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyunchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name Margaret Kipkeu

ID/Phone Number 22479617 / 0795224130

Age set.

☐ 20 – 30

☑ 31 – 40

☐ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

39 Years

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Soil erosion may occur
2. Wild animal habitat displaced.
3. destruction of the natural forest.
4. conflicts among members of the community

Suggest mitigation measures of the listed impacts

1. some trees to be kept
2. Proving last solution of long conflicts
3. soil preventing solution eg trees.

4. Natural habitat is to be destroyed.

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee keeping
2. Practice of zero grazing
3. cash crop production
4. Tree plantation

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Volume of water
2. The water intake problem
3. Telegraph of the land

V. HOW ARE THE DISPUTES RESOLVED?

1. provision of piped water
2. Improvement of water intake
3. proper management of both

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE ✓

YOUTH

PWD

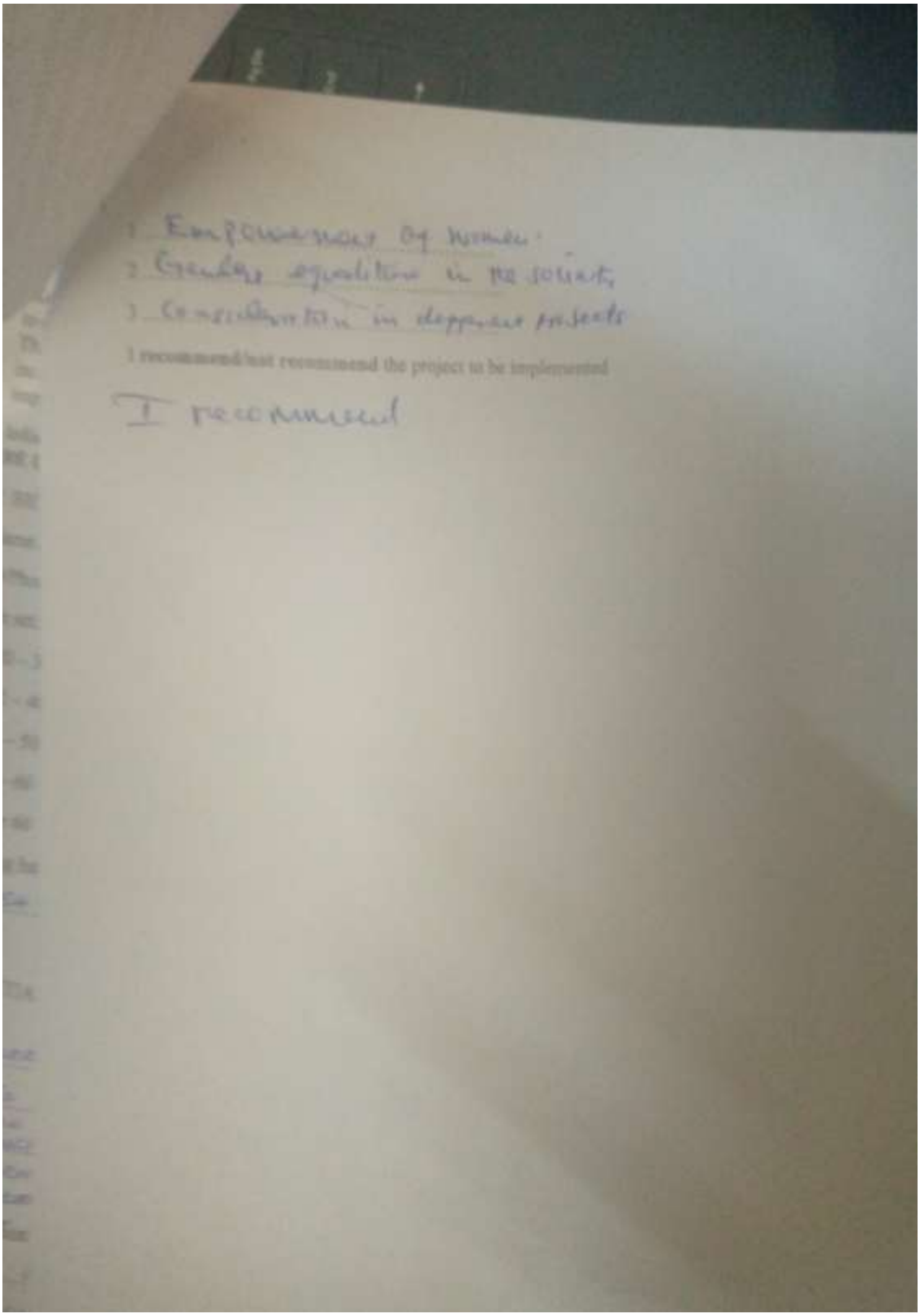
IPs

ORPHANS

HOW ARE THEY DISADVANTAGED?

1. harassment from men.
2. Most project are conducted by men.
3. Neglected by the society
4. left with all family issues.

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE



1. Empowerment of women.
2. Gender equalities in the society
3. Consideration in different projects

I recommend/not recommend the project to be implemented

I recommend

-7-

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name: Margaret Teyoi [illegible]

ID/Phone Number.......................................

Age set.

☐ 20 – 30

☐ 31 – 40

☐ 41 – 50

☑ 51 – 60

☐ Over 60

How long have you lived in this area?

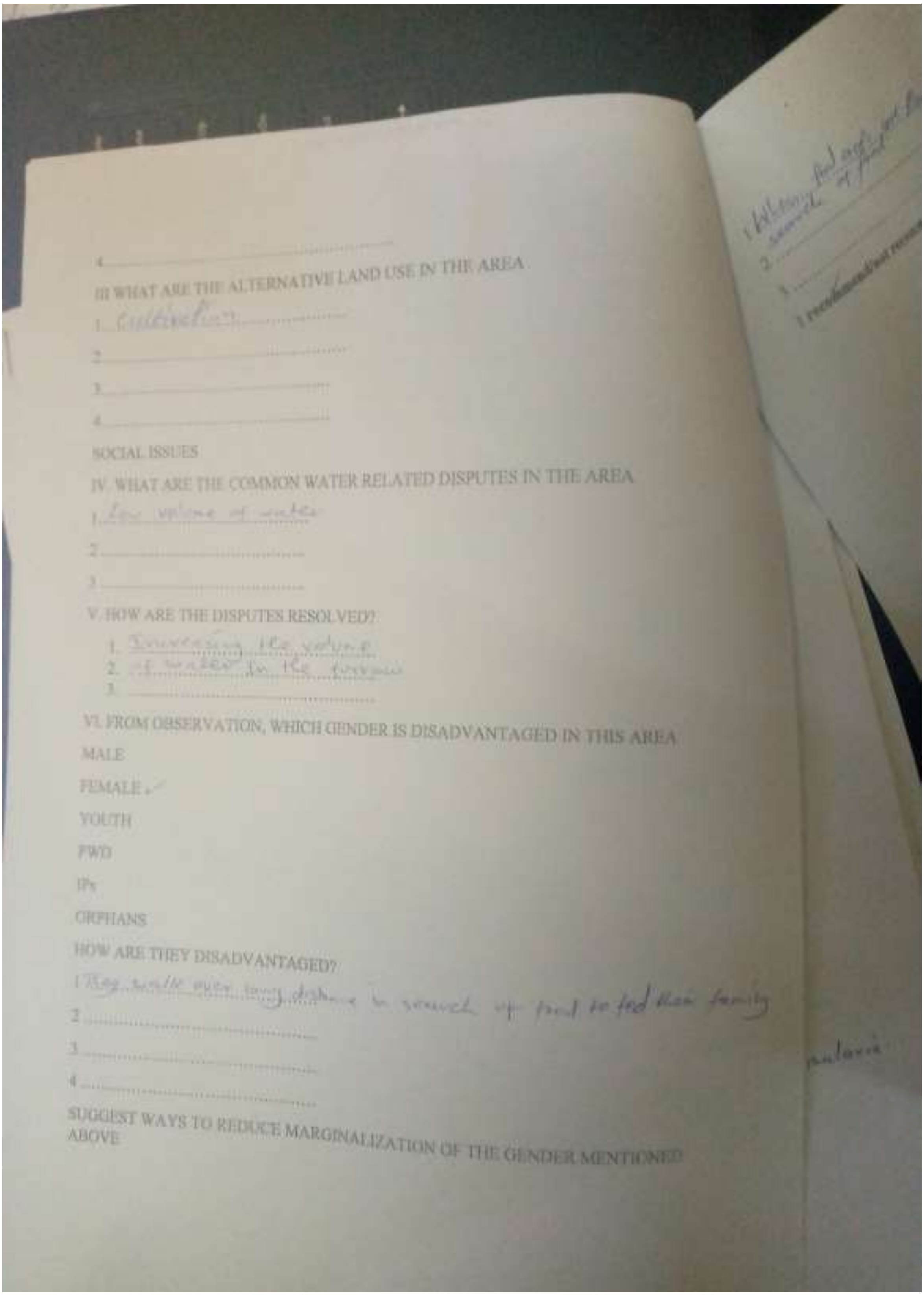
....

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Air pollution due to charcoal burning
2. Deforestation
3. ....
4. ....

Suggest mitigation measures of the listed impacts

1. ....
2. Planting of more tree cover
3. ....



4. ....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. cultivation

2. ....

3. ....

4. ....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Low volume of water

2. ....

3. ....

V. HOW ARE THE DISPUTES RESOLVED?

1. Increasing the volume
2. of water in the furrow
3. ....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE ✓

YOUTH

PWD

IPs

ORPHANS

HOW ARE THEY DISADVANTAGED?

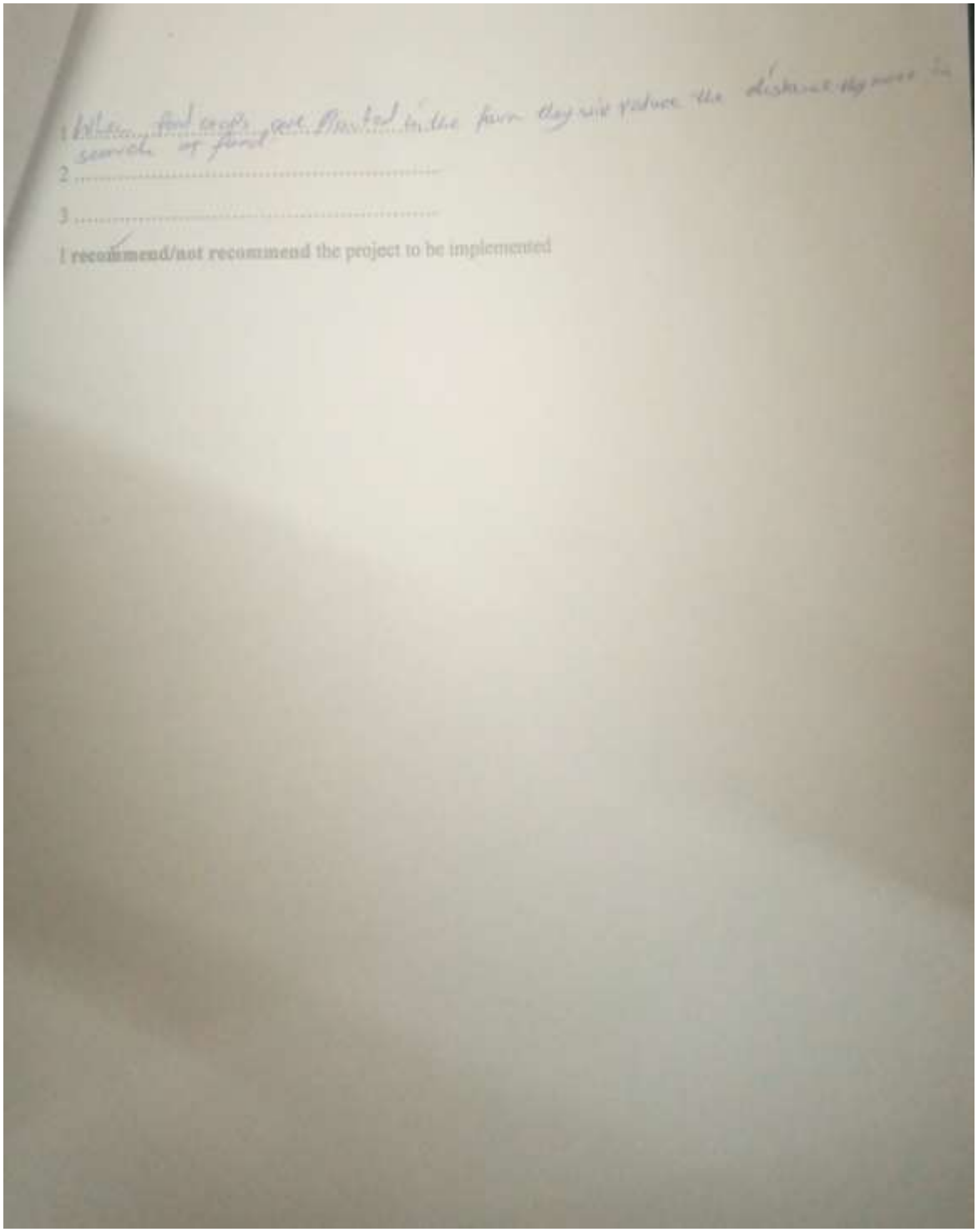
1. They walk over long distance in search of food to feed their family

2. ....

