ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT

FOR THE PROPOSED ESTABLISHMENT OF SUSTAINABLE TILAPIA CAGE CULTURE AROUND LWANDA ROMBO BEACH WATERS ON LAKE VICTORIA, SUBA-NORTH SUB-COUNT HOMA BAY COUNTY, KENYA

GPRS COORDINATES OF THE PROPOSED SITE S 0^0 23' 24.5472" E 34^0 11' 54.9348"
Point A: S 0°23'24.5472'' E34°11'54.9348'', Pont B 0°23'25.50"S 34°11'57.12"E, Point C-

Point C 0°23'23.60"S 34°11'58.00"EPoint D- 0°23'22.53"S 34°11'56.10"E

APPROXIMATED AREA IS 47,000M^2

THE PROPOSED SITE FOR THE ESTABLISHMENT OF THE COMMERCIAL TILAPIA CAGE CULTURE FISH SUBMITTED TO NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

APRIL, 2022

Contents

DECLARATION.....Error! Bookmark not defined.

ACKNOWLEDGEMENT **7**

EXECUTIVE SUMMARY **9**

Anticipated Environmental Impacts and Mitigation **9**

Environmental Management Plan **10**

Water quality **12**

ABBREVIATIONS **14**

ACRONYMS **15**

1.0 CHAPTER ONE INTRODUCTION **16**

1.1 Background Information 16

1.2 The Impact of Enclosure Structures on the Environment 16

1.2.1 Space 16

1.2.2 Water flow and currents 17

1.2.3 Aesthetics 17

1.3 Objectives 18

1.4 Terms of Reference 18

1.5 Responsibilities 20

1.6 Description of Approaches and Methodologies 20

1.7 Public involvement **21**

2.0 POLICY, LEGAL AND INSTITUTIONAL FRAME WORK 22

2.1 Introduction 22

2.2Environment Management and Coordination Act (EMCA, 1999) 22

2.3 Physical Planning Act 1996 22

The Public Health Act as Revised 23

2.6 Water Act 2002 23

2.6.1 Water Resources Management Rules 2007 24

2.7 Fisheries Act 24

2.8 County Government Act 24

2.8.1 Powers of county governments 24

3.0 PROJECT DESCRIPTION 26

3.1 Site description 26

3.2 Location of the proposed project 26

3.2.1 Aquaculture Production Zone (APZ) 26

3.3 Commercial Project Cost 27

3.4 Cage Materials and dimensions and Designs 28

4.0BASELINE INFORMATION OF THE STUDY AREA 30

4.1 BACKGROUND 30

2.3 Population and Settlement 30

2.4 Physiographic and Natural Conditions 31

2.5 Geological and Soil Characteristics 31

2.6 Climate 31

2.7 Vegetation Characteristics 32

2.8 Wildlife 33

2.9 Natural Resources 33

2.10 Environment Issues 34

2.11 Cross Cutting Socio-Economic Issues 35

5.0 PUBLIC PARTICIPATION AND STAKEHOLDERS' COMMENTS 36

5.1 Legal requirement 36

5.2. Methodology and Data Collection 36

5.3. Minutes 37

6.0 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES 40

Project Impacts 40

6.1 Socio-economic impacts 40

6.2 Impact on Agricultural Lands 41

6.3 Impact on Access to Common Property Resources 41

6.4 Impacts on local businesses and employment 41

6.5 Demographic Impacts 42

6.5.1 Mitigation of Social Impacts of Demographic Change 42

6.5.2 Health Impacts, HIV/AIDS and Malaria 43

6.6 Impacts on Gender Participation 44

6.6.1 Mitigation of Gender Inequalities 44

6.7 Wider Socio-economic Impacts 44

6.8 Project Impacts on Environmental Resources 45

6.8.1 Impact on Land Resources 45

6.8.2 Impact on Water Quality 46

6.9 Impacts on Biodiversity 48

6.9.1 Mitigation of Escaped Fish on Wild Fish Population 49

6.9.2 Mitigation of Organic Loading on Biodiversity of Benthic Flora and Fauna 49

6.10 Significance of Impacts Combining 49

6.11 Impact of the Environment on Aquaculture 49

6.11.1 Predation 50

6.11.2 Impact of Rough Weather Episodes 50

7.0. ANALYSIS OF PROJECT ALTERNATIVES 51

7.1 Relocation Option 51

7.2 No Project Option 51

7.3 The Proposed Development Option 52

7.4 Analysis of Alternative Construction Materials and Technology 52

7.4.1 Materials 52

7.5 Waste water management alternatives 53

8.0 ENVIRONMENTAL MANAGEMENT/MONITORING PLAN (EMP)..... 54

8.1 Introduction to EMP 54

9.4 Decommissioning Phase 63

9.0 CONCLUSION AND RECOMMENDATION 67

REFERENCES..... 69

APENDIX 71

Photo gallery 71

Attendance lists 72

KRA pin certificate 76

Company Acts 2015, Certificate 77

Certificate of incorporation 78

No objection letter..... 79

Memomorundum of Understanding..... 80

DECLARATION

I submit the following Environmental Impact Assessment Project Report for the proposed establishment sustainable tilapia cage culture Lwanda Rombo beach-Lake Victoria Homa Bay County**.** To best of my knowledge all information contained in this report is accurate and a truthful representation of all findings as relating to the project.

ENVIRONMENTAL EXPERTS

Staunlass Palapala
EIA/Audit Lead Expert, Reg. No.7882
Navola Green Consultancy Ltd
Signature

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Designation:

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Date: ……..…….

ACKNOWLEDGEMENT

I take this chance to thank the people who provided invaluable assistance in the preparation of this document. Special gratitude goes to the Lwanda Rombo BMU community, the proponent,

Homa Bay County department of fisheries, and other stakeholders for their informative views and comments.

Special thanks go to the proponent for his valuable input towards the understanding of the project report and its design and the National Environment Management Authority for their guidance and input in providing the required guidelines and standards as to the EIA of the proposed commercial project.

EXECUTIVE SUMMARY

YIRUO Fish Farm Kenya LTD intends to establish a proposed sustainable and responsible tilapia cage culture in the waters of Lake Victoria, around Lwanda Rombo beach area Suba-North Sub- County, Homa Bay County. This EIA report seeks an approval from the National Environmental Management Authority (NEMA) in accordance to the Environment Management and Coordination Act (EMCA) OF 1999. The Commercial project activities are listed in the second schedule of the Act as Projects that will require ESIA. The EIA Expert was assigned by the proponent to conduct an Environmental and Social Impact Assessment for the proposed development project. Preliminary designs and site plans for proposed project have been completed. The commercial project will be done professionally with due regard to procedure and constant consultation with relevant authorities.

This project report is for submission to National Environment Management Authority (NEMA) in fulfillment of the requirements of the EMCA, 1999-part VI section 58 (1). The Project falls under projects outlined in the Second Schedule of EMCA.

The Proponent is advised as per the EMCA 1999 to register the facility as a workplace with the department of Occupational Safety and Health. Further, there should be adherence to the Disability Act 2005 to ensure that the facility is friendly to those with disabilities. The following is a summary of potential environmental impacts associated with the design of the proposed project.

Anticipated Environmental Impacts and Mitigation

The project will follow the ‘ecosystem approach’ to fisheries and aquaculture and therefore adhere to the United Nations Food and Agricultural Organization (FAO) Code of Conduct for Responsible Fisheries and Aquaculture2. The project will therefore:

- Preserve aquatic ecosystems and protect the quantity and quality of fisheries resources, including genetic resources.
- Avoid dumping in water bodies.
- Avoid the depletion of other fishery stocks or wild populations.
- Protect artisanal fisheries and commercial fishing vessels and their gears from conflict with cage culture facilities.
- Protect small-scale farmers and local communities

The project involves growing of fish in cages. Similarly, there will be a small laboratory and a dumping pit. A pit will be used for dumping dead fish after incineration. On the other hand, to achieve placement of desired cages and preservation of habitat, cages will be placed offshore and positioned in areas free from aquatic vegetation or away from other lake users. In addition, cages will be installed in areas with free circulation of water giving the currents opportunity to circulate oxygen and carry away sediments thereby, replenishing cages with fresh water. Therefore, it will be necessary to use controlled amounts of floating pellets correctly sized to the age of the fish being fed. There is need of correct site selection, use of high-quality floating feeds as well as good feeding and stocking practices in order to avoid the problem of eutrophication of the lake. The proponents will therefore, construct his own cages and establish an on-site feed formulation regime.

Environmental Management Plan

Environmental Management Plan (EMP) provides guidelines in avoiding the possible adverse impacts of a project and to maintain the existing environmental quality. The EMP states all aspects of planning, construction and operation of the project, which are relevant to environment. It is a requirement that EMP be implemented throughout the project, for example, right from the

planning stage to the construction and operation stage. Therefore, its main objective is to identify the project specific activities that should be considered as having significant adverse impacts, monitoring and required mitigation measures. In addition, its purpose is to protect the environment without which the aquaculture industry in Lake Victoria is impossible. It is therefore, in the best interest of the developer to ensure that the capacity of the ecosystem is sustained by mitigating environmental degradation that could potentially harm the enterprise. The proposed management and mitigation measures, the environmental and social commitments that are supposed to be undertaken by the respective production managers and a framework for implementation of this management plan are for protection of the environment and sustainability of the project and the industry. These measures shall be consistent with the Government of the Republic of Kenya at both levels (County and National) recommended Best Management Practice (BMP) which provides guidance for offshore cage and pond culture operations. With respect to impact on water quality, the variable units of measurements are provided, an initial value is proposed and final upper limit value also suggested. If the source water has higher concentrations of water quality variables than allowed by the initial criteria, demonstration that the concentrations of the variables do not increase (or decrease for dissolved oxygen) by more than the final values between the source water and farm effluent is an acceptable alternative to compliance with the criteria. However, this option does not apply to pH and dissolved oxygen. For the land-based ponds, samples shall be collected near the point where effluents enter natural water bodies (If any) or exit the farm property. A water control structure at the sampling site or suitable sampling method should be used to prevent mixing of effluent and water from the receiving body.

Water quality

During the site survey the water quality of the proposed area was measured and found to be good and can be rated to be very suitable for tilapia cage farming. The main water parameters have been measured during a site evaluation visit in April 2022. The findings are **appended** in the **report annexes.**

Conclusion

The project will sustainably improve Kenyan food security through easy access and availability of fish to the community and the entire nation thus, the project will directly and indirectly create employment opportunities to Lwanda Rombo community and its surrounding neighbors; reduce overfishing pressure on local waterways (giving time to local fish species to reproduce) making Kenya a leading regional fish producer. The project will stimulate economic development in the marginalized region of Lwanda Rombo beach area and its surroundings thus, contributing to regional balance development. The project has a positive economic impact as it will make use of a previously underutilized Kenyan resource in a sustainable manner for the benefit of the Kenyan population. The proponent intends to install two types of fish cages namely; circular and cuboids cages both of high-density PVC materials. The proponent intends to install 70 circular cages of 15m in diameter and a depth of 10m each having a capacity 30,000 fingerlings for the first phase and additional 180 cages in the near future. In addition, cuboids cages will be measuring 10m by 5m each and will be 25 in number for the phase one each having a capacity of 15,000 fingerlings. Fingerlings will be sourced locally while inbreeding will kick off on the 6^{th} month of the project's operation. Fish feeds will be sourced from Unga LTD, Nairobi, some will be imported from Zambia while some feeds will be sourced from Egypt and will be available at Kisumu depot. Cages are to be situated 500m offshore at a depth of 10m. Two types of cages will be

The cages will be imported from China as shown in the design. GI pipes will be fitted with treated imported cage nets from Thailand. The project will assist in diversifying Kenyan economic activity away from other economic activities. The project will also assist the national budget through the payment of corporate income tax and personal taxes by employees. The project has positive downstream impacts on suppliers of aquaculture inputs with feed and seed purchases of several million Kenya Shillings per year. The project assists and is in line with the **National Aquaculture Program**. It embodies the core of the National Aquaculture Strategy through demonstrating the economic viability of Kenyan Tilapia cage aquaculture to other potential investors; demonstrates environmental and fish health management through implementation of best cage aquaculture practices; enhances marketing of fish as a healthy food product for the population and alleviates factors responsible for slow growth of aquaculture e.g., Poor access to seed, feed and markets. The expert recommends the project for approval by relevant authorities.