3. ....

4. ....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE


1 Water and seeds are planted in the farm they will reduce the distance they move in search of food
2
3
I recommend/not recommend the project to be implemented

31

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapsyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name. Enock Kibet

ID/Phone Number. 0790 947 538

Age set.

- ☑ 20 – 30
- ☐ 31 – 40
- ☐ 41 – 50
- ☐ 51 – 60
- ☐ Over 60

How long have you lived in this area?

23 years

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Flood of water may lead to spread of malaria.
2. ...
3. ...
4. ...

Suggest mitigation measures of the listed impacts

1. Provide people with mosquito nets to reduce the spread of malaria.
2. ...
3. ...

4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1 For crop farming

2.....

3.....

4.....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1 Low volume of water

2.....

3.....

V. HOW ARE THE DISPUTES RESOLVED?

1. By increasing the volume of water
2. .....
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE ✓

FEMALE

YOUTH

PWD

IPs

ORPHANS

HOW ARE THEY DISADVANTAGED?

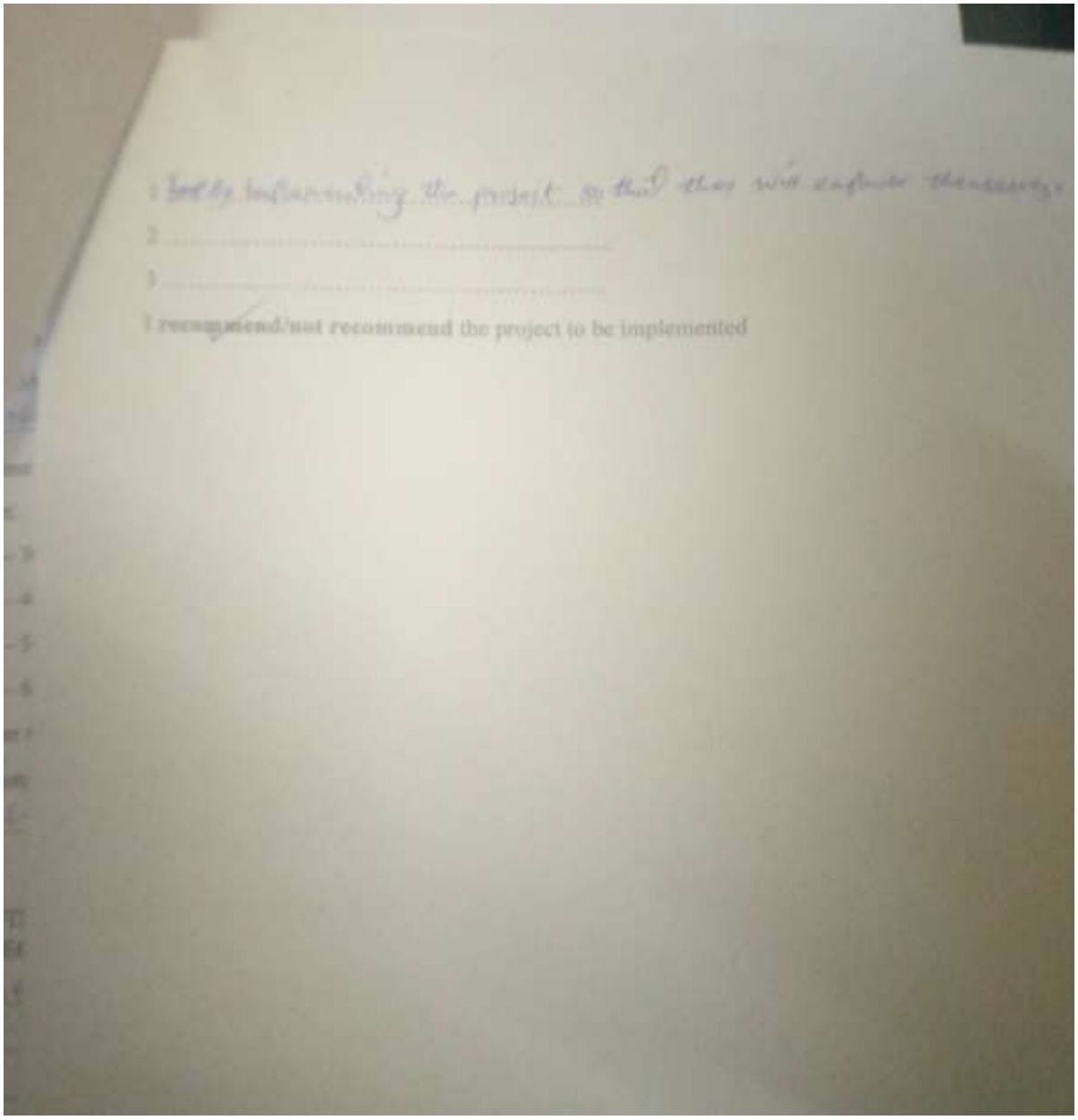
1 They lack school fees for their children.

2.....

3.....

4.....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE


2.
3.
I recommend/not recommend the project to be implemented

Kenya Climate Smart Agriculture Project (KCSAP), Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name: Nancy Koech

ID/Phone Number: [illegible] 36 059 625

Age set.

- ☐ 20 – 30
- ☑ 31 – 40
- ☐ 41 – 50
- ☐ 51 – 60
- ☐ Over 60

How long have you lived in this area?

16-yrs

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Clearing of the bush will lead to soil erosion
2.
3.
4.

Suggest mitigation measures of the listed impacts

1. After clearing will plant trees to minimize soil erosion
2.
3.

4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Planning/Cultivating

2.....

3.....

4.....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Shortage of water

2.....

3.....

V. HOW ARE THE DISPUTES RESOLVED?

1. Increasing the volume

2. .....

3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE ✓

YOUTH

PWD

IPs

ORPHANS

HOW ARE THEY DISADVANTAGED?

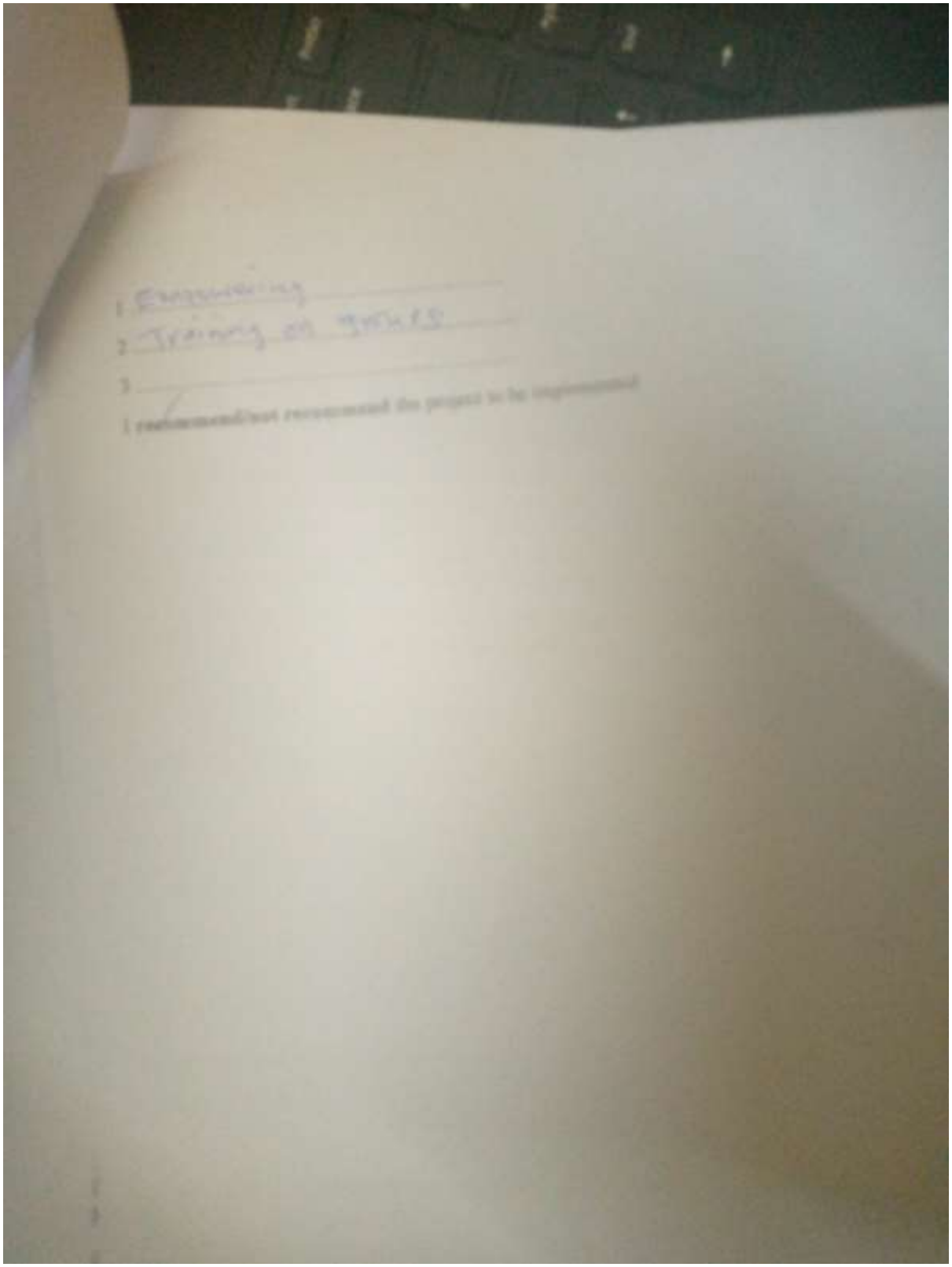
1 Lack knowledge of maintance

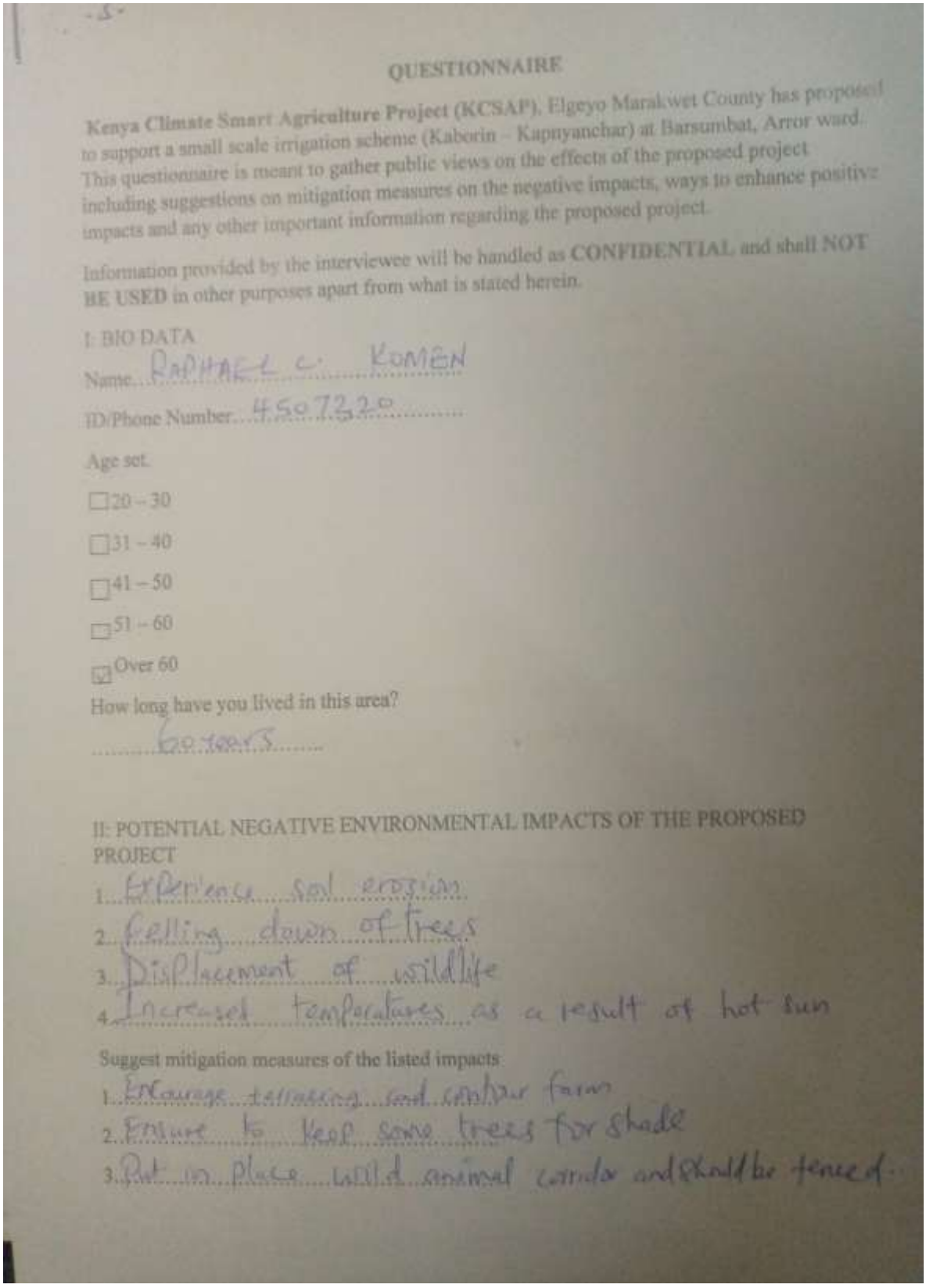
2 Struggling too much to maintain the family

3.....

4.....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE





QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP). Elgeyo Marakwet County has proposed to support a small scale irrigation scheme (Kaborin – Kapnyanchar) at Barsumbat, Arror ward. This questionnaire is meant to gather public views on the effects of the proposed project including suggestions on mitigation measures on the negative impacts, ways to enhance positive impacts and any other important information regarding the proposed project.

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I: BIO DATA

Name: RAPHAEL C. KOMEN

ID/Phone Number: 4507320

Age set.

☐ 20 – 30

☐ 31 – 40

☐ 41 – 50

☐ 51 – 60

☑ Over 60

How long have you lived in this area?

60 years

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Experience soil erosion
2. Felling down of trees
3. Displacement of wildlife
4. Increased temperatures as a result of hot sun

Suggest mitigation measures of the listed impacts

1. Encourage terracing and contour farm
2. Ensure to leaf some trees for shade
3. Put in place wild animal corridor and should be fenced

4. Plant some trees for shade

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee Keeping
2. Practice zero grazing farm
3. Fish farming
4. Poultry keeping

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Poor water rationing
2. Using water during irrigation without permission from others (watering (non turn taking)
3. Irrigation beyond ones boundary