ABBREVIATIONS

B.M.U Beach Management Unit

EA Environmental Auditing

EIA Environmental Impact Assessment

EMCA, 1999 Environment Management and Co-ordination Act, 1999

EMP Environmental Management Plan

EMS Environmental Management Systems (ISO14001E:1996)

NEMA National Environment Management Authority

DEC Sub-County Environment Committee

EPE Environmental Performance Evaluation

MSDS Material Safety and Data Sheet

KP&LC Kenya Power & Lighting Company

SEMS Sustainable Environmental Management Strategies

VAT Value Added Tax

SOP Save Operating Procedures

ACRONYMS

Environmental Assessment (EA)

A systematic, documented, periodic and objective evaluation of activities and processes of an ongoing project to determine how far these activities and programs conform to the approved environmental management plan of the said project

Environmental Management Plan (EMP)

All details of project activities, impacts, mitigation, measures, time schedule, costs, responsibilities, and commitments proposed to minimize environmental impacts of activities, including monitoring and environmental audits during implementation and decommissioning phases of the project.

Project commissioning

In this report this is the launching time or the projected time by which a project start sits life cycle.

Decommissioning

In this report this is the winding up period of a project the projected time when a project end sits lifecycle.

Public Participation

This is an exercise in which the views, perceptions and interests of the citizens and the public are considered as important inputs in order to improve on the quality of decision making.

1.0 CHAPTER ONE INTRODUCTION

1.1 Background Information

Water bodies and socio-environment have been affected positively and negatively by the installations of fish cages. Increasing pressure from local fishermen and cage investors has lead to internal and external conflicts. Pen farming operations and cage installations on a reservoir, river or a lake can have impacts outside the immediate vicinity of the site due to its demands for the construction materials. In addition, enclosures can impacts on water bodies both by their physical presence at a site and changes they can induce in the biological, physical and chemical characteristics of the water body through culture method (extensive/semi-intensive/intensive) and species used.

1.2 The Impact of Enclosure Structures on the Environment

Cage structures affects water bodies mainly through taking up space thus, competing with other users. Similarly, cage structures alter flow and transportation of oxygen, planktons, fish larvae, and sediments. In addition, cage structures impact on the aesthetic value of the site. Despite the impacts mentioned, the proposed Commercial Tilapia Cage Culture Project is properly sited taking into consideration the mitigation measures of the negative environmental impacts that might rise.

1.2.1 Space

Enclosures can compete with lake and river fisheries for space. The circular cages will measure 15m in diameter and 10m deep, and each will have a carrying capacity of 30,000 pieces of fish while cuboids cages will be measuring 10m by 5m each having a capacity of 15,000 fingerlings. Between each cage a distance of 7m will be created. Between each series a distance of 20m will

be created. This obviously will occupy space within the Lake. However, the space occupied by the cages will not significantly alter the aquatic ecosystem.

1.2.2 Water flow and currents

The flow of water through enclosures is affected by drag forces exerted by the framework and netting (Inoue, 1972; Wheaton, 1977; Milne, 1979; Wee, 1979). The reduction in flow is dependent upon a number of variables including flow rate and density of water, enclosure size and shape, mesh type (knotted/knotless, diamond/square) and material, degree of fouling, and stocking density (Milne 1970, 1979; Inoue, 1972; Wheaton, 1977, Wee, 1979; Kils, 1979). Cages therefore, can have a considerable impact on local currents, and this has a number of implications. Sediment transportation in an aquatic system, although influenced by a number of factors, is principally determined by current flow (Smith, 1975; Gibbs, 1977). Significant reductions in flow, as can occur in some cage enclosure systems would cause the sedimentation of larger, denser particles in the immediate vicinity of the cages.

1.2.3 Aesthetics

In many countries, provision is made within conservation laws to preserve areas of outstanding natural beauty, and protect them from unsightly developments. The introduction of cages to a water body can transform its physical appearance therefore; the establishment of a commercial Tilapia Cage Culture in Lwanda Rombo has been designed in a way that it takes into account the aesthetic value of the site. The National Environmental Management Authority (NEMA) is the lead agency mandated with supervisory role, guidance and abatement procedures to proponents through provisions of EMCA1999 and other related legislations with an objective of putting this menace to an end. In order to achieve Sustainable Environmental Management Strategies (SEMS), there is a need to integrate the environmental, economic and social aspects of

development levels of project life. The emphasis for efficient use of resources, conservation of renewable resources, protection of human environment and environmentally friendly activities should form the basis for management. This will ensure the ecosystem is maintained at steady state at all time. Environmental Impact Assessment (EIA) is a tool used to sustainably manage environment through examination of the project's impacts on the environment. In addition, it is a tool that defines both positive and negative impacts of any development projects and how the project affects people well being, their property and the environment. Lastly, EIA is a tool that defines mitigation measures to the negative environmental impacts while maximizing on the positive environmental impacts

1.3 Objectives

The objectives of this Environmental Impact Assessment exercise include:

- Impacts identification.
- Predicting likely changes on the environment as result of introducing a new project to the site.
- Evaluation of impacts for various alternatives on the project.
- Amelioration of significant impacts on the environment and surrounding communities as a result of the new project.
- Forming/establishing a baseline for future environmental conservation programs.
- Policy analysis in a view to making it known, articulated and enforced.

1.4 Terms of Reference

The terms of reference are as follows:

i. To collect relevant information that will be useful for the project report.

ii. To assess and report on the location of the commercial project including the physical area that may be affected by the project's activities.

iii. To assess and report the nature, design and budget of the project.

iv. To assess and report on the economic and socio-cultural impacts of the project to the local community and the nation in general.

v. To assess and report the activities that shall be undertaken during the project implementation

vi. To assess and report the materials to be used products and by-products, including waste to be generated especially during construction phase and the methods of their disposal.

vii. To assess the potential environmental impacts of the project and develop the environmental management plan for the construction, operation and maintenance including mitigation measures.

viii. To develop an action plan that ensures the health and safety of the workers and neighboring communities in the project cycle.

ix. To fill in and submit the Project Report Form (in appendix 7).

x. To provide recommendation if any, for improving the existing environment screening process.

xi. Prepare and submit a Project Report to NEMA.

xii. To provide any other information that the NEMA may require.

1.5 Responsibilities

I. The Experts mandate

Apart from strictly complying with the TOR, the consultant is also expected to exercise responsibility in his actions in dealing with all stakeholders

II. The proponent's role

The client shall undertake the following:

- Introduce the service provider to the key parties.
- Provide relevant documents that may be required.
- Explain the methods and procedures of the project proposal development.
- Provision of timely feedback.
- Payment of dues as per the contract

1.6 Description of Approaches and Methodologies

The following steps were taken in assessment, evaluation consultations and public participation in preparation of this report.

- Site visit
- Administering of questionnaires
- Detailed discussions with the project proponent and wide consultations with stakeholders.
- Site assessment
- Relevant literature source references
- Production of draft report
- Production of the final project report

1. **Site visits**

A site visit was done to observe the status of the environment as it exists. It was observed that the proposed project site is best suited for the commercial project.

2. **Questionnaire**

A guided and structured questionnaire was developed to solicit for views from several stakeholders and those who are most likely to be affected by the project.

1.7 Public involvement

Methods of collecting views from the public were considered for the purpose of receiving balanced information. Structured questionnaires, aided the respondents at arriving to specific answers. Various answers from the respondents through the questionnaire and interpersonal interviews amongst other methods were also considered. The questionnaires have been attached.

2.0 POLICY, LEGAL AND INSTITUTIONAL FRAME WORK

2.1 Introduction

According to EMACA (1999), development projects are categorized into categories A, B and C. All categories A and B are supposed to undergo a comprehensive environmental impact assessment. The proponent's tilapia cage project lays in category B, hence the requirement of an EIA. Apart from EMCA (1999), there are other relevant acts of parliament that provide laws that govern protection of the environment. The following statutes and laws will guide the establishment of the proposed project.

2.2Environment Management and Coordination Act (EMCA, 1999)

EMCA, 1999 gives a summary of environmental management laws. NEMA is the national body that is responsible with the execution of the law. Part II establishes a link between environmental protection and the right to a clean and healthy environment. The virtues of this section will enhance the concerns of the rehabilitation center. The project management will have to bring a link between the urge for efficient and effective enterprise and environmental protection. Section 3 (1) States, "Every Kenyan is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment". PART VI of EMCA deals with EIA/EA. Part VI section 58, Deals with Environmental Impact Assessment. The proponent complicity to the laws of this country is thus manifested through observance of this section before starting to put up the physical infrastructure.

2.3 Physical Planning Act 1996

The planning laws should allow provision of ample space for management. All development projects must undergo approval from relevant county government before implementation. The proponent has complied with this provision.

The Public Health Act as Revised

This act provides for proper sanitary conditions and clean environment. The act provides for proper health requirements on all 1evels of human and environment. Subsidiary legislation section 62(b) defines the distance from building and plot boundaries for sewage disposal specifications such shall include storage tanks, septic tanks sewage filters installation or sewage reception sites. Provision of this act requires accessibility to said sites for the purpose of cleansing or removing the contents there of. The proposed project is not expected to have sewage waste but the proponent will comply with the public health act in as far as handling fish as food is concerned.

2.6 Water Act 2002

Water resources management in Kenya is vested in the Water Act. The Water Act, Cap 372 of Laws of Kenya, is "An Act of Parliament to make better provisions for the conservation, control, apportionment, and use of the water resources of Kenya, and for purposes incidental thereto and connected therewith". According to the Act, all applications for a water permit, transfer, cancellation, or renewal of a permit must be considered by the Catchment Board before being considered by the Water Apportionment Board. Whereas the Water Apportionment Board usually accepts recommendations by the Catchment Board, it is not bound to accept every recommendation made by a Catchment Board; it may accept, reject, or modify any recommendation. The water Act protects water bodies and sources from pollution and controls their use by the project. It ensures that the projected required amount of water that can be provided by the existing water system and that the project designer will work to conserve the available water both during construction and operation phases.

2.6.1 Water Resources Management Rules 2007

Part II-in section 16 specifies activities that require approval by Water Resource Management Authority. Any person intending to or currently undertaking any of the water use activities defined in this Act including the activities listed in the Fifth Schedule shall obtain approval from the Authority to undertake the activity: These approvals in the case of the proposed project may not be necessary because no abstraction is expected. However, the proponent is willing to comply with any section of this law should he be required.

2.7 Fisheries Act

This is a fisheries sector regulatory law. It encompasses several aspects of fishery including marine, aquaculture, cage culture and inland and river fisheries. The proponent has had several consultations with the fisheries department and has requisite approvals in compliance with the fisheries Act.

2.8 County Government Act

This Act may be cited as the County Governments Act, 2012 and it is already operational.

2.8.1 Powers of county governments

(1) As an entity exercising constitutional authority, a county government shall be a body corporate with perpetual succession and shall have all the powers necessary for the discharge of its functions.

(2) Without prejudice to the generality of subsection (1), a county government may:

(a) Enter into a contract;

(b) Acquire, purchase or lease any land; or

(c) Delegate any of its functions to its officers, decentralized units or other entities within the county.