V. HOW ARE THE DISPUTES RESOLVED?

1. Dialogue
2. Public barazas
3. Using council of elders, administration & religious leaders

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE ✓

YOUTH

PWD

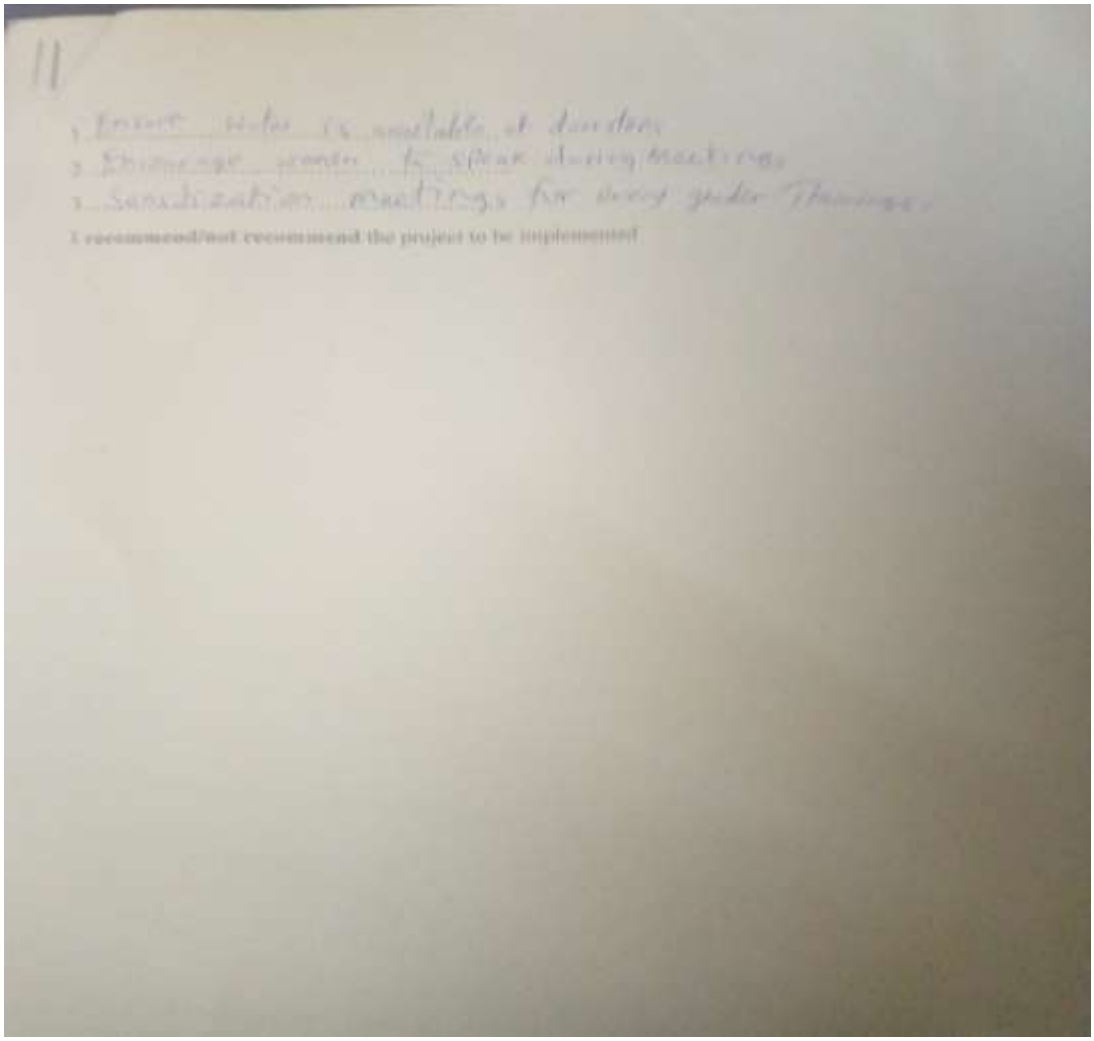
IPs

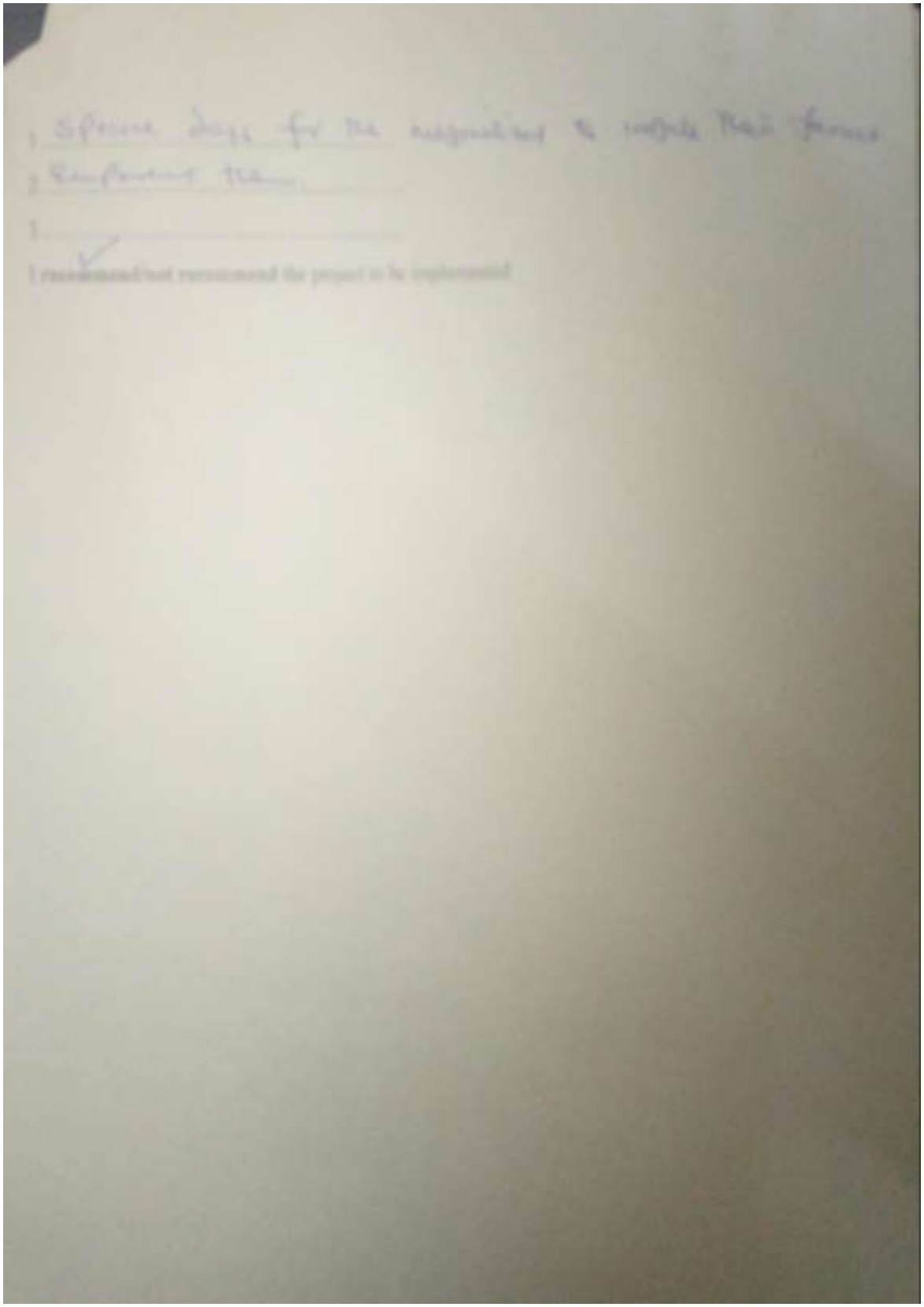
ORPHANS

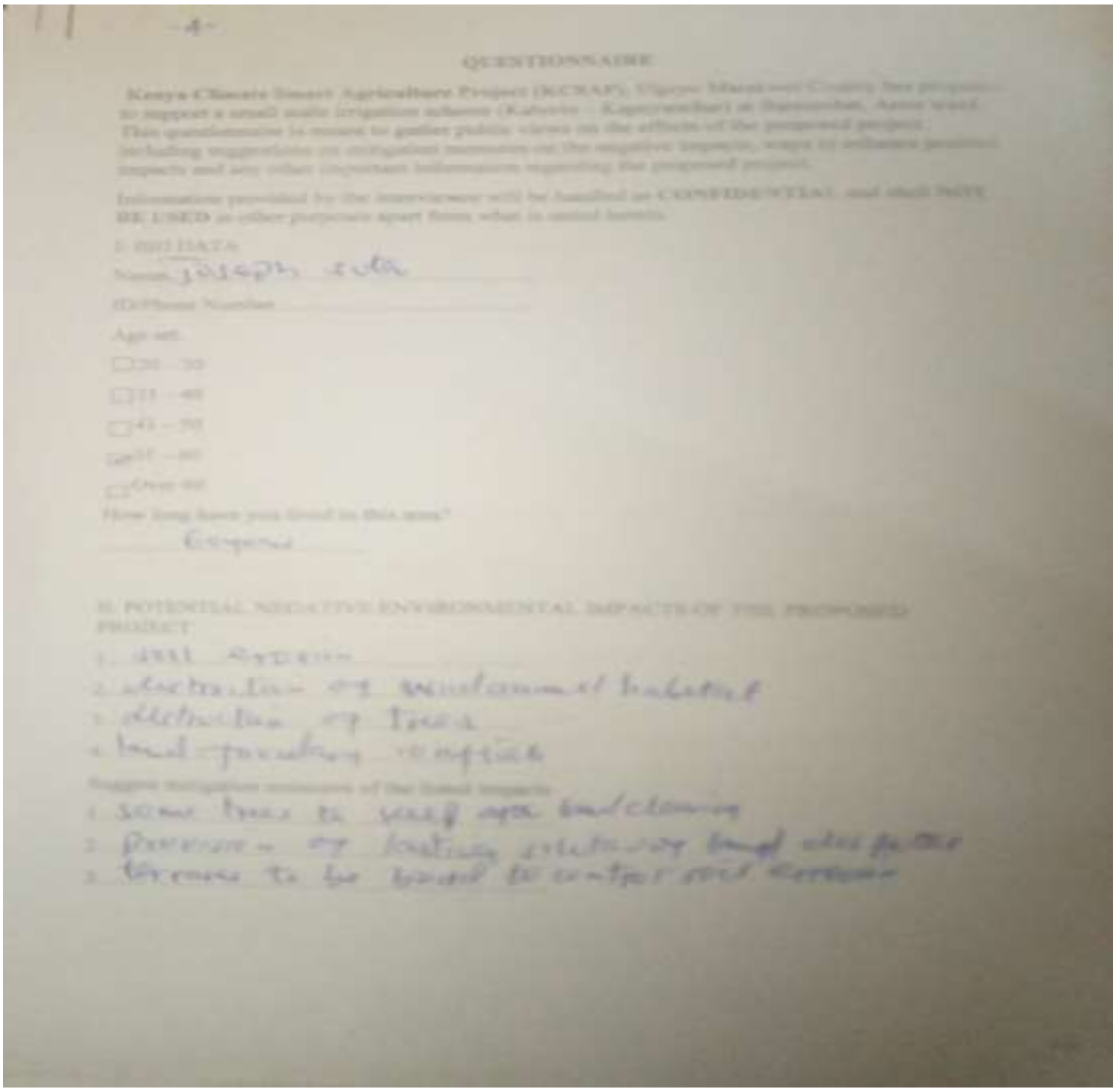
HOW ARE THEY DISADVANTAGED?

1. Travel long distance to get drinking water
2. Limited opportunity given to women during meetings.
3. Suffer from domestic violence
4. ……………………

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE


11
1. Ensure water is available at borehole
2. Encourage women to speak during meetings
3. Sensitization meetings for every gender
I recommend/not recommend the project to be implemented





-4-

QUESTIONNAIRE

Kenya Climate Smart Agriculture Project (KCSAP)

I. BIO DATA

Name

ID/Phone Number

Age set

How long have you lived in this area?

II. POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee keeping
2. Zero grazing practices
3. cash crop productions
4. Tree Nursery plantation

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. The Water intake problem
2. land terrian
3. Irrigation water related problems

V. HOW ARE THE DISPUTES RESOLVED?

1. Increase water volume
2. provision of water pipes
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE

YOUTH

PWD ✓

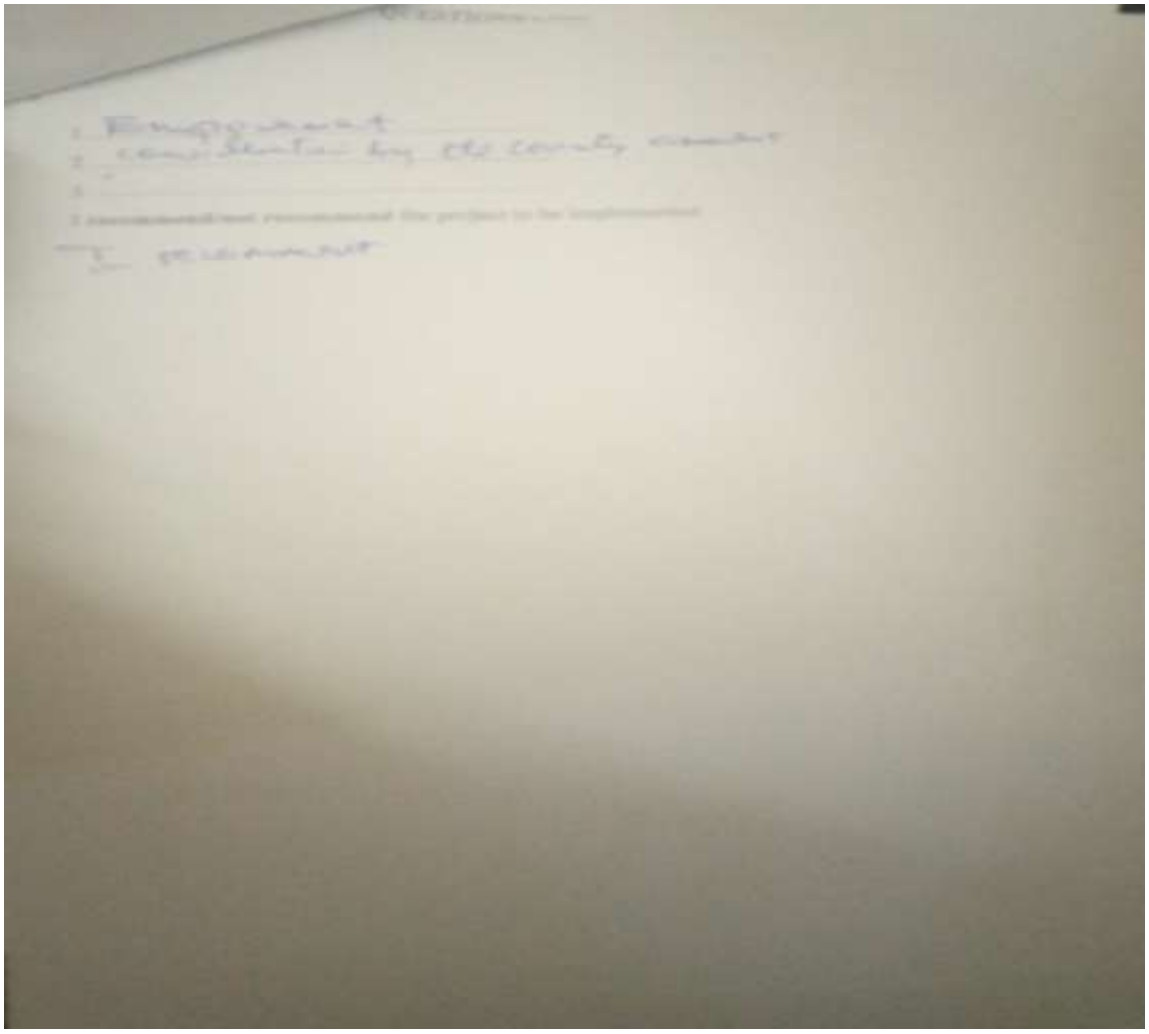
IPs

ORPHANS

HOW ARE THEY DISADVANTAGED?

1. harassment from the public
2. Neglected by the community
3. .....
4. .....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE



111 26

QUESTIONNAIRE

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I: BIO DATA

Name: William Kisang

ID/Phone Number: 0111949037

Age set.

☐ 20 – 30

☐ 31 – 40

☑ 41 – 50

☐ 51 – 60

☐ Over 60

How long have you lived in this area?

49

II: POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

1. Deforestration
2. Limiting Annual otacking
3. Land dispute
4. .....

Suggest mitigation measures of the listed impacts .

1. Total land surveying
2. Practising Zero grazing
3. Limit deforestration

4.....