(3) A county government may enter into partnerships with any public or private organization in accordance with the provisions of any law relating to public or private

partnerships for any work, service or function for which it is responsible within its area of jurisdiction.

(4) All contracts lawfully entered into under this section shall be valid and binding on the county government, its successors and assigns.

(5) To ensure efficiency in the delivery of service or carrying out of a function for which the county government is responsible, the county government may:

(a) Establish a company, firm or other body for the delivery of a particular service or carrying on of a particular function; or

(b) Contract any person, company, firm or other body for the delivery of a particular service or carrying on a particular function.

The proponent has had adequate consultations with the County government of Homa Bay which resulted in a letter of approval being issued to him subject to four (4) conditions being met by the investor.

3.0 PROJECT DESCRIPTION

3.1 Site description

Lwanda Rombo Beach is one of Rusinga Island Ward inland fishing centers. It is approximately 6.5km from Mbita town (Suba North Sub County, Homa Bay County). Main economic activity is fishing and seasonal subsistence farming. After having intensively surveyed various areas in Rusinga Island fishing centers, it was found out that Lwanda Rombo is suitable for Tilapia cage aquaculture because of its water depth which is shallowest point of the APZ zone is more than 18m, thus the distance between cage bottom and Lake Bottom is 8m with rest at 31m hence distance between cage and Lake Bottom is more than 20m.

3.2 Location of the proposed project

Having extensively surveyed areas along the open Lake Victoria surrounding Rusinga Island, it was found out that Lwanda Rombo beach water of Lake Victoria offers the best site for cage farming. The proposed Aquaculture Production Zone (APZ) of the proposed site for this project is located approximately 500m from the shoreline. The GPRS coordinates of the APZ are shown on the cover page.

3.2.1 Aquaculture Production Zone (APZ)

This is an exclusive region within the Lake Victoria's Lwanda Rombo beach area specifically for this commercial project. It will be a bio safety-zone for optimum tilapia cage aquaculture. There will be no other cage culture project within this APZ to help manage pollution and accumulation of organic matter. The APZ has a total surface area of 47,000m^2. The Google earth digital image below shows the APZ.

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

Point A: S 0°23'24.5472'' E34°11'54.9348'', Pont B 0°23'25.50"S 34°11'57.12"E, Point C-

Point C 0°23'23.60"S 34°11'58.00"EPoint D- 0°23'22.53"S 34°11'56.10"E

(Four Corners-Geo-references)

It's worth noting that the cages will not cover the entire APZ zone, but they can be moved freely within the zone whenever there is a change in environment that is not very favorable to the fish.

3.3 Commercial Project Cost

The estimated total project cost for the proposed tilapia cage culture is approximately seventy five million sixty thousand nine hundred and forty nine Kenya shillings only **(Ksh. 75,060, 949)**. (**See appendix for Budget)**. The annual maintenance expenditure will vary depending on factors such as:

- Type of repair work required
- Frequency of maintenance work
- Skilled and unskilled labor required
- Any additional materials required in maintenance

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

3.4 Cage Materials and dimensions and Designs.

The cages are mostly imported. The cage (bag net) is having a diameter of 15 m and 15m deep while cuboids measuring 10m by 5m will be made of HDPE Floating pipes with double net cage with Knotless net Bag. They are Long Service Life cages which are CE, ISO9001:2008 certified. Frame system: HDPE tubular products, the frame will have the ability to resist big waves; all pipes go through anti -UV and antioxidant process, service life at least 15 years. Performance parameters have been reported to include anti-Windstorm capacity Maximum grade 11, ability of anti—wave Maximum wave high of 5 meter in the water and anti—flow capability Maximum flow rate of 1.5 ms-1.

Fish feeds

Fish will be fed on imported pellets from Egypt, Unga Ltd (Kenya) and Zambia -Prime feeds of 35% CP, Fat 4%, Ca 1.2%, P 1.1%, Ash 8%, Fiber 6% Mn 60ppm. Made from Sunflower meal, soybean meal, Rapeseed meal, Wheat midds, DPG, Wheat flour, DCP, Poultry fat, Salt, Vitamins and minerals, ani0xidants, Preservatives E282, E260, E200. Starter feed by Unga ltd. 40%CP, EE (fat) 4%, Fiber 12%, NFE 19, Ash 21%, Ca 2.5, P 1.16; made from Wheat pollard, sunflower cake meal, Soybean meal, Fishmeal (Caridina), DCP, Vitamins. The starter feed will make 20% of the diet while the grow-out pellet will account for 80% of the diets as fed. The cages have walkways. Cage operations equipped with walkways allow more detailed inspections of feed consumption. This will facilitate feed handling and storage, and promote feed delivery to as often as 4 times/day and even more during grow-out compared to lesser times when distributed from feed boats. Walkways also allow the collection of fish debris and more frequent clean-up of feeding rings or net curtains.

On-site Feeds formulation

There will be no onsite feed formulation. fish feed imports are from Zambia and Egypt while some feeds will be purchased locally from Unga Ltd (Kenya).

Fig3: Cage Design

The cages grouped into 5. Dimension 15m diameter by 15m deep. Floats are PVC pipes as shown above.

4.0BASELINE INFORMATION OF THE STUDY AREA

4.1 BACKGROUND

In recent years, Kenya has been facing increase in population that has led to increase in demand for fish and its products resulting to overfishing a problem that has led to a steady decline in capture fish production. To solve the problem of decline in fish production, the government of Kenya has implemented economic stimulus program (ESP) for small scale farmers in the country to increase fish production by around 22,000 Tones thereby, creating conducive atmosphere for aquaculture production as a business. To achieve ESP, the proponent intends to set up a cage farm at the shores of Lake Victoria in Homa Bay County in around Lwanda Rombo BMU water. The site is located in Rusinga Island ward, Suba-North Sub- County.

2.2 Administrative and Political Units

Table 2.1 Area of the Sub-County by Division and Respective Population

Division	Population	Urban population	Population density
Suba North Sub county	124,938	0	307
Rusinga Island	30,000	0	142

From census 1999

2.3 Population and Settlement

The target population is approximately 18,000 residents (direct beneficiaries) of Lwanda Rombo beach whose occupation is mainly fishing, fish trade and subsistence farming.

2.4 Physiographic and Natural Conditions

The sub-county has an inland equatorial type of climate that is modified by the effects of altitude, and closeness to Lake Victoria that regulates the atmospheric temperature. The area along the lakeshore is dry with one cropping season while that around Gwassi Hills is wet with the possibility of two cropping seasons. The annual rainfall ranges from 700mm to 1200mm with 60% reliability. Long rains occur in March/May, while short rains occur in August/December. The Sub-County experiences high temperatures throughout the year, which range from 17.10°C to 34.8°C. Hot months are between December and March with February being the hottest. Temperatures increase towards the lowland's region of Mbita Division.

2.5 Geological and Soil Characteristics

- **Rocks**

The Homa Bay County is underlain by various rock types, namely, agglomerates, conglomerates, tuff sandstone, granite and other deposits which are useful in the construction industry.

- **Soils**

The Homa Bay county soil is black cotton soil, which is difficult to work upon with simple hand implements. It is also difficult to work on during heavy rains, making farming difficult. The lake shore lowland is dominated by alluvial soils, mainly the sandy loam type which is well drained and suitable for cotton, sunflower, maize, beans, cow peas and vegetable production. Other crops with potential are sugar cane and potatoes.

2.6 Climate

- **Rainfall**

The Homa Bay County experiences two rainy seasons, the long and the short rains, which fall between February and March and between the months of August and November, respectively. The rainfall pattern ranges between 250 and 700 mm per annum. The rainfall probabilities and

nature of soil determine the activities of small-scale farmers around the Homa Bay County. Crops grown here are, therefore, those requiring low rainfall like cassava, millet and sunflowers.

- **Winds**

Generalized wind speeds average about 4 m/sec and have certain regularity due to the convection effect of the large water body of the lake that borders the often-hot dry land.

- **Temperatures**

Temperature varies with altitude and proximity to the lake and tends to increase towards the lowland with an average of 17.10 to 34.80 centigrade. Temperatures are highest between December and March with the hottest weather being experienced in February and the lowest in April and November.

2.7 Vegetation Characteristics

The vegetation is largely of acacia woodland and bush land growing over expansive black cotton soils that cover most of the Homa Bay County apart from the hilly areas which have rock outcrops. The vegetation of acacia woodland is characteristic of the kind of vegetation cover found in areas of dominate black cotton soils. There is also an assortment of species of indigenous species of trees. A lot of trees are grown within the urban and peri-urban areas for the conservation of the environment. However, since agriculture is still exercised in most parts of the Homa Bay county, crops also form part of vegetation cover as do grass in open fields and homesteads and compounds or courtyards, as well as trees planted for landscaping like the jacaranda dot the landscape of the Homa Bay county. It is to be noted that the water hyacinth in the lake can also be considered available vegetation, but this is subject to winds as sometimes it is blown further into the lake, but mostly it covers a large tract of the shoreline.

2.8 Wildlife

Wildlife in the Homa Bay County is mostly made up of a few small land animals like snakes and mongooses and a large population of large lake animals such as hippos and crocodiles at the shores of the Lake Victoria. There are also a number of water bird species on the shores of the lake.

2.9 Natural Resources

The Homa Bay County's resources can be ranked into land resources and water resources, both endowments that are rich and a blessing to the people. Land resources include the strategic location just at the mouth of the bay, an area that is not prone to flooding and other calamities that are associated with large water bodies. The land is a good starting point for the construction industry for the building of houses. The prevailing climate, regulated by the winds and the calming effects also make life in the Homa Bay County friendlier. The land can be put into a wide array of other uses like agriculture, and development of public utilities.

The Homa Bay County also gains from its location since it is the gateway to vast tourist attraction sites in that part of Kenya. The Homa Bay County is the gateway to the islands of Mfangano and Rusinga, as well as to Ruma National Park. The Homa Bay County stands to gain from these sites for the improvement of its economy. Water resources include the rich Lake Victoria. If there is proper investment in the water supply from the lake, the Homa Bay County stands to benefit significantly. This remains pegged on the environmental preservation and protection so that the water in the lake is not so polluted as to make it unfit for human use. The lake also has the potential for tourism since it is the second largest fresh water lake in the world and has an array of aquatic life and scenic beauty.

2.10 Environment Issues

- **Water Pollution**

The pollution of Lake Victoria is a critical issue. The lake, being a huge system fed by rivers that originate from far-off areas, has elements of both on-site and off-site pollution:

  - Agro-chemicals/ fertilizer (non-point sources of pollution of the lake)
  - Water hyacinth menace
  - Direct draining of sewers into the lake
  - Car washing in town (run-off to main sewer)
  - Clothes washing and bathing in the lake
  - Agro-based industrial water release on rivers

- **Proposed Mitigation Measures**
  - Proper management of sewage
  - Ensure riparian reserves are protected
  - Efforts to rid the lake of hyacinth urgently

- **Air Pollution**

Air pollution within the area is minimal; however, there are notable problems and challenges which include;

- Dust during constructions
- Stench from fish mortality
- Burning of wastes such as polythene bags, tyres
- Smoking in public places
- Exhaust fumes from un-roadworthy automobiles

Opportunity for improvement

- Enforcement of laws for hoarding construction sites
- Watering during construction to reduce the dust levels

- Provision of incinerators
- Improve public awareness, especially on the advantages of environmental conservation
- Designating smoking zones within the Homa Bay County

2.11 Cross Cutting Socio-Economic Issues

- **Water**

There's a lack of water storage facilities to keep water during after treatment. The residents consume water directly from the lake hence contributing to water borne diseases.

- **Sanitation**

Lack of toilets is a big problem in beach areas.

Pit latrines collapse due to lose soils in the beach.

- **Solid waste**

There is lack of waste management system in the beach.

- **Poverty**

Poverty in the Homa Bay County is exemplified through the following factors:

- Lack of food security
- Poor housing conditions
- Mushrooming of slums and squatter settlements
- Increased insecurity
- Dwindling health standards, high under-5 mortality rates, low life expectancy and high prevalence of HIV-AIDS
- Inequitable resource distribution

5.0 PUBLIC PARTICIPATION AND STAKEHOLDERS' COMMENTS

5.1 Legal requirement

ESIA regulations of 2003, requires that an ESIA shall incorporate public consultation. The aim of public consultation is to ensure that all stakeholders interested in a project (including the project beneficiaries and the public in general in the vicinity of the project) are identified and their opinion considered during the project implementation and operation.

5.2. Methodology and Data Collection

The field reconnaissance study was carried out in April 2022 with public forum meetings held at the site of the proposed project. All project Data was collected and documented for future reference. The data and stake holder consultation were done and obtained through: questionnaire, visits, meetings, observation and photography. The data thus collected was to be shared and agreed upon with all relevant Partners, collaborators and stakeholders. Attached at (appendixes) are copies of questionnaires that were distributed and filled up by the community members. The consultations resulted in minutes signed by Lwanda Rombo BMU.

Fig 1., Community members filling questionnaires

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

5.3. Minutes

MINUTES FOR THE PUBLIC PARTICIPATION HELD ON 28TH APRIL, 2022 AT THE BMU ASSEMBLY GROUND AS FROM 15OO HOURS TO 1600 HOURS

ATENDANCE

Find the attached attendance list.

AGENDA

1. Preliminaries
2. Introduction of members present
3. Discussions and public participation on the proposed project
4. Filling in of questionnaires
5. A.O.B

MIN 01/01/2022: PRELIMINARIES

The meeting kicked off at 3:30 pm with a word of prayer from Md. Beatrice Wasonga. BMU chairman therefore, welcomed everyone present to the meeting and assured them of their safety in the beach. Various stakeholders e.g., boat owners, crews, traders and local authorities were well presented in the meeting as was confirmed by the BMU chairman. In addition, BMU secretary was given an opportunity to take the assembly through the previous minutes on the related issues of discussion whereby, the assembly confirmed that, minutes read were true.

MIN 02/01/2022: INTRODUCTION OF MEMBERS PRESENT

BMU executive members present were given an opportunity to briefly introduce themselves stating their roles. In addition, various stakeholders' representatives, for example; crews, boat owners, local authority, and traders were given an opportunity to introduce themselves. Lastly, brief introductions came from YIRUO Fish Farm Kenya Ltd representative and the environmental expert.

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

MIN 03/01/2022: Discussions and public participation on the proposed project

An opportunity was given to YIRUO Fish Farm LTD representative to take the public on what the company is all about. In addition, he lectured the public on the importance of the proposed project and how it is going to impact positively on the lives of Lwanda Rombo community and its surrounding communities. To wrap up his explanations, he did not forget to mention some of the successful fish cages around that have positively changed the lives of the surrounding communities, for example, he mentioned fish Victory Fish Farm and Lake View Fisheries in Kakiimba. On the other hand, the environmental expert took the opportunity to educate the public on environmental negative and positive impacts of such projects in the community.

The community also got an opportunity to seek clarifications from both the environmental expert and the project representative, for example;

Mourice Otunga wanted to know examples of job opportunities that the project has, the criteria that will be applied during recruitment phase and how applications will be made. This was strongly seconded by Anne Akinyi and John Odhiambo.

Siting of Victory Fish Farm, John Ochieng and Leornard Odira wanted to know how the project is going to prevent occurrences of future conflicts over the natural lake routes, fish prices and over fishing grounds. This was also, supported by Lidya Adhiambo who happens to be a fish trader in the area. In conclusion, the community raised issues related to the following:

- Employment
- Income generation
- Competition of fishing grounds
- Security
- Cooperate responsibility

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

MIN 04/01/2022: FILLING IN QUESTIONNAIRES

Before rolling out questionnaires, environmental expert took the public through the questionnaire thereby, giving an opportunity to 20 people, taking into the gender distribution and willingness to participate, to fill in the questionnaires.

MIN 05/01/2022: A.O.B

Being no other business, BMU chairman closed the meeting at 1600 hours with a word of prayer from John Ochieng'.

6.0 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Project Impacts

The impacts between aquaculture and environment are closely related. Fish cages have an impact on the environment and the environment also has impacts on floating cage aquaculture. This section presents these impacts and mitigation measures of environmental factors on floating cage aquaculture and floating cage aquaculture on the environment.

6.1 Socio-economic impacts

Socio-economic impacts are the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society. In addition, the term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society. Social-economic impacts can be both positive and negative as it affects the following areas; employment, income, production, way of life, culture, community, political systems, environment, health and well-being, personal and property rights, and fears and aspirations. In a nutshell, social impact is a significant improvement or deterioration in people's well-being.

Projects affect different groups of people differently. Some people tend to benefit while others may lose. Historically, impacts are particularly severe for vulnerable groups, for example, tribal people, women, elderly persons, landless persons, displaced, and the poor.

The development of the fish cage project has a number of impacts on the community. For example, positive impacts such as increased employment for rural households, improved livelihoods, and improved healthcare for employees, employment and increased economic activity for local business in Lwanda Rombobeach. In order to allow for suitable, safe and cooperative land and business development there are also impacts involving voluntary purchase or lease of land and loss of previously open access pasture land.

6.2 Impact on Agricultural Lands

The project has zero loss on agricultural lands because it will be implemented off shore Lwanda Rombo BMU waters.

6.3 Impact on Access to Common Property Resources

The common property resources involved are the lakeshore area and access to the lake. For instance, access to the lakeshore area will not be blocked due to the minimal fencing on fish cage project. The project has no provision for enclosure of the shoreline therefore, the proposed project will not affect access to common property resources.

6.4 Impacts on local businesses and employment

Impacts on Local Small-Holder Fishers

The establishment of a cage operation has broadly positive impacts on other businesses and jobs. The impact and competition with local fishers are low. Local fishers mostly operate from shallow areas, while the commercial cages are located into deep areas. At the request of local stakeholders in the Community Consultation meeting in April 2022, the proponent will sell fish into the local market.

Impacts around Lwanda Rombo beach BMU Fishers

There is more potential for competition for lake space is between cages, however, because of the small amount of space taken by cages, it is unlikely fishers would be negatively affected by the new development. A second consideration with respect to fishing ground is that, uneaten fish feeds floating cages, may encourage plankton growth. Plankton growth in turn would encourage growth of fish, increasing catches for local Lwanda Rombobeach fishers. This is a positive impact of the project.

Impacts on Tourism

The second most important economic activity on Lake Victoria is tourism. The design of the cages will improve scenic beauty and aesthetic perspectives.

Impact on Employment

The project has a positive impact for employment within the local areas. The project will definitely employ Kenyans from Rusinga Island Ward and its neighboring communities, hence boosting the income as well as improving their living standards.

Impact on Local Suppliers

Within Lwanda Rombo beach community, the economic impact of fish cage culture project on local business activities is positive and immediate. The presence of better paid workers creates a good market for local suppliers such as fish mongers and local food sellers. This may cause local prices to increase initially, however revenue generated by sellers will then enable investment in supply, bringing prices down again. Furthermore, the incomes spent by commercial cage farm employees will enable a 'trickle-down' effect, whereby the local vendors will also have increased income, which they will spend with other local vendors thereby reinforcing a virtuous cycle of economic growth. It is also normal for the amount of a good produced to increase when prices increase. This investment will create further local jobs and improved conditions for local businesses.

6.5 Demographic Impacts

The demographic impacts of the project refer to changes to the population numbers and distribution. At full operation, the cage farm will employ a number of people on full time basis and short-term employment. The influx due to project employment and attendant swift growth of the population could bring in businesses to Lwanda Rombobeach.

6.5.1 Mitigation of Social Impacts of Demographic Change

The cage farm will endeavor to strengthen existing (traditional) institutions and through dialogue with local leadership assist in the development of new frameworks for addressing long-term

development and regional planning that addresses changes; for handling an increased number of disputes and social problems and gradually help to improve the capacity of the community institutions to accommodate a much more diversified population.

6.5.2 Health Impacts, HIV/AIDS and Malaria

An indirect impact of rising population due to immigration is the spread of HIV/AIDS. Lwanda Rombo beach community is predominantly composed of fishers. Studies from around the world and in the past decade indicate that AIDS-related illness and mortality are devastatingly higher in fishing communities. Vulnerability to HIV and AIDS stems from complex, interdependent causes that may include the mobility of many fisher persons, the time fishers and fish traders spend away from home, their access to daily cash income in an overall context of poverty and vulnerability; their demographic profile (they are often young and sexually active) and the readily availability of commercial sex in fishing camps. In addition, cultural factors related to fishing as a high-risk, low-status and uncomfortable occupation, lead to high-risk sexual behavior practices. Many of these causes make fisher persons not only vulnerable to HIV and AIDS but also more likely to miss out on access to prevention, treatment and care. Exposure to water-borne diseases and to malaria, along with poor sanitation and limited access to medical care, also combine to increase susceptibility to infection.

6.5.2.1 HIV/AIDS Mitigation

In order to reduce susceptibility to HIV/AIDS the proponent will have to take the lead in adopting the ILO Code Practice on HIV/AIDS and the World of Work. YIRUO Fish Farm Kenya Ltd recognizes the seriousness of HIV/AIDS epidemic and its impact on the workplace. The Company will support national efforts to reduce the spread and infection and minimize the impact of the disease. Accordingly, the proponent will:

- Formulate and implement HIV/AIDS workplace and community policy;
- Sustain sensitization of staff and community on the dangers of HIV/AIDs and STIs

- Support local programs by Ministry of Health regarding HIV/AIDs.

6.6 Impacts on Gender Participation

Impacts from aquaculture might not be felt in the same way by both genders within the community, due to the physical nature of many roles within the company. As a result, and to minimize and mitigate this potential issue, the proponent will employ women in as many roles as possible just like men

6.6.1 Mitigation of Gender Inequalities

The project will contribute to gender equality and development by creating equal opportunities for the empowerment of both genders, Safeguard the rights and needs of vulnerable or marginalized populations, including women, and youth through equal opportunity employment policies take into account the different vulnerabilities of men and women, due to differences in access to resources and different constraints in its employment policy.

6.7 Wider Socio-economic Impacts

In the case of socio-economic factors, the dominant impact of the project is positive due to the development it will bring, as detailed above. The primary direct benefit at the national level is improved Kenyan food security and improved nutrition. This is a positive step forward for a population that is suffering declining fish consumption due to stagnant natural fish productivity and sluggish growth of aquaculture. The project will also stimulate economic activity within Homa bay County through purchase of local goods. Direct fiscal contributions at the national level are in form of corporate income tax, VAT and personal income tax of employees. Indirect fiscal benefits will be in form of downstream impacts on suppliers of aquaculture inputs; feed and seed. The project will also provide for training, extension and economic incentives to local community.

6.8 Project Impacts on Environmental Resources

The project will follow the ecosystem approach to fisheries and aquaculture and therefore adhere to the United Nations Food and Agricultural Organization (FAO) Code of Conduct for Responsible Fisheries and Aquaculture. The project will therefore:

- Preserve aquatic ecosystems and protect the quantity and quality of fisheries resources, including genetic resources.
- Avoid dumping of fish processing wastes in water bodies.
- Avoid the depletion of other fishery stocks or wild populations.
- Protect artisanal fisheries and commercial fishing vessels and their gears from conflict with cage culture facilities.
- Protect small-scale farmers and local communities.