III WHAT ARE THE ALTERNATIVE LAND USE IN THE AREA

1. Bee Keeping
2. People to practice zero grazing
3. providing for boundaries
4. .....

SOCIAL ISSUES

IV. WHAT ARE THE COMMON WATER RELATED DISPUTES IN THE AREA

1. Disturbance in water sharing
2. water volume decrease during dry se
3. .....

V. HOW ARE THE DISPUTES RESOLVED?

1. Directing water to farms from intake
2. employing people to monitor water al
3. .....

VI. FROM OBSERVATION, WHICH GENDER IS DISADVANTAGED IN THIS AREA

MALE

FEMALE

YOUTH ✓

PWD

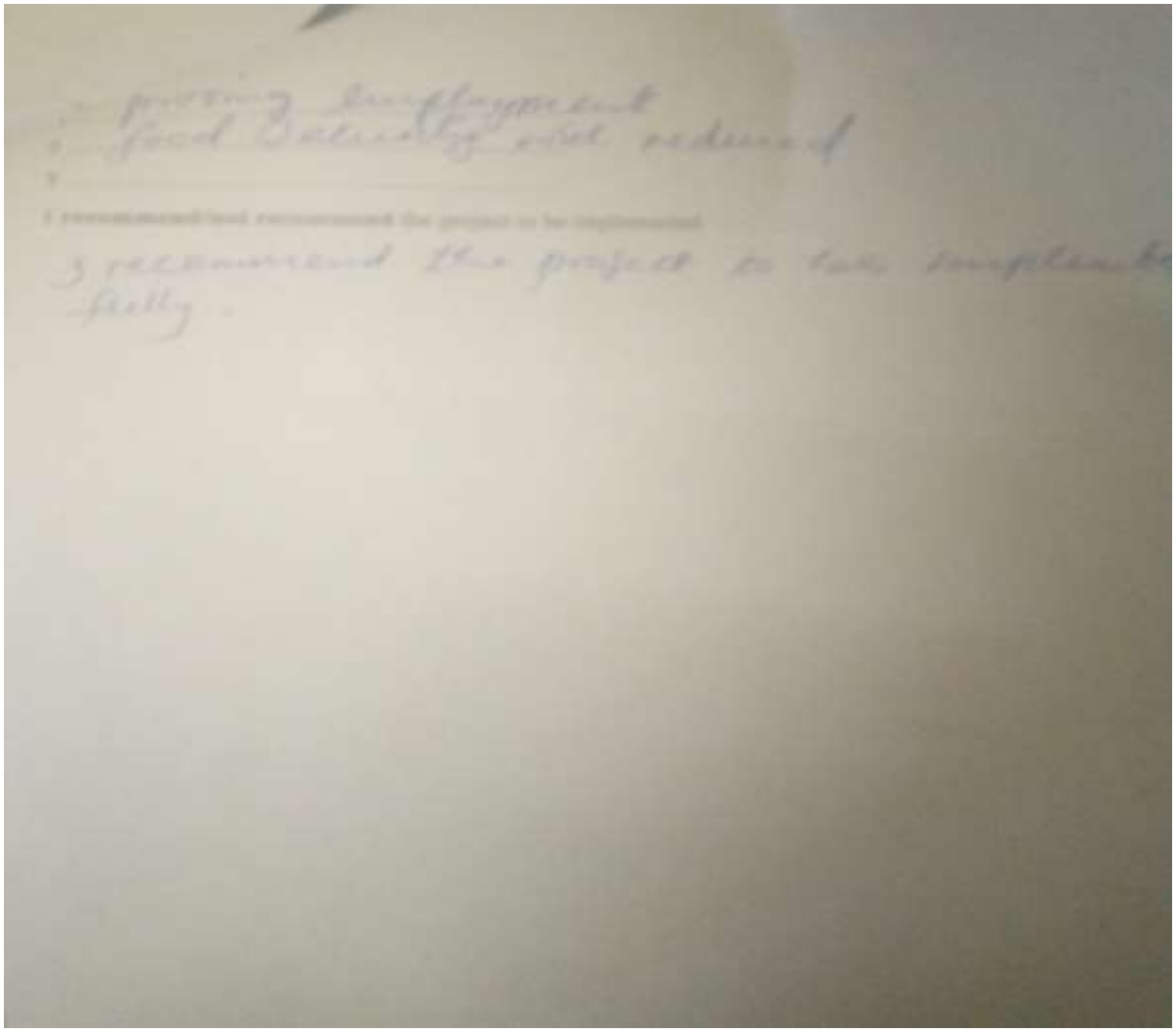
IPs

ORPHANS

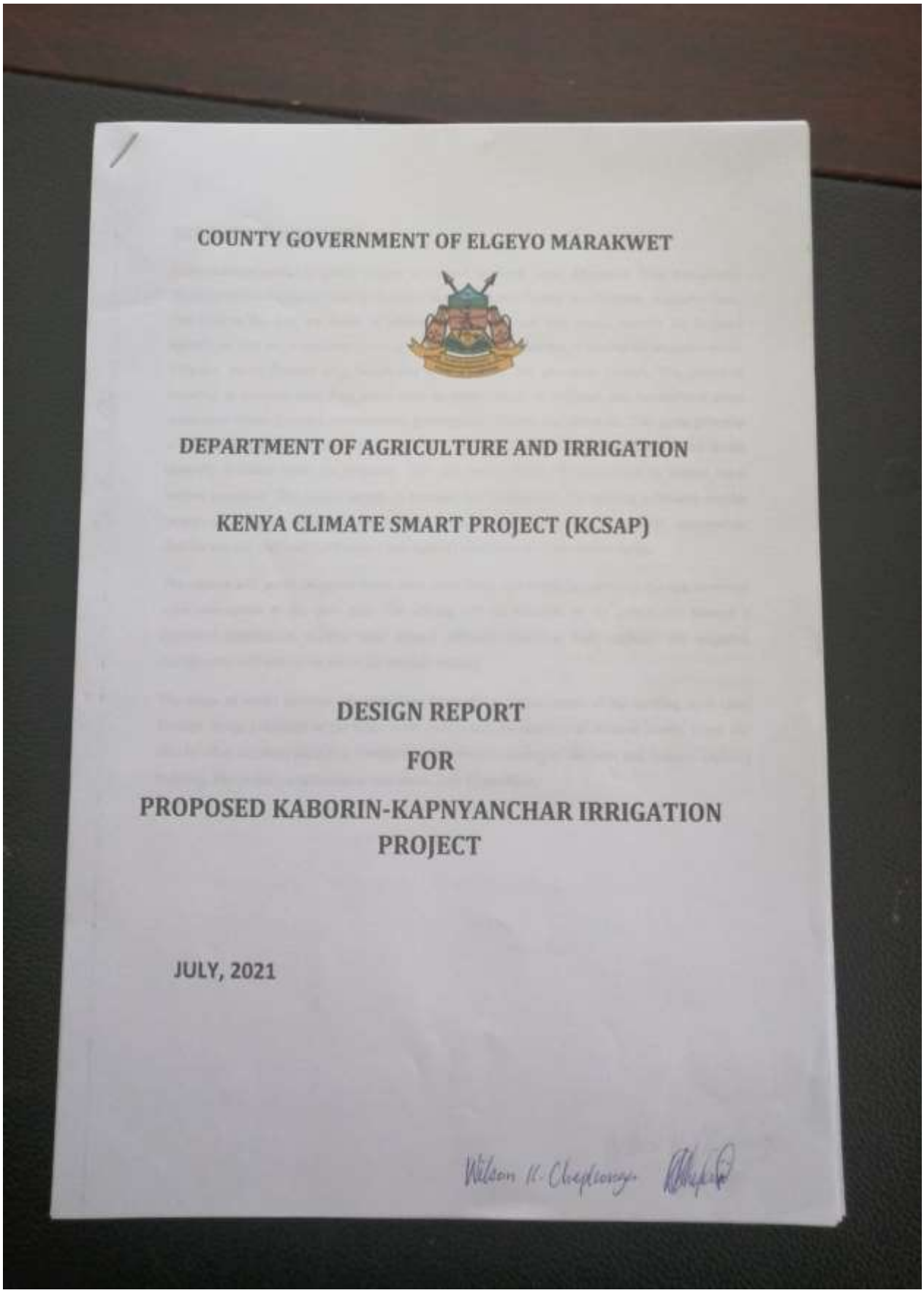
HOW ARE THEY DISADVANTAGED?

1. They pay school fees
2. on employment
3. They are relaiable to other gender
4. .....

SUGGEST WAYS TO REDUCE MARGINALIZATION OF THE GENDER MENTIONED ABOVE



Annex 8: Design & drawing.



EXECUTIVE SUMMARY

Kaborin-Kapnyanchar irrigation project is located in Arror ward, Marakwet West Sub-county, Elgeyo-Marakwet County, next to former Chesuman Kerio Valley Development Authority farm. The soils in the area are fertile of predominantly sandy and clay loams, suitable for irrigated agriculture. The crops currently grown are mainly under rain fed due to inadequate irrigation water. This has led to frequent crop failure due to inadequate and unreliable rainfall. This project is targeting to promote both food crops such as maize, beans & sorghum and horticultural crops production which includes watermelons, green grams, onions, and tomatoes. The gross potential scheme area is over 500 acres (20ha) but the target for irrigation 300 acres (120 ha) based on the currently available water for irrigation. This will enable about 100 households to irrigate using surface irrigation. This project targets to increase land productivity by ensuring sufficient, regular supply of irrigation water in the scheme through improved water abstraction, conveyance, distribution and application efficiency and capacity development of the beneficiaries.

The scheme will get its irrigation water from Arror River and it will be conveyed through improved open conveyance to the farm area. The scheme will be managed by the community through a registered corporative society, with elected officials. However their capacity for irrigation management will have to be enhanced through training.

The scope of works includes rehabilitation of the intake, improvement of the existing open canal through lining, extension of the main canal system and construction of division boxes. There will also be other activities including completion of perimeter fencing of the farm and farmers' capacity building. The project is estimated to cost about **Ksh 13.8million.**

Wilson K. Cheplwogo

GOAL AND OBJECTIVES

GOAL: This project is proposed to be an intervention to increase access to water for irrigation through an efficient water abstraction, conveyance and distribution system, improve the health and living standards of families within the project area and contain/eradicate the insecurity caused by cattle rustling.

OVERALL OBJECTIVE: The overall objective of the project is to contribute to poverty reduction and food security in the area by installing efficient, effective and sustainable irrigation system that is able to diversify the people's livelihood and supply sufficient food production and improve household income.

SPECIFIC OBJECTIVES:

- Construct a more efficient irrigation system on the scheme for improved crop production.
- Reduce the present high dependence on rain-fed agriculture thus minimizing crop failures.
- Utilize the semi arid but fertile land for effective agricultural production through irrigated farming.
- Diversify the peoples' livelihood thereby reduce or eliminate incidences of insecurity caused by cattle rustling.
- Minimize irrigation water losses in abstraction, conveyance, distribution and application by improving the intake, lining the canal and construction of division boxes.
- Build the capacity of the beneficiaries through training on irrigated agriculture.
- Minimize human and capital costs used in operation, maintenance and management of the scheme.

Wilson K Chepkonga

JUSTIFICATION

The frequent occurrences of droughts and subsequent lack of adequate food in the project area, call for a sustainable means of food production. Therefore the improvement of the gravity fed irrigation schemes will not only ensure food production at relatively low cost but also enable the community to increase their household income by engaging in growing of cash crops.

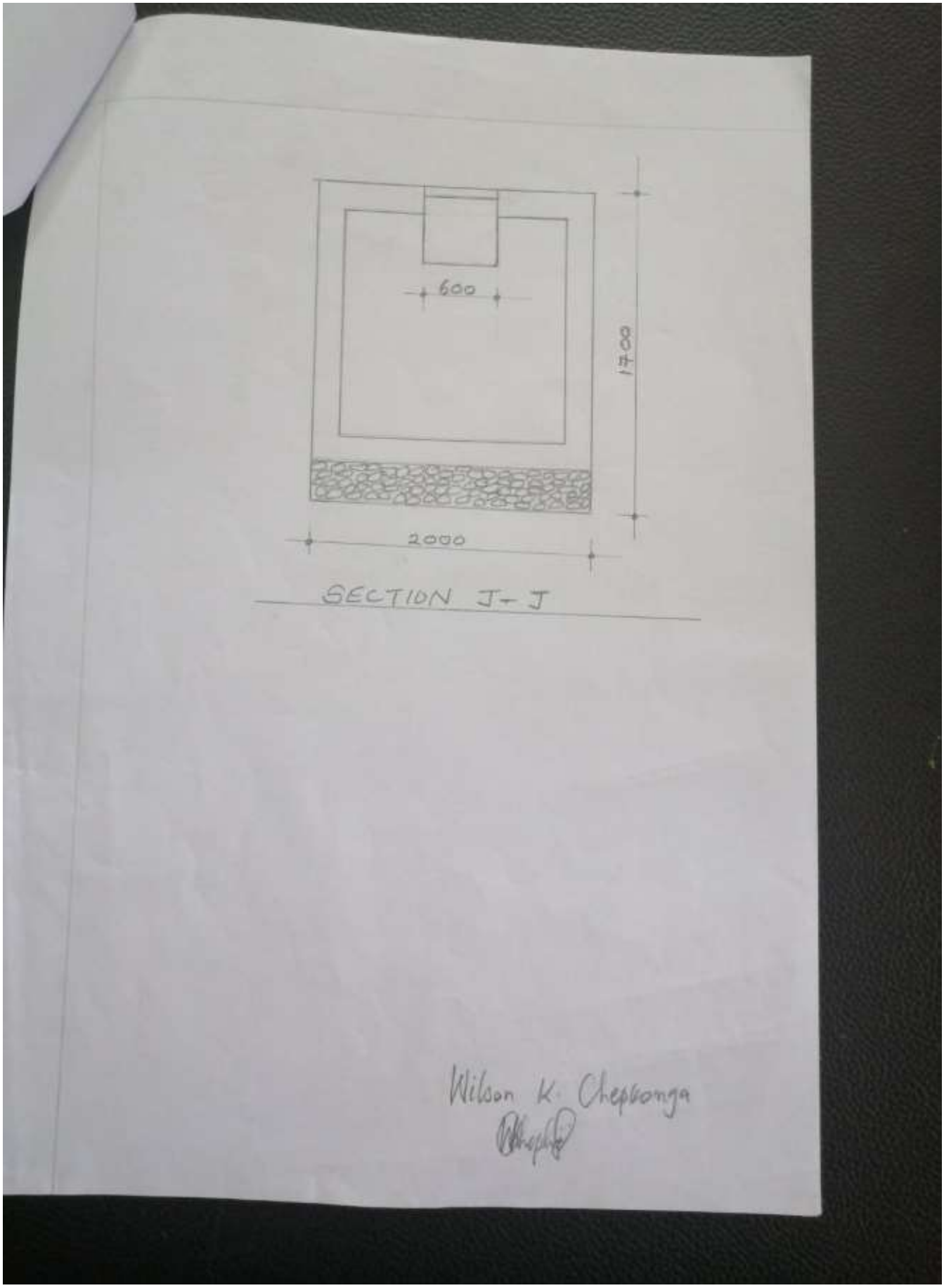
The project area has potential for irrigated agriculture that has not been exploited. Apart from availability of suitable fertile land for irrigation, there is the potential to efficiently and effectively utilize the available water for agricultural production.