6.8.1 Impact on Land Resources

Improper location of farm activities can harm the environment. In order to conserve the natural habitat and local biodiversity the farm layout is such that it does not disrupt the structure of native fish population, enhance eutrophication in the receiving waters, and cause the loss of sensitive habitat. The farm layout takes into account other Lakeshore activities and avoids negative impacts on the lake and land resources.

6.8.1.1 Mitigation of impacts on Land

Site selection

A full evaluation in consultation with the Department of Fisheries and the community to ensure that ecological and social conditions are sustained and protected shall be carried out at each stage of the development. The following mitigation guidelines will apply: ·

- Alternatives to mitigate potential environmental and social impacts shall be considered;
- The proponent will seek appropriate permissions from the authorities

- Actively involve the participation of local people in implementation of activities that affect them.

6.8.2 Impact on Water Quality

- There will not be effluent discharge from the cages

6.8.2.1 Mitigating Water Quality Impacts – Stock Selection and Stocking Practices

Stock selection and stocking practices shall ensure increased production of good quality and disease-free stocks to promote profitable farming. Therefore, the developer shall ensure that:

- Moderate and appropriate stocking density shall be employed. For production cages,
- Only species already present in the Lake shall be cultured;
- Only healthy fry and fingerlings shall be stocked. We will employ grading throughout our production process
- A qualified professional will be engaged to ensure that health audits are done to ensure thorough screening of disease and consistence through developing of protocols on good stocking practices.
- Hatchery fry and fingerlings shall be used and not wild caught. Fry will only be procured from a trusted source (in the absence of own hatchery) and in accordance with best practice, under the management of a qualified Hatchery Manager.
- The introduction of exotics or and Genetically Modified Organisms shall not be cultured or introduced in the Lake by the developer.
- The proponent will undertake to use strong nets per cage to avoid fish escapes. This will curb escaping of fingerling into the wild thereby competing with the wild populace for resources.

6.8.2.3 Mitigating Water Quality Impacts –Feed Use and Feed Management

The following practices shall be adopted to maintain water quality, improve efficiency of feeds and feed management and at the same time reduce the number of wastes discharged into the environment.

- Feeds shall be selected for their high utilization rates to reduce the nutrient pollution from uneaten feed and excreta.
- The proponent will employ a qualified expert to deal with issues of feed formulation that will ensure feed efficiency, low feed conversion ratios, maximum feed floatability
- Feed shall include balanced levels of amino-acids and other nutrients appropriate for age of the fish, high palatability to stimulate consumption and high stability to prevent rapid nutrient release.
- Ideally only extruded feeds shall be used.
- Feed shall be stored in cool and dry areas to prevent contamination.
- Medicated feeds shall be used only if and when necessary for the control of specific diseases;
- Feeding management shall be in conformity with carrying capacity, stocking density and size of the fish.
- Good feeding practices shall be employed to ensure minimal feed wastage and this will be achieved by the use of appropriate technology like feed blowers and automatic feeding mechanism.

6.8.2.4 Mitigating Water Quality Impacts –Fish Health Management

The following disease prevention practices shall be complied with to provide effective management of fish health by focusing on prevention rather than disease treatment, eventually reducing disease incidence and protecting natural fisheries.

- Promotion of sustainable and good aquaculture management practices.

- Appropriate quarantine procedures, handling, transport and proper acclimatization of healthy fry and fingerlings prior to stocking shall be strictly observed.
- Good water quality shall be maintained using appropriate stocking and feeding practices.
- For non-infectious diseases, specific corrective management measures shall be carried out.
- For mild infectious diseases, with potential to spread within the farm, the pond or cage shall be quarantined and remedial measures shall be applied.
- For serious infectious diseases that may spread widely, the pond shall be isolated and the remaining fish harvested by net and disinfected without discharging the water.
- Treatment shall be done when necessary.
- The developer will participate in the national program on fish disease information, surveillance and reporting system.
- On site monitoring and reporting shall be conducted by a competent staff employed by the proponent.

6.8.2.5 Mitigating Water Quality Impacts –Database Management and Reporting

Data management shall be properly coordinated with all agencies and producer networks. This shall be through:

- Database of environment, social and land use impacts and operational statistics.
- Linkages with local and national information networks shall be pursued.
- Submission of annual reports as requirement for renewal of licenses and other
- regulatory requirements;
- Regular monitoring and post EIA audits.

6.9 Impacts on Biodiversity

Most farmed species are genetically different from native species and there is always concern about genetic contamination from the release of farmed species into the wild. Domestic fish are bred for traits that may not be optimal for survival in the wild. If some escape into the wild, for

example, if a storm or predator attack damages a pen, the viability of wild populations may be threatened by inter-breeding. Aquaculture can affect local biodiversity in other ways. The movement of bloodstock and fry within a country or between countries may significantly alter the genetic characteristics of local stocks of the same species through escapes. Organic loading from cage aquaculture can also cause a decrease in benthos flora and fauna biodiversity.

6.9.1 Mitigation of Escaped Fish on Wild Fish Population

In order to avoid escape of farmed fish into the wild, ponds will have series of net meshes and/or grill sand screens and barriers on inlets and outlets of culture facility. Cages will be equipped with strong and appropriate nets, including a predator net. Nets will be appropriately sized to retain the stocked fish.

6.9.2 Mitigation of Organic Loading on Biodiversity of Benthic Flora and Fauna

The rate of loss of biodiversity can vary according to seasonal factors and intensities of disturbances to the habitats as well as the number of species inhabiting particular areas. In order to avoid build-up of organic nutrients below the cages and associated impacts on benthic flora and fauna, the recorded data or the management plan will be used, based on the information recorded, to fallow cages. Ideally, cages should be moved every five years.

6.10 Significance of Impacts Combining

According to the determination of the combination of impacts, including chemicals could have an impact on the environment if not properly monitored, minimized and mitigated. The proponent does not intend to use any chemicals at the farm.

6.11 Impact of the Environment on Aquaculture

Cages are subcomponents of the aquatic ecosystems where they are situated; since the enclosure and the surrounding environment are intimately related i.e., changes occurring in the water body will have an effect on the enclosure environment and vice versa. This section examines the impacts of environmental elements on the ‘enclosure’ environment.

6.11.1 Predation

Cages attract a wide range of both obligate and facultative fish-eating vertebrates. The range of species reported to cause problems at cage farms includes fish, reptiles, birds and mammals. Many of these species move into an area where a fish farm has been established, attracted by the large numbers of readily detected fish and also by the bags of commercial feed if left unprotected on the cage walkways. Damage to nets by unsuccessful predators such as birds, tortoises, monitor lizards and rats has been reported, thus contributing to the loss of fish and feed from fish farms.

Mitigation to Predation by Fish Eating Vertebrates

As already indicated in the discussion on mitigation of escapees, a strong net with anti-predator nets reduces the impact of predators on fish pens. Equally useful is covering of the cage top to avert bird attacks. In case of ponds, lines will be used to cover the ponds and haps will be covered by bird nets.

6.11.2 Impact of Rough Weather Episodes

Gusty weather is often a cause of considerable damage to fish cages. Hence an appropriate mitigation measure is required.

Mitigation of the Impact of Storms on Cages

In addition to suitable site selection, the proponent will use floating cages that are designed to withstand sea conditions rather than traditional cages made of local materials. This will significantly decrease the risk of loss of fish due to adverse weather.

7.0. ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of site, technology scale and waste management options.

7.1 Relocation Option

Relocation option to a different site is an option available for the project implementation. At present the proponent has alternative sites but the current site is the best according to the surveys done. However, this means that he has to look for another site and this will take more time and resources.

7.2 No Project Option

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to the proponent and the community as a whole. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The proponent will not benefit from the revenue expected from the project.
- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain underutilized.
- No Rehabilitation center and job opportunities will be created for thousands of Kenyans who will work and live in the proposed project.
- Increased urban and rural poverty and crime in Kenya.
- Discouragement for investors to produce this level of affordable facility to the public.

From the analysis above, it becomes apparent that the No Project Option is no alternative to the proponent, Local people, Kenyans, and the government of Kenya.

7.3 The Proposed Development Option

Under the Proposed Development Option, the developer of the proposed project would be issued with an EIA License. In issuing the license, NEMA would approve the proponent's proposed development of the project, provided all environmental measures are complied with during the construction period and operational phases. This alternative consists of the applicant's final proposal with the inclusion of the NEMA regulations and procedures as stipulated in the environmental impacts to the maximum extent practicable.

7.4 Analysis of Alternative Construction Materials and Technology

Cages for fish culture can be constructed from a variety of materials and in practically every shape and size. Cages can also be purchased from companies that sell aquaculture supplies but it will be more economical if construction of cages can be done by oneself. The two most important things to remember are: Cages should be made of sturdy materials. The cage materials should be strong, durable, and nontoxic. The cage (mesh size) must be able to retain the fish, yet allow maximum circulation of water through the cage. It is best to select the largest mesh possible that will retain your fish. Adequate water circulation brings oxygen into the cage while washing wastes away.

7.4.1 Materials

Cage components consist of frame, nets, floats, weights and ropes.

Frame: The frame of the cage can be made from wood, plastic, fiberglass, PVC or metal. Frames made from metals and wood should be coated with a water-resistant paint.

Net materials: Net materials can be plastic coated, welded wire, solid plastic mesh or nylon netting. Mesh size of the net depends on the culture species, initial size of the seed, and the culture method. If we use 6 - 8 inch1 fingerlings as seed to culture most suitable mesh size is ½

inch and nets with 1/8, ¼ or 3/8-inch (0.5 – 1.0 mm) mesh sizes can be used for fry to fingerling rearing cages.

Floats: For the floating cages, flotation can be provided by waterproof foam rubber, Styrofoam, sealed PVC pipes, plastic bottles or barrels, sealed metallic barrels or any other suitable floating material. For small cages Styrofoam or foam rubber floats are commonly used and plastic or metal barrels are used for large cages.

Anchors: On the other hand, it should be anchored using stones or cement or metallic anchors. For fixed cages the cage should be fixed to the bottom using bamboo, PVC pipes or metallic pipes and nylon ropes to avoid drift. Materials used for cage construction should have following qualities:

- Be durable and strong, but lightweight
- Allow complete exchange of water volume every 30 to 60 seconds
- Allow free passage of fish wastes
- Not stress or injure fish
- Be resistant to fouling
- Be inexpensive and readily available

7.5 Waste water management alternatives

The project is not expected to generate waste water.

8.0 ENVIRONMENTAL MANAGEMENT/MONITORING PLAN (EMP)

8.1 Introduction to EMP

The aim of an Environmental Management Plan (EMP) is to avoid the possible adverse impacts of a project and to maintain the existing environmental quality. It clarifies on all aspects of planning, construction and operation of the project, which are relevant to environment. It is therefore, necessary to implement EMP from the planning stage to construction and operation stage. Therefore, the main objective of EMP is to identify the project specific activities that should be considered as having significant adverse impacts and the mitigation measures required.

In addition, EMP involves documentation of land use and water quality issues during construction and operations. The project involves pond fish breeding and on-growing in offshore cages. An Environmental Management Plan (EMP) can be defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".

An EMP is therefore, important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life-cycle. It is proposed to set the environment management plan for the Cage Culture Project alongside the Best Management Practice Guide which spells out recommended good practice at all stages of the aquaculture project cycle to mitigate adverse environmental impacts of cage aquaculture on the environment and vice versa.