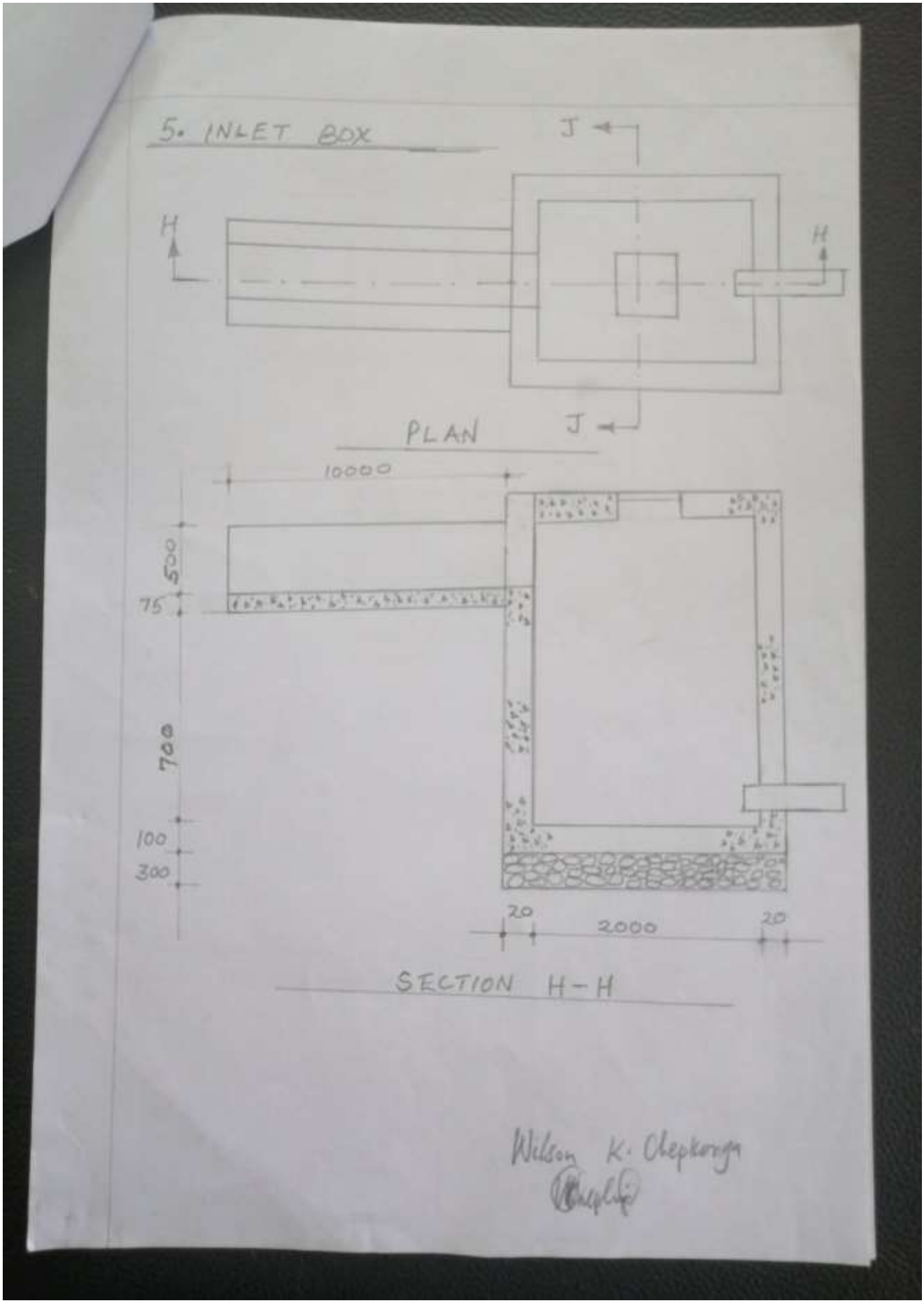
The project will contribute towards reduction of poverty level among the people of Kerio valley which currently stands at about 55%.

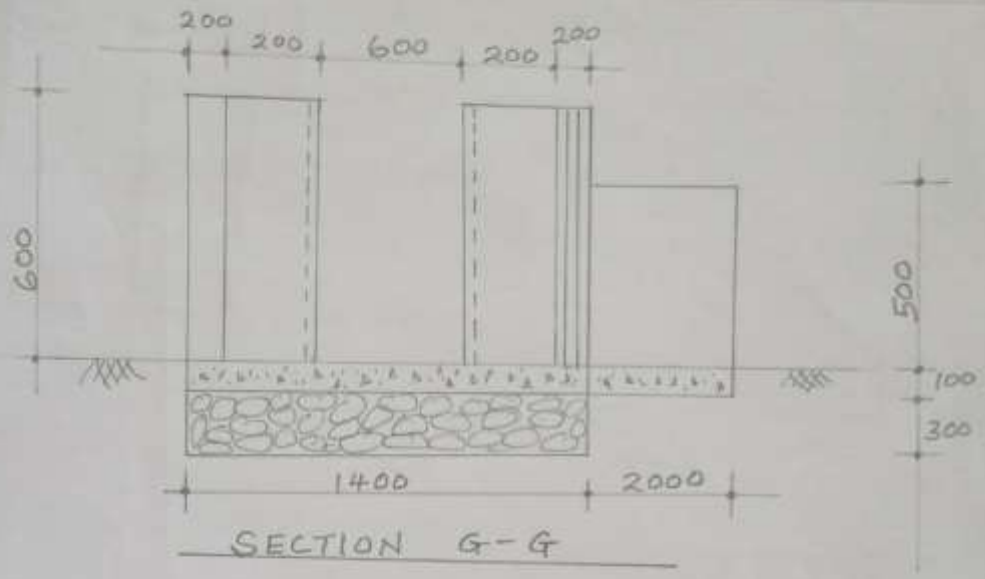
The development of this project will improve food and nutrition self sufficiency and incomes of the beneficiary community. It is expected to directly benefit about 100 households and over 2,000 people indirectly.

The project will enable the community to diversify their livelihood style and adopt crop farm which will in turn address the problem of cattle rustling that has led to insecurity and even loss of lives in the past.

W.M.C.

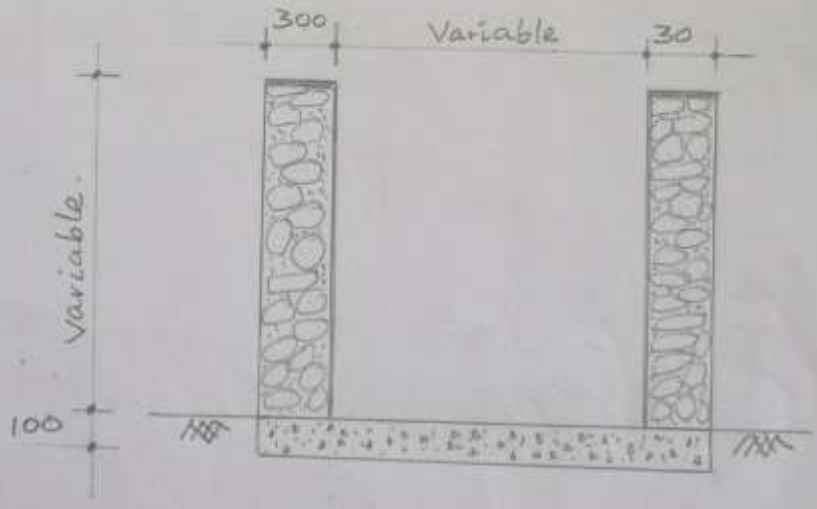

600
1700
2000
SECTION J-J
Wilson K. Chepkonga


5. INLET BOX
J
H
H
J
PLAN
10000
500
75
700
100
300
20
2000
20
SECTION H-H
Wilson K. Chepkonga



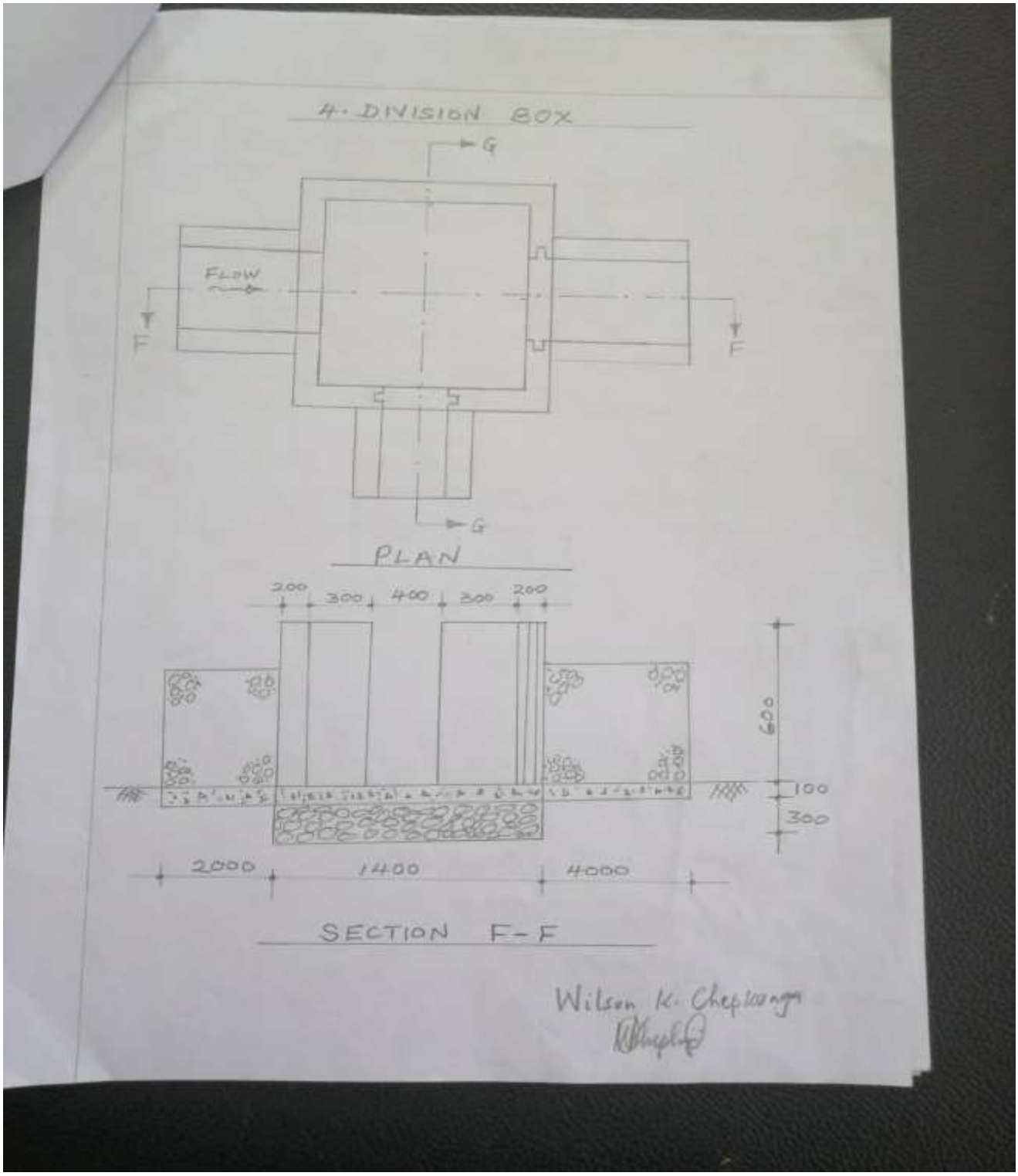
SECTION G-G

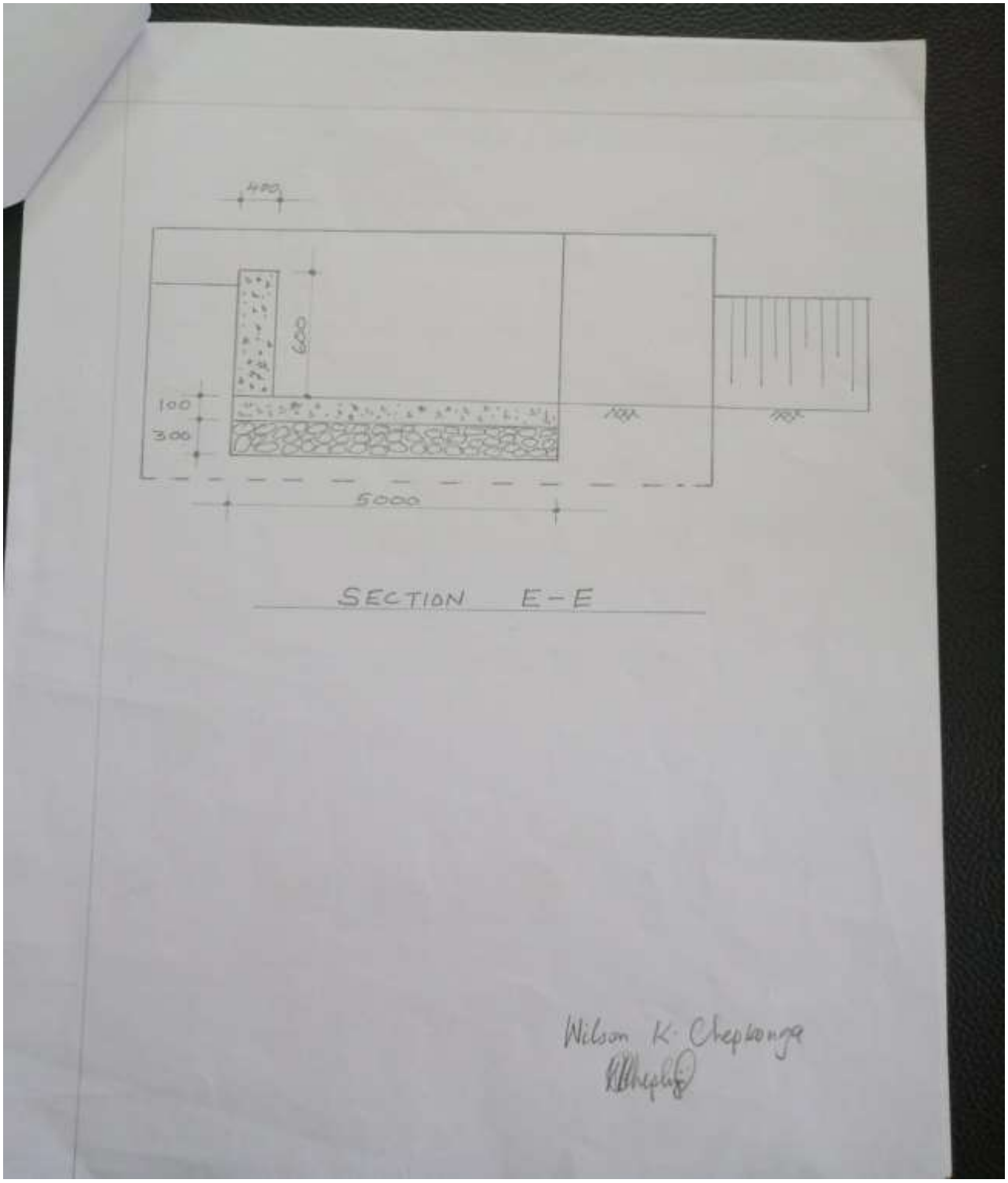
6. CANAL LINING



CROSS SECTION (2 WALLS/BED LINED)

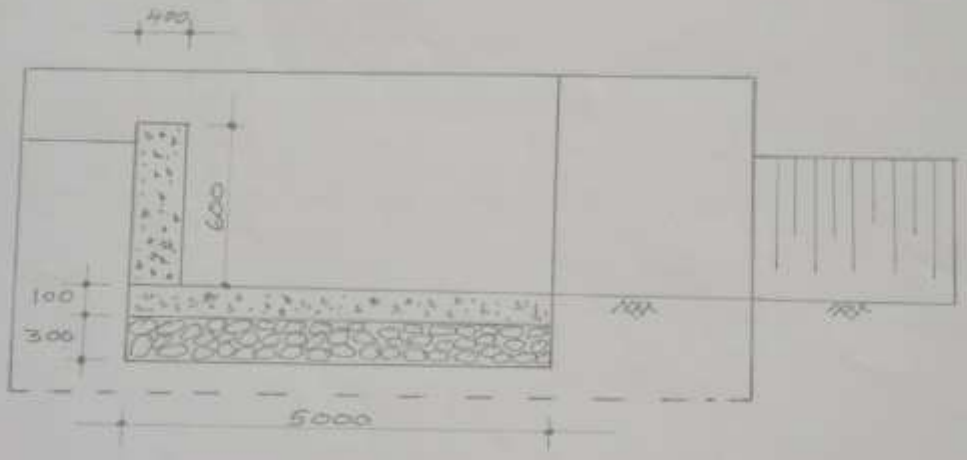
Wilson K. Cheplonga


4. DIVISION BOX
G
FLOW
F
F
G
PLAN
200
300
400
300
200
600
100
300
2000
1400
4000
SECTION F-F
Wilson K. Chepkwony



SECTION E-E

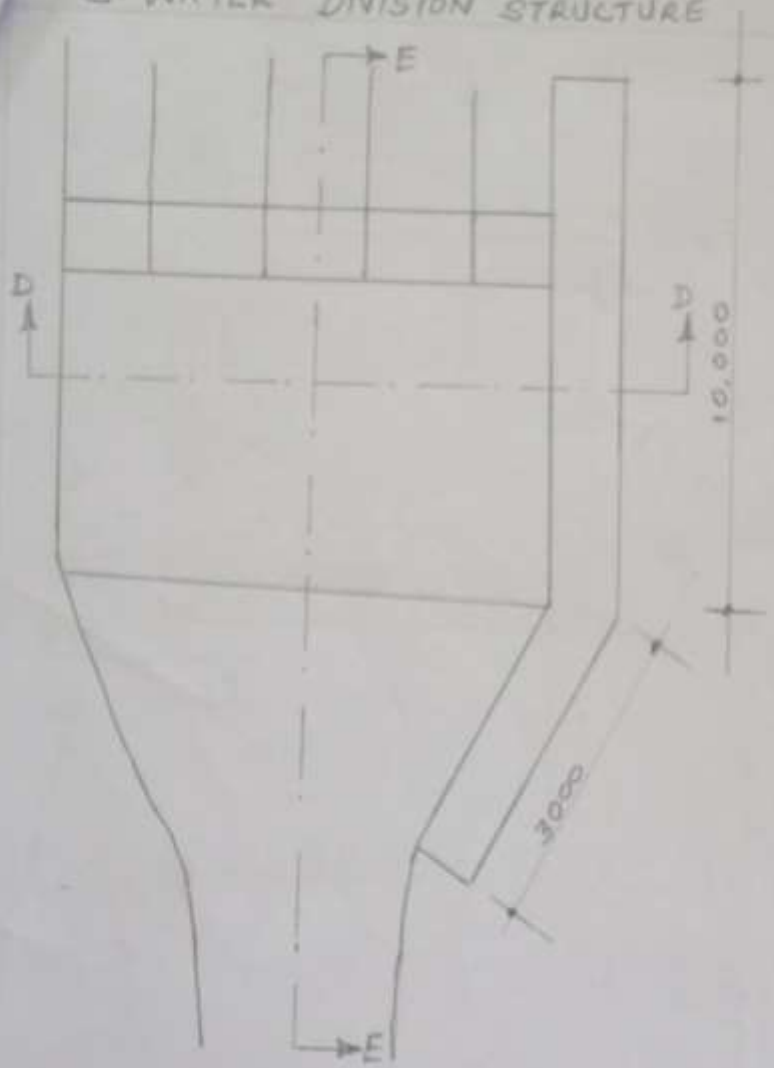
Wilson K. Chepkonga



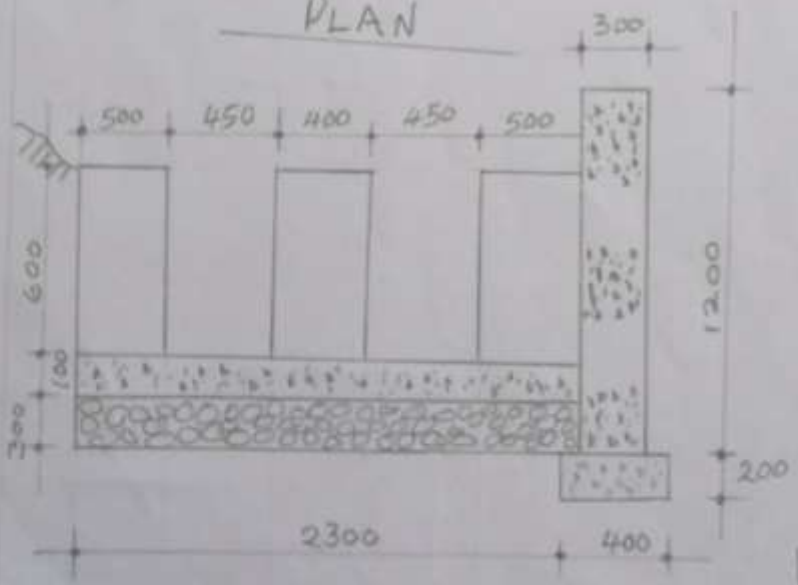
SECTION E-E

Wilson K. Chepkonga

3. WATER DIVISION STRUCTURE

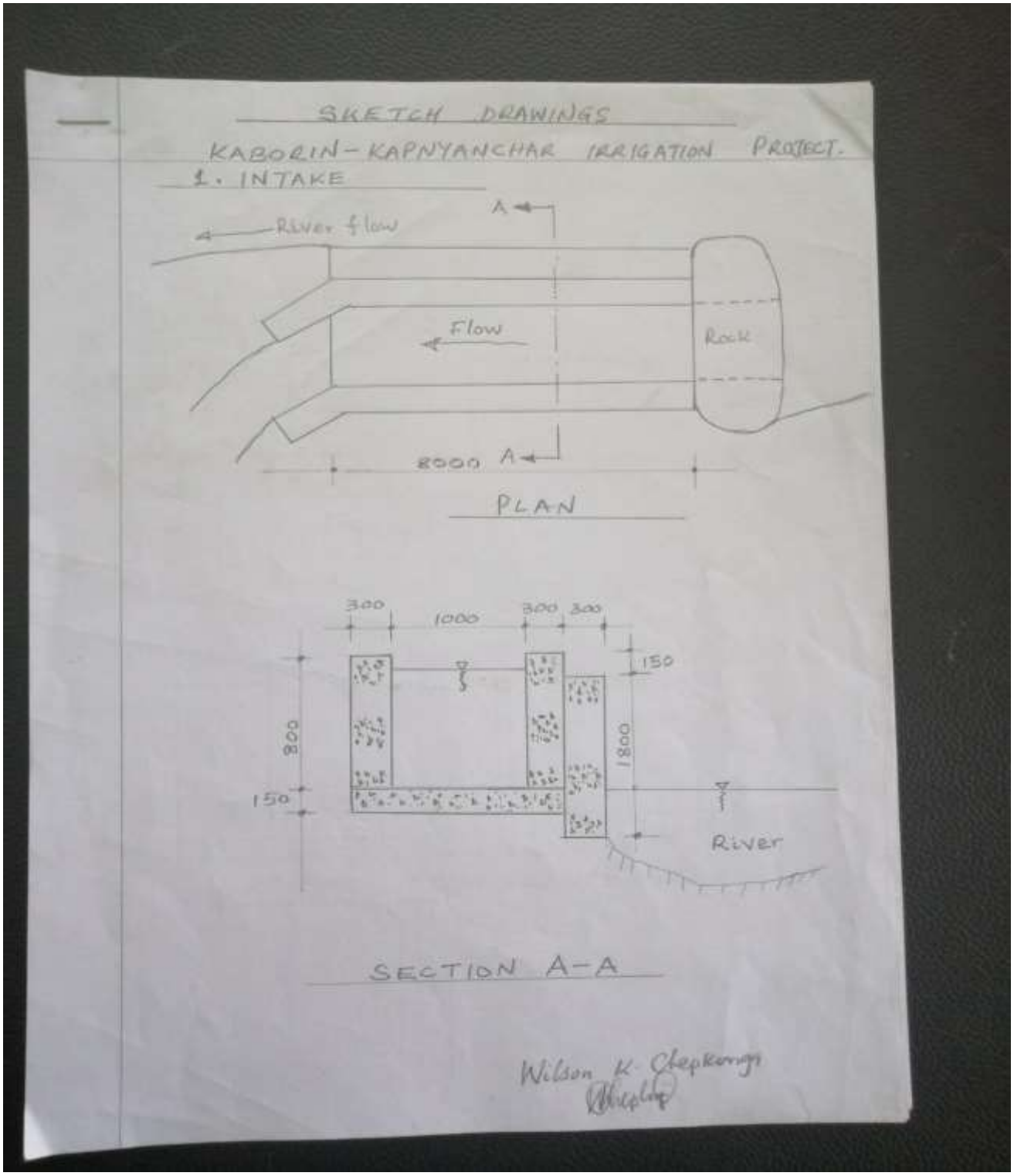


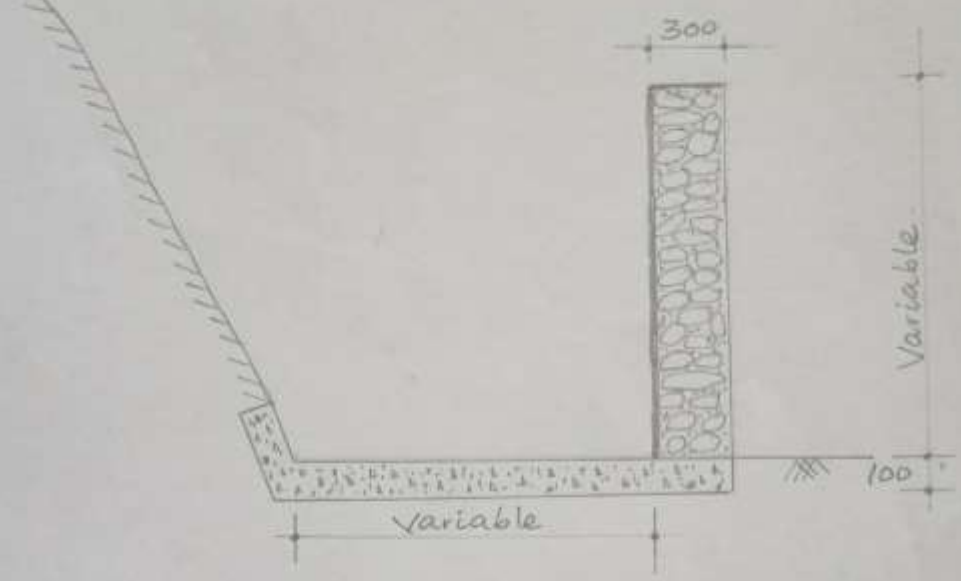
PLAN



SECTION D-D

Wilson K. Chepkwony


SKETCH DRAWINGS
KABORIN-KAPNYANCHAR IRRIGATION PROJECT.
1. INTAKE
River flow
A
Flow
Rock
8000
A
PLAN
300
1000
300
300
150
800
150
1800
River
SECTION A-A
Wilson K. Chepkonga



CROSS SECTION (1 WALL/BED LINED)

NOTES:

1. The drawings are NOT to scale. However, they give indication of actual dimensions.
2. All the units are in mm.
3. The dimensions of the canal wall and bed will vary according to the location. The details will be given in the Engineer's instructions

PREPARED BY:

WILSON K. CHEPKONGA
LEAD ENGINEER
KCSAP/EMC

Annex 9: screening checklist.