The objectives of the EMP should be understood in terms of the following approaches (strategies) to environmental management:

- Good Aquaculture Management Practices
- Site Selection and Management
- Environmental Protection

- Nature and Biodiversity
- Waste Management and Reduction
- Water Quality Management and Conservation

Table 1: Summary of Potential impacts from operations and their proposed mitigation measures

Issue	Impact	Mitigation/Managem	Time	Co
Nutrient Enrichment	Exceeding the critical level or load) would lead to a eutrophic state in the lake and such	-Monitor feed rates to avoid overfeeding - Acquire quality floating pellets that can easily be washed away naturally to the	During and after project implementation	Par t of capital investment
Disposal of Waste	- contamination of environment -attracting scavengers -injure	Recycling, Re-use and transfer to approved sites	Throughou t project	20, 000 per year
Flow regimes/ water currents	-Water flowing through the cages is affected by drag forces exerted by the framework and netting - Increase in the rate	- Jump nets that extend above the water line should be constructed to prevent overtopping by storm surges or waves - Install cages away from	During and after project implementation	20,000 per year

Issue	Impact	Mitigation/Management	Tim	C
Fish mortalities	- Bacterial action and autolysis of dead fish results in the excretion of ammonia in lake waters - Live fish preying on dead fish can result in the spread of diseases if the corpse died of a disease -Mortalities attract	- Conduct a daily routine of collecting mortalities on the farm -All mortalities should be burnt decomposed at a designated area	Throughout the project life cycle	12,000 per month
Fish feed waste	- Uneaten feed accumulates as waste and produces ammonia as it decomposes in the ponds - Uneaten feed accumulating at the bottom of the cages where it	- Feed on response to avoid overfeeding - Practice regular flushing of ponds/tanks - Adjust feed chart in winter to avoid overfeeding and unnecessary feed loss	Throughout the project life cycle	5000 per Month

	mineralized by bacteria - Feed contains some macro-minerals which are possible pollutants of the environment - Increase in levels of ammonia, nitrogen and phosphorus in lake waters -Waste can accumulate beneath cages and cause	Environment -Anchoring of cages on single point moorings so that waste will be distributed over greater area - Increase feed use efficiency by using high-quality feed that contains desired nitrogen and phosphorus minerals and by assuring that fish consume most of the feed offered - Fallowing of are below cages to allow the breakdown of accumulated		

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

Fish escapes	- The escape of non-native culture species could lead to interbreeding thereby altering the local gene pool of local fish populations - Non-native species could also lead to competition with native species - Diseases can also be transmitted from escapees to wild fish -Competition can also alter or modify the pre-existing natural and fragile aquatic habitats and destroying some segments of aquatic	-Install screens on all inlet and outlet points in the fish farm to minimize the escape of fry, juveniles and brood stock -Filter screens in fish farm shall be designed to retain the smallest life stage present -Filter devices should be capable of screening all water -Cages should be made of sturdy, non-corrosive material - Make through inspection of nets before they are deployed so as to avoid possible escapes from the cages -Follow protocols when transferring, changing nets or harvesting fish from the cages e.g. use of fish boxes	Throughout the project life cycle	45000 per year

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

Issue	Impact	Mitigation/Management	Time Frame	Cost
Fish diseases	-Spread of diseases to wild	-Practice good husbandry -Limit use of chemicals - Quarantine introductions	Before and during project	10,000 per year
Predator/prey interaction	- Fish losses to Predation	-Putting nets over ponds to deter birds	Throughout the project life	20,000 throughou
Road access	- Road deterioration	Assist in road maintenance	Annually	To be
Food hygiene	- Spread of diseases	-Quality assurance/wet laboratory	Throughout the	50 00 per
Health issues	-Accidents	-Annual inspection of facilities by	Throughout the	10,000 per
Bio-safety measures	-Disease outbreak	- Use footbaths and restrict entry	Throughout the	0
Health service	-Health challenges	- Consider having a resident	Throughout the	10,000 per
Encroachment into Lwanda	-Reduction of Lwanda Rombo fishing grounds	- Restrict expansion to currently agreed area and new around to be out of fishing	Throughout the project life cycle	0
Conflict with	-Reduced space for	-Accommodate issues as they	Throughout the	10,000

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Navigational requirement	-Boat accidents at Night	- Install self-extinguishing Equipment, lights, use of approved equipment and use of	Throughout the project life	15,000
Aesthetic value	Cages and lake based fish feed	Allow tourist, school children to look and learn from prescribed distances.	Throughout the project life	0
Employment opportunit	Production is likely to reduce the	Employ those dependent on capture fishing as	Throughout the project life	To be determine

Table2: Summary of environmental impact mitigation and monitoring

Activity	Probl	Appli	Mitigation	Cost
Farm design, site selection and construction	Habitat preservation	Breeding ponds	- Place ponds above the flood level. - Area occupied by ponds should be smaller that of natural vegetation - Place ponds well apart	To be determined
		Production cages	- Do not set cages in areas with aquatic vegetation - Avoid setting cages where there may	0
	Nutrient control	Production cages	- Set cages in areas with good current flow - Currents help to remove sediments and replenish oxygen - Set cages according to direction of	0

YIRUO FISH FARM KENYA LTD-SUBA NORTH SUB COUNTY, HOMABAY COUNTY

Operations	Over-feeding	Production cages	- Use only necessary quantities of food. - Use feed pellets designed to float longer in the water column. - Use correct pellet size for size of fish to avoid feed wastes. - Use meals from terrestrial animal	0
	Overcrowding	Production	- Use lower stocking densities. - Use strong nets	0

Activity	**Problem**	**Appli**	**Mitigation**	**Cos**
Creation of A bio-zone	Disease preventio n	Production cages	- Use pathogen free stock if possible. - Consider quarantine of stock for observation and treatment if necessary	0
Overfeeding	Excess organic	Production	- Move cages periodically to different	0
	Predation	Production cages	- Place protective netting on sides and top of cages to protect fish from bird attack. - Use nets with mesh sizes that will not entangle birds	

9.4 Decommissioning Phase

In addition to the mitigation measures provided in **tables 1** and **2**, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined in **table 3** below.

Table 3: Environmental Management Plan for the Decommissioning Phase

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Time Frame**	**Cost (KShs)**
1. Demolition waste management				
Demolition waste	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3.Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Manager & Contractor	One-off	25,000
	All equipment and structures s that will not be used for other purposes must be removed and recycled/reused as far as possible	Project Manager & Contractor	One-off	20,000
	All debris should be removed and recycled, reused or disposed of at a licensed disposal site	Project Manager & Contractor	One-off	20,000

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Time Frame**	**Cost (KShs)**
	Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site	Project Manager & Contractor	One-off	To be determined
	Donate reusable demolition waste to charitable organizations, individuals and institutions	Project Manager & Contractor	One-off	0
2. Rehabilitation of project site				
Site degradation	Implement an appropriate re-vegetation program to restore the site to its original status	Project Manager & Contractor	One-off	100,000

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Time Frame**	**Cost (KShs)**
	Consider use of indigenous plant species in re-vegetation	Project Manager & Contractor	One-off	
	Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent area and the development.	Project Manager & Contractor	Once-off	

9.0 CONCLUSION AND RECOMMENDATION

This project is economically, environmentally and socially justified. Economic justification rests on its contribution to fish food production. It is socially acceptable because it will provide employment to a number of persons that are currently unemployed, open up a marginalized region to development and provide alternative livelihood to fishers and other smallholder farmers. The project will employ best aquaculture management practices and in order to minimize negative impacts on the environment. Because of this the project is not only socially acceptable; it is economically viable and therefore environmentally sound and sustainable. The project EIA report merits approval.

The report considers a number of options with regard to location, farming system and species in use. The conclusion is that Lwanda Rombo beach waters is the sites identified by the proponent and other key stakeholders for development of the tilapia cage culture in Homa Bay County.

The study also reviewed alternatives to Nile Tilapia and concluded that the species is suitable to the environment because it is already present in the natural environment of the Lake. The project will not introduce a new species. Other alternative species are economically risky and should not be tried for the commercial project. Cage culture option is preferred because the technology is more cost effective than ponds in terms of land requirements and total investments. Fishpond alternative is rejected in preference for cage culture because the latter is associated with less discharge of waste into the environment. In addition, because the project will use locally available species, feed and fertilizers, it has positive spill over to other input suppliers and therefore good for the development of the economy. The wastes generated by the project have minimal impacts on the environment. This is because of the mitigation measures provided and also because most of the solid wastes to be generated by the fish processing operation will be

processed further to produce fish meal and fish oil for use in other industry. There are no families that will be displaced by the project. In addition a project impact management and monitoring framework that have been proposed, the project has no unavoidable impacts and therefore merits support.

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Yalelo Ltd, (2012), Developing Tilapia Aquaculture, Lake Kariba, Zambia

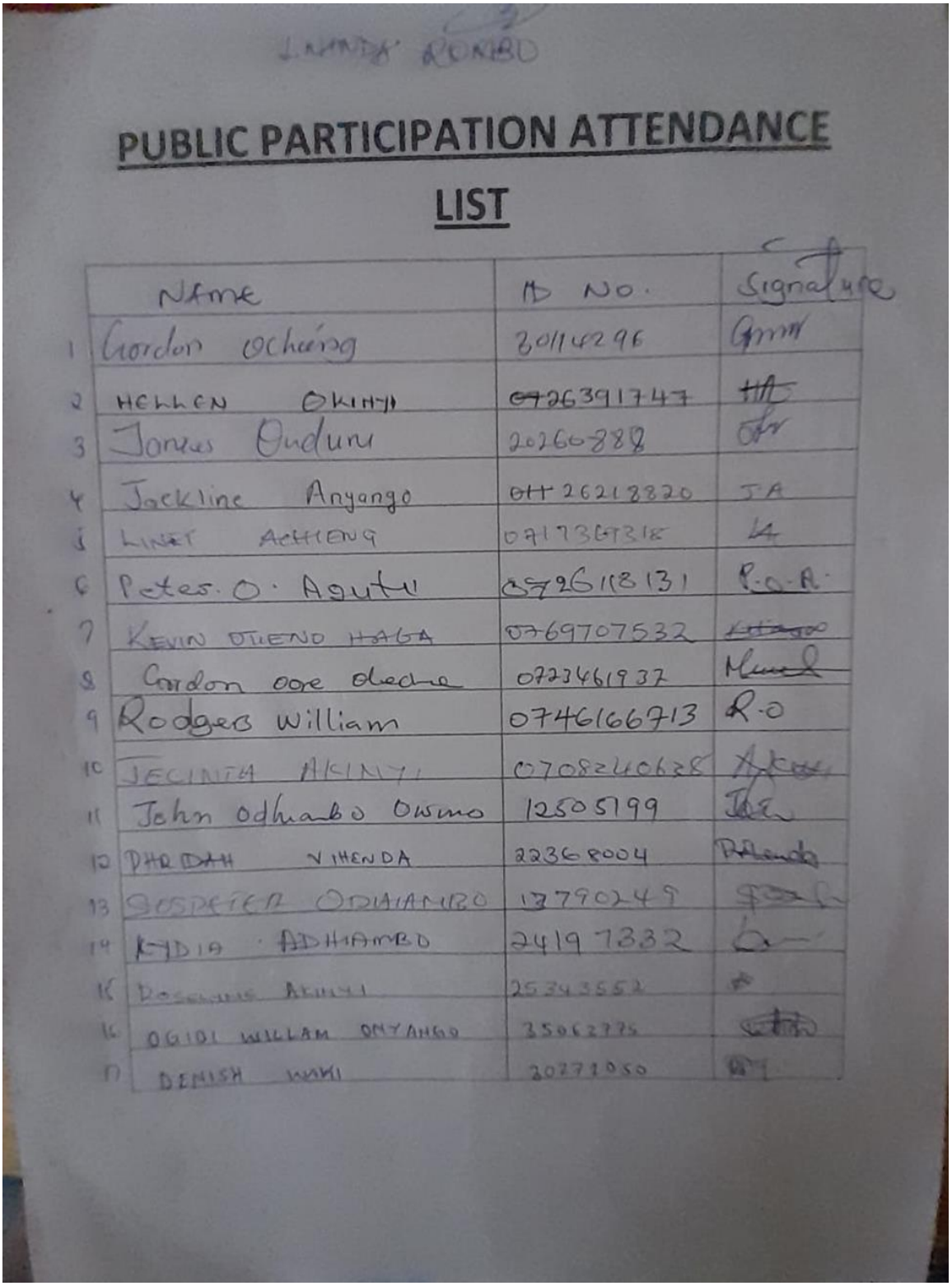
APENDIX

Photo gallery



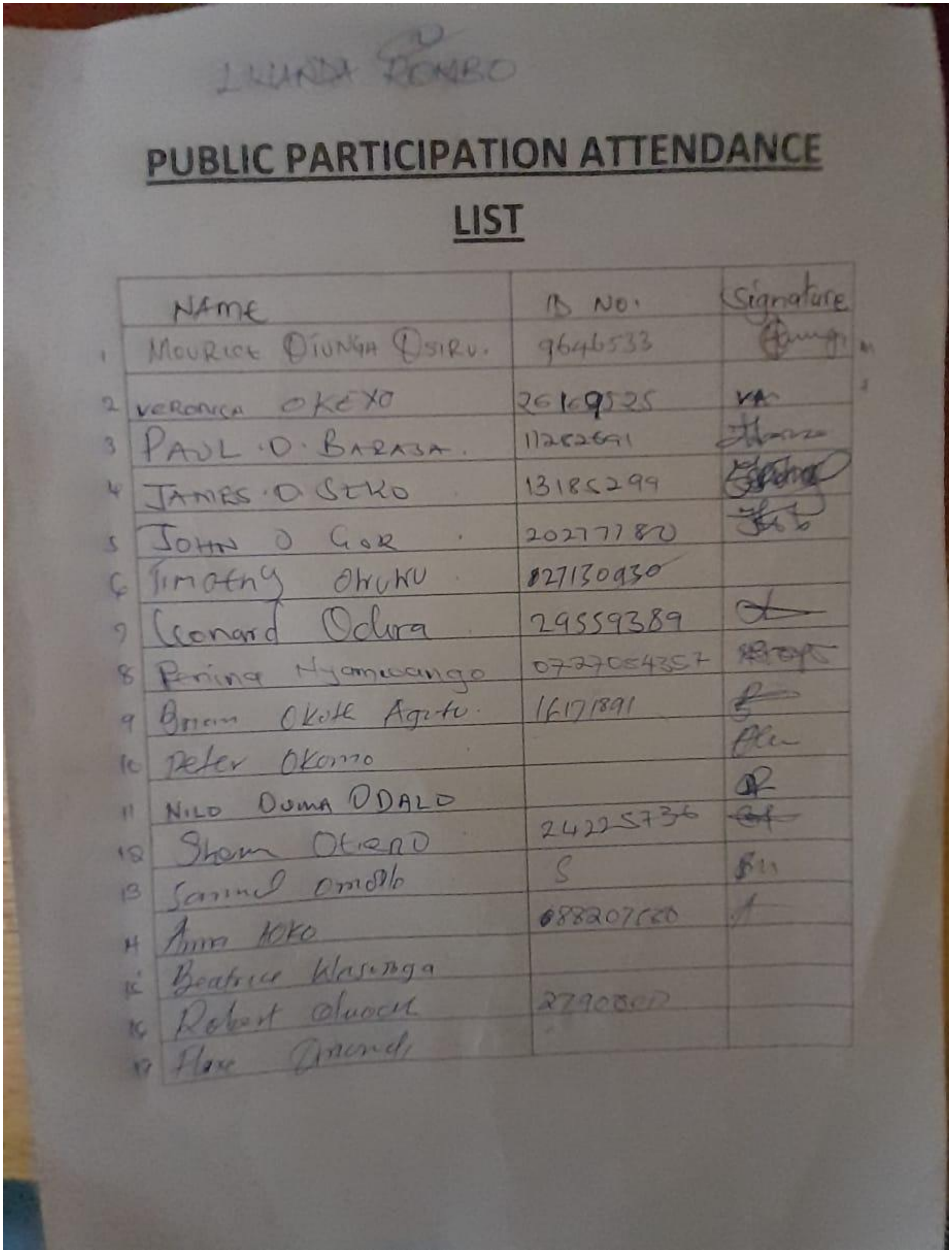



Attendance lists



PUBLIC PARTICIPATION ATTENDANCE LIST

	Name	ID NO.	Signature
1	Gordon Ochieng	30142496	
2	HELLEN OKINYI	0726391747	
3	James Ouduru	20260888	
4	Jackline Anyango	0717 26218820	JA
5	LINET ACHIENG	0717367318	
6	Peter. O. Agutu	0726118131	P.O.A.
7	KEVIN OTIENO HAGA	0769707532	
8	Gordon ooe dieche	0723461937	
9	Rodgers William	0746166713	R.O
10	JECINTA AKINYI	0708240628	
11	John odhiambo owuo	12505799	
12	DHADAH VIHENDA	22368004	
13	OSPETER ODHIAMBO	13790249	
14	LYDIA ADHIAMBO	24197332	
15	ROSELINE AKINYI	25343552	
16	OGIDI WILLAM ONYANGO	35062775	
17	DENISH WAKI	20271050	



LWANDA RONBO

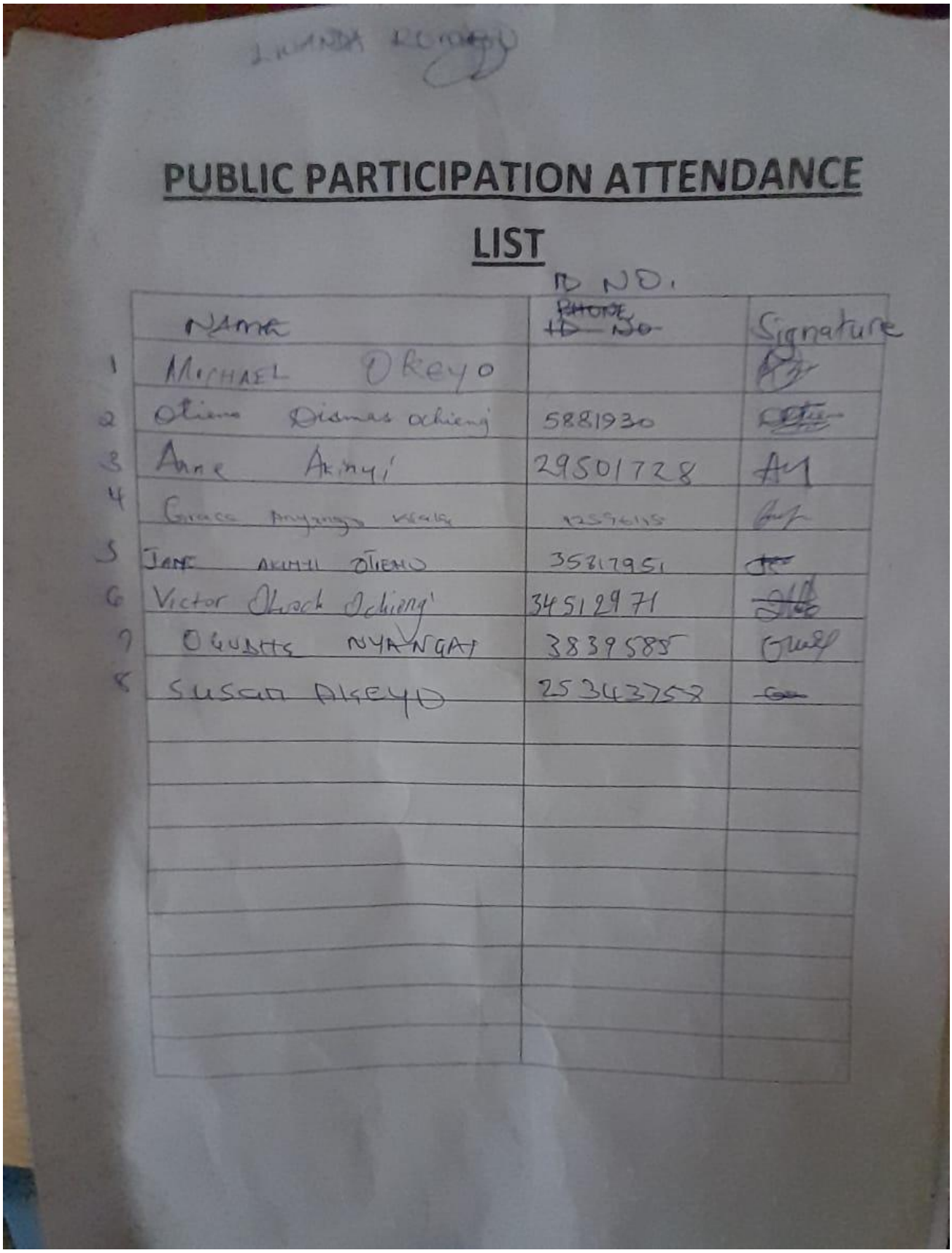
PUBLIC PARTICIPATION ATTENDANCE LIST

	NAME	ID NO.	Signature
1	MOURICE OIUNGA OSIRU.	9646533	[illegible]
2	VERONICA OKEXO	26169525	VA
3	PAUL .O. BARASA.	11262691	[illegible]
4	JAMES .O. OTKO	13185299	[illegible]
5	JOHN O GOR .	20277780	[illegible]
6	Timothy Otwuku .	827130930	
7	Leonard Odira	29559389	[illegible]
8	Perina Nyamwango	0727054357	[illegible]
9	Brian Okoth Agutu.	16171891	[illegible]
10	Peter Okomo		[illegible]
11	NILO DUMA ODALO		[illegible]
12	Shem Otieno	24225736	[illegible]
13	Samuel Omollo	S	[illegible]
14	Anna Koko	688207620	[illegible]
15	Beatrice Wasinga		
16	Robert Oluoch	2790800	
17	Flore Onendi		

LWANDA ROMBO

PUBLIC PARTICIPATION ATTENDANCE LIST

	NAME	ID. NO	Signature
1	FRED ONYANGO OKETO	0799467496	Onyango
2	Janet Ogunda	0754347[illegible]	JA
3	DENIS ODHIAMBO	336101732	[illegible]
4	Kiringa Absalom		
5	Daniel Okombo	32808591	
6	Caroline Okinyi	20248303	[illegible]
7	[illegible] Odhiambo	24600558	[illegible]
8	Ochieng Ogwer	35593250	[illegible]
9	JOHN OCHIENG	0740224081	[illegible]



PUBLIC PARTICIPATION ATTENDANCE LIST

	NAME	ID NO.	Signature
1	MICHAEL Okeyo		
2	Otieno Dismas Achieng'	5881930	
3	Anne Akinyi	29501728	
4	Grace Anyango Keya	12576115	
5	JANE AKINYI OTIENO	35817951	
6	Victor Okoth Achieng'	34512971	
7	OGUSTS NYANGAT	3839585	
8	SUSAN AKEYO	25343758	

KRA pin certificate

KENYA REVENUE AUTHORITY

www.kra.go.ke

PIN Certificate

For General Tax Questions
Contact KRA Call Centre
Tel: +254 (020) 4999 999
Cell: +254(0711)099 999
Email: callcentre@kra.go.ke

Certificate Date : 24/01/2022

Personal Identification Number
P052086651G

This is to certify that taxpayer shown herein has been registered with Kenya Revenue Authority

Taxpayer Information

Taxpayer Name	YIRUO FISH FARM KENYA LIMITED
Email Address	yiruofish100@gmail.com

Registered Address

L.R. Number : NA	**Building** SOIN ARCADE
Street/Road WESTLAND ROAD	**City/Town :** NA
County : Nairobi	**District** Westlands District
Tax Area Westlands	**Station** West of Nairobi
P. O. Box 9100	**Postal Code** 00200

Tax Obligation(s) Registration

Sr.	Tax Obligation(s)	Effective Date
1	Income Tax - Company	24/01/2022

The above PIN must appear on all your tax invoices and correspondences with Kenya Revenue Authority. Your accounting end month is December unless a change has been approved by the Commissioner-Domestic Taxes Department. The status of Tax Obligation(s) with 'Dormant' status will automatically change to 'Active' on date mentioned in "Effective Till Date" or any transaction done during the period. This certificate shall remain in force till further updated.