Environmental and Social Screening Checklist

Name of County……… ELGEYO MARAKWET
Name of CPCU/Monitoring Officer/Researcher …BEN… KIBOR
Sub-project location…[illegible]
Name of CBO/Institution…KABORIA/KAPNYANGHAR IRRIGATION SCHEME
Postal Address:…220 - 30700 KAPSOWAR
Contact Person……… Cell phone:………
Sub-project name…KABORIA/KAPNYANGHAR… IRRIGATION SCHEME
Estimated cost (KShs.)….22, 830, 000………
Approximate size of land area available for the sub-project………
Objectives of the sub project……… 1. Increase… water… supply… for… irrigation… [illegible] 2. Increase… agricultural… production… and… [illegible]… income…!
Activities/enterprises undertaken………
How was the sub-project chosen?…PUBLIC…… PARTICIPATION
Expected sub project duration:……1 YEAR………

Section B: Environmental Issues

YES	NO	Will the sub-project:
☐	☑	Create a risk of increased soil erosion?
☐	☑	Create a risk of increased deforestation?
☐	☑	Create a risk of increasing any other soil degradation
☐	☑	Affect soil salinity and alkalinity?
☐	☑	Divert the water resource from its natural course/location?
☐	☑	Cause pollution of aquatic ecosystems by sedimentation and agro-chemicals, oil spillage, effluents, etc.?
☐	☑	Introduce exotic plants or animals?
☐	☑	Involve drainage of wetlands or other permanently flooded areas?
☐	☑	Cause poor water drainage and increase the risk of water-related diseases such as malaria?
☐	☑	Reduce the quantity of water for the downstream users?
☐	☑	Result in the lowering of groundwater level or depletion of groundwater?
☐	☑	Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater?
☐	☑	Reduce various types of livestock production?
☐	☑	Affect any watershed?
☐	☑	Focus on biomass/bio-fuel energy generation?

If the answers to any of the above is 'yes', please include an ESMP with sub-project application.

Section C: Socio-economic Issues

YES	NO	Will the sub-project:
☐	☑	Displace people from their current settlement?
☐	☑	Interfere with the normal health and safety of the worker/employee?
☐	☑	Reduce the employment opportunities for the surrounding communities?
☐	☑	Reduce settlement (no further area allocated to settlements)?
☐	☑	Reduce income for the local communities?
☐	☑	Increase insecurity due to introduction of the project?
☐	☑	Increase exposure of the community to communicable diseases such as HIV/AIDS?
☐	☑	Induce conflict?
☐	☑	Have machinery and/or equipment installed for value addition?
☐	☑	Introduce new practices and habits?
☐	☑	Lead to child delinquency (school drop-outs, child abuse, child labour, etc.?
☐	☑	Lead to gender disparity?
☐	☑	Lead to poor diets?
☐	☑	Lead to social evils (drug abuse, excessive alcohol consumption, crime, etc.)?

Section D: Natural Habitats

		Will the sub-project:
☐	☑	Be located within or near environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species?
☐	☑	Adversely affect environmentally sensitive areas or critical habitats – wetlands, woodlots, natural forests, rivers, protected areas including national parks, reserves or local sanctuaries, etc.)?
☑	☑	Affect the indigenous biodiversity (flora and fauna)?
☐	☑	Cause any loss or degradation of any natural habitats, either directly (through project works) or indirectly?
☐	☑	Affect the aesthetic quality of the landscape?
☐	☑	Reduce people's access to the pasture, water, public services or other resources that they depend on?
☐	☑	Increase human-wildlife conflicts?
☐	☑	Use irrigation system in its implementation?.

NB: If the answers to any of the above is 'yes', please include an ESMP with sub-project application

SECTION E: Pesticides and Agriculture Chemicals

		Will the sub-project:
☑	☐	Involve the use of pesticides or other agricultural chemicals, or increase existing use?
☐	☑	Cause contamination of watercourses by chemicals and pesticides?
☐	☑	Cause contamination of soil by agrochemicals and pesticides?
☐	☑	Experience effluent and/or emissions discharge?
☐	☑	Export produce? Involve annual inspections of the producers and unannounced inspections?
☐	☑	Require scheduled chemical applications?
☐	☑	Require chemical application even to areas distant away from the focus?
☐	☑	Require chemical application to be done by vulnerable group (pregnant mothers,

		chemically allergic persons, elderly, etc.)?

If the answer to the above is 'yes', please consult the IPM that has been prepared for the project.

Section F: Vulnerable and Marginalized Groups meeting requirements for OP 4.10

		Are there:
□	□	People who meet requirements for OP 4.10 living within the boundaries of, or near the project?
□	□	Members of these VMGs in the area who could benefit from the project?
□	□	VMGs livelihoods to be affected by the sub project?

If the answer to any of the above is 'yes', please consult the VMGF that has been prepared for the project.

Section G: Land Acquisition and Access to Resources

YES	NO	Will the sub-project:
□	□	Require that land (public or private) be acquired (temporarily or permanently) for its development?
□	□	Use land that is currently occupied or regularly used for productive purposes (e.g. gardening, farming, pasture, fishing locations, forests)
□	□	Displace individuals, families or businesses?
□	□	Result in temporary or permanent loss of crops, fruit trees and pasture land?
□	□	Adversely affect small communal cultural property such as funeral and burial sites, or sacred groves?
□	□	Result in involuntary restriction of access by people to legally designated parks and protected areas?
□	□	Be on monoculture cropping?

If the answer to any of the above is 'yes', please consult the mitigation measures in the ESMF, and if needed prepare a (Resettlement Action Plan) RAP.

Section H: Proposed action

(ii) Guidance	(i) Summarize the above:
If all the above answers are 'No', there is no need for further action; If there is at least one 'Yes', please describe your recommended course of action (see below).	□ All the above answers are 'No' □ There is at least one 'Yes'

(iii) Recommended Course of Action

If there is at least one 'Yes', which course of action do you recommend?

□ CPCU[1] and CDE will provide detailed guidance on mitigation measures as outlined in the ESMF; and

☑ Specific advice is required from CDE[2], Lead Officer t and CPCUs regarding sub-project specific ESIA(s) and also in the following area(s).

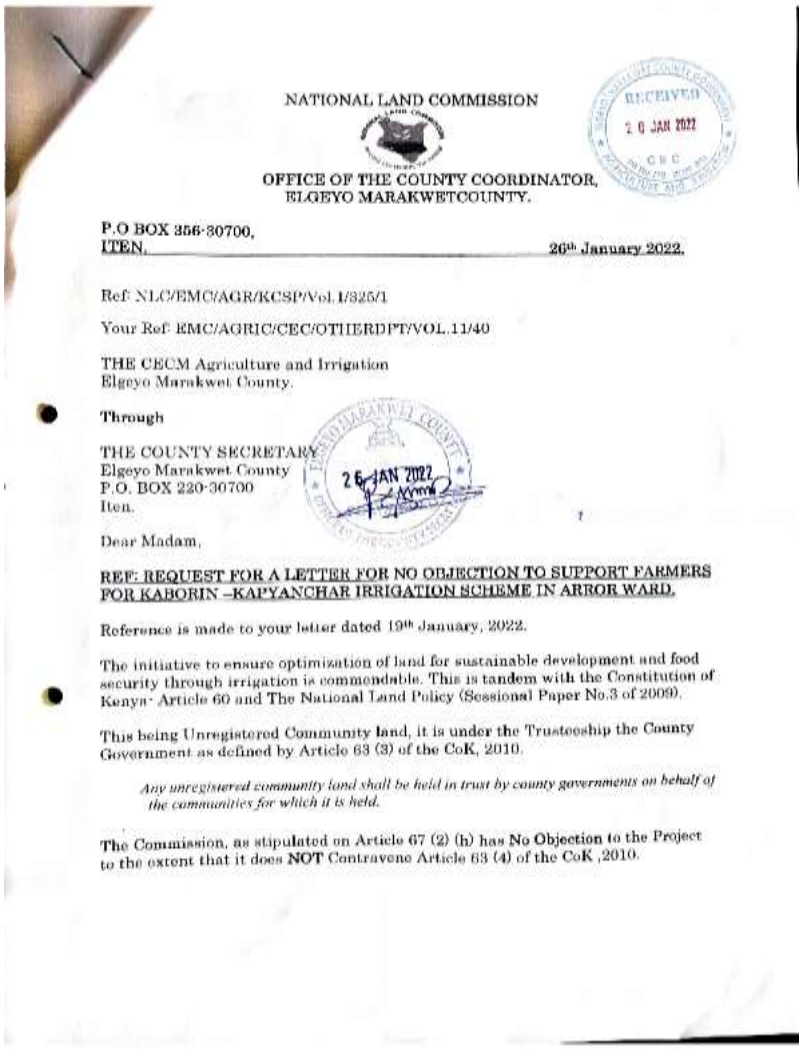
The project is low Risk which requires undertaking of Submission of the Summary Project Report (SPR).

COUNTY GOVERNMENT OF N.E.M.A ELGE YO MARAKWET COUNTY Sign..... P. O. Box 467-30700, ITEN

[1] Project County Coordinating Unit

[2] County Director of Environment and the County Technical Team

Annex 10: No objection letter from National Land Commission.



NATIONAL LAND COMMISSION

RECEIVED
20 JAN 2022
CEC

OFFICE OF THE COUNTY COORDINATOR,
ELGEYO MARAKWETCOUNTY.

P.O BOX 356-30700,
ITEN. 26th January 2022.

Ref: NLC/EMC/AGR/KCSP/Vol.I/325/1

Your Ref: EMC/AGRIC/CEC/OTHERDPT/VOL.11/40

THE CECM Agriculture and Irrigation
Elgeyo Marakwet County.

Through

THE COUNTY SECRETARY
Elgeyo Marakwet County
P.O. BOX 220-30700
Iten.

26 JAN 2022

Dear Madam,

REF: REQUEST FOR A LETTER FOR NO OBJECTION TO SUPPORT FARMERS FOR KABORIN –KAPYANCHAR IRRIGATION SCHEME IN ARROR WARD.

Reference is made to your letter dated 19th January, 2022.

The initiative to ensure optimization of land for sustainable development and food security through irrigation is commendable. This is tandem with the Constitution of Kenya- Article 60 and The National Land Policy (Sessional Paper No.3 of 2009).

This being Unregistered Community land, it is under the Trusteeship the County Government as defined by Article 63 (3) of the CoK, 2010.

Any unregistered community land shall be held in trust by county governments on behalf of the communities for which it is held.

The Commission, as stipulated on Article 67 (2) (h) has **No Objection** to the Project to the extent that it does **NOT** Contravene Article 63 (4) of the CoK ,2010.