Disclaimer : This is a system generated certificate and does not require signature.

Company Acts 2015, Certificate

THE REPUBLIC OF KENYA

BUSINESS REGISTRATION SERVICE
P. O. BOX 30031
NAIROBI
24 JAN 2022

To
The Director(s)
YIRUO FISH FARM KENYA LIMITED
P.O. Box 9100
00200 - CITY SQUARE

THE COMPANIES ACT, 2015

Records relating to the below company held by the Companies Registry as at **24 Jan 2022**

COMPANY	YIRUO FISH FARM KENYA LIMITED
COMPANY NUMBER	PVT-Y2ULBK6K
NOMINAL SHARE CAPITAL	3,000,000.00
NUMBER AND TYPE OF SHARES (VALUE PER SHARE)	ORDINARY: 100 (KES 30,000.00 EACH)
DATE OF REGISTRATION	24 JAN 2022
REGISTERED OFFICE	P.O BOX 9100, CITY SQUARE TELEPHONE: +254708264006, EMAIL: YIRUOFISH100@GMAIL.COM COUNTY: NAIROBI, DISTRICT: WESTLANDS DISTRICT, LOCALITY: WESTLANDS STREET: WESTLAND ROAD, BUILDING: SOIN ARCADE
POSTAL ADDRESS	P.O BOX 9100 CITY SQUARE
ENCUMBRANCES	

Name of Directors and Shareholders of the above company with their particular are as follows

NAME	DESCRIPTION	ADDRESS	NATIONALITY	SHARES
LI HONGWEI	DIRECTOR/SHAREHOLDER	P.O BOX 9100	CHINA	ORDINARY: 51
DONG JIANPU	DIRECTOR/SHAREHOLDER	P.O BOX 9100	CHINA	ORDINARY: 20
ZHANG YONGQIANG	DIRECTOR/SHAREHOLDER	P.O BOX 9100	CHINA	ORDINARY: 17
WASHINGTONE OKELLO OMIRA	DIRECTOR/SHAREHOLDER	P.O BOX 9100 CITY SQUARE	KENYA	ORDINARY: 12
			TOTAL	100

Yours Faithfully,
REGISTRAR OF COMPANIES

REF NO: PVT-Y2ULBK6K

DISCLAIMER: THIS IS A SYSTEM GENERATED CERTIFICATE AND DOES NOT REQUIRE A SIGNATURE

Certificate of incorporation

No. **PVT-Y2ULBK6K**

CERTIFICATE OF INCORPORATION

I hereby **CERTIFY** that,

YIRUO FISH FARM KENYA LIMITED

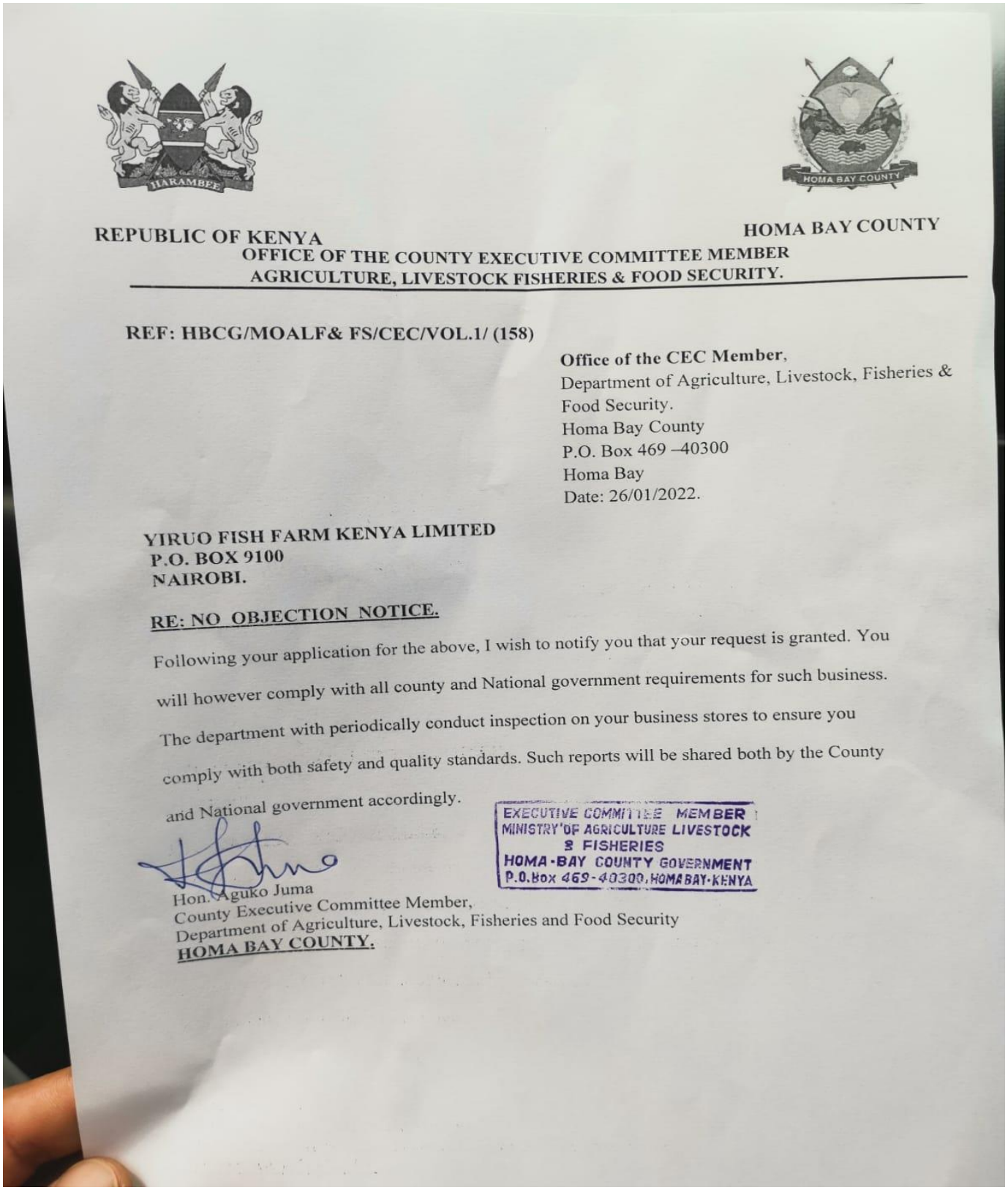
is on this date 24 Jan 2022 Incorporated under the Companies Act, 2015 and that the Company is a **PRIVATE LIMITED COMPANY.**

.....

Registrar Of Companies

This is a system generated certificate. To validate this document send the word **BRS** to **21546**

No objection letter



REPUBLIC OF KENYA

HOMA BAY COUNTY

OFFICE OF THE COUNTY EXECUTIVE COMMITTEE MEMBER
AGRICULTURE, LIVESTOCK FISHERIES & FOOD SECURITY.

REF: HBCG/MOALF& FS/CEC/VOL.1/ (158)

Office of the CEC Member,
Department of Agriculture, Livestock, Fisheries &
Food Security.
Homa Bay County
P.O. Box 469 –40300
Homa Bay
Date: 26/01/2022.

YIRUO FISH FARM KENYA LIMITED
P.O. BOX 9100
NAIROBI.

RE: NO OBJECTION NOTICE.

Following your application for the above, I wish to notify you that your request is granted. You will however comply with all county and National government requirements for such business. The department with periodically conduct inspection on your business stores to ensure you comply with both safety and quality standards. Such reports will be shared both by the County and National government accordingly.

EXECUTIVE COMMITTEE MEMBER
MINISTRY OF AGRICULTURE LIVESTOCK
& FISHERIES
HOMA-BAY COUNTY GOVERNMENT
P.O.Box 469-40300,HOMA BAY-KENYA

Hon. Aguko Juma
County Executive Committee Member,
Department of Agriculture, Livestock, Fisheries and Food Security
HOMA BAY COUNTY.

Memomorundum of Understanding

Annex 5: Memorandum of Understanding

Certified true Copy of the Original

HUMPHREY O. ORUCH
ADVOCATE
P.O. Box 745 - HOMA-BAY
Cell: 0723 431 935 / 0736 431 935

MEMORANDUM OF UNDERSTANDING

BETWEEN

LWANDA ROMBO BEACH MANAGEMENT UNIT

AND

YIROU FISH FARM KENYA LIMITED

.....

FOR

THE DEVELOPMENT OF A COMMERCIAL, SUSTAINABLE & SOCIALLY RESPONSIBLE TILAPIA CAGE CULTURE PILOT PROJECT ON LAKE

VICTORIA LWANDA ROMBO BMU

HOMA-BAY COUNTY KENYA.

LWANDA ROMBO B.M U
P O BOX 313
MBITA
SITE

Article 1: Preamble

Certified true Copy of the Original

WHEREAS

(i) **LWANDA ROMBO** Beach Management Unit is a fishing community, located in Homa-Bay County, Suba North Constituency RUSINGA Ward in the Republic of Kenya;

(ii) **LWANDA ROMBO** Beach Management Unit is registered Beach Management Unit (BMU) under the Laws and Regulations of Kenya.

(iii) **LWANDA ROMBO** BMU is the relevant and responsible BMU for the intended project area.

AND WHEREAS

(i) **YIROU FISH FARM KENYA LIMITED** is a Kenyan Citizen and having its address at P.O. Box 9100 CITY **SQUIRE, Kenya;**

(ii) **YIROU FISH FARM KENYA LIMITED** is an expert researchers in sustainable agriculture and has the intent to carry out a sustainable cage fish farming business in Kenya at the **LWANDA ROMBO** BMU location in the County of Homa-Bay in the Republic of Kenya;

LWANDA ROMBO BMU and **YIROU FISH FARM KENYA LIMITED** can be hereafter also named as "the parties".

Now therefore **LWANDA ROMBO** BMU and **YIROU FISH FARM KENYA LIMITED** enter into an agreement in which the key principles and regulations for a sustainable cage fish farming operation in the area of the **LWANDA ROMBO** BMU are described and finalized.

Article 2: Description of the Business

YIROU FISH FARM KENYA LIMITED has the aim to produce fish in a sustainable and socially responsible way in Africa.

In a first attempt he is aiming to produce tilapia in net-cages in Lake Victoria in Kenya. In a first step and designed as a pilot project 150 tons per year shall be produced. If the pilot project turns out as feasible and profitable the production shall be increased up to the environmental limits of the site(s). To produce the aimed quantity of fish several cage clusters have to be set up and installed within a designated Aquaculture Production Zone (APZ).

Around these cage clusters a special zone for bio-security have to be designated in which trespassing, fishing and other activities apart from operating the cage clusters, are prohibited.

LWANDA ROMBO B.M.U
P.O BOX 313
SUBA
DATE

HUMPHREY O. OBACH
ADVOCATE
P.O. Box 745 - HOMA-BAY
Cell: 0726 431 935