assure consulting

MEMBI FISHERIES LIMITED

Business Plan for the setup of a fully-fledged modern tilapia aquaculture and a feed processing facility in Mwanza Region.

November 2024

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STATEMENT TO THE DIRECTORS

We have prepared this business plan for Membi Fisheries Limited for the financial year 2023.

Our responsibility as the preparers of this business plan is to provide details to the extent of the market and potential operations based on the information that has been provided by the authorized representatives of Membi Fisheries Limited. This report has been prepared in accordance with the requirements stated by the authorized representatives of Membi Fisheries Limited for the purpose of seeking funding to complete the operations of the tilapia aquaculture facility in Mwanza.

FOR ASSURE CONSULTING

Management Consulting | Governance & Assurance | ESG Consulting | Accounting & Taxation

SIGNED BY

Ali Mohamed AmirAli FCCA, ACPA(T), MSc, CertBV _____

Principal Consultant

ACCA Membership Number	2166407
NBAA Membership Number	ACPA 4283
Date	**5 November 2024**

DIRECTORS STATEMENT

This business plan is strictly the proprietary property of Membi Fisheries Limited and is absolutely not to be released or transmitted in any form without explicit, written approval from the authorized representatives of Membi Fisheries Limited.

This information presented in this document has been reviewed, approved and authorized by the Board of Directors of Membi Fisheries Limited to be used in its operations for smooth, effective and efficient delivery of operations of the company.

This document has been prepared to project a six-year plan.

APPROVED BY:

Name _____

Date _____

Position _____

Signature _____

1 INTRODUCTION

1.1 Project Idea

1.1.1 Project Concept

This business plan for the establishment of a modern setup of a tilapia aquaculture farm in Buzwege village in the district of Ukerewe in Mwanza. This business plan outlines the initial plan laid out by the promoters in undertaking this project, setting a business vision and gathering initial cost estimates. It is also a set of communication of the promoters' idea to external parties in planning for planning and mobilizing resources, keeping regulatory authorities in line with the project's plans as well as the implementation of the tilapia production project.

It is proposed that the modern tilapia aquaculture farm will encompass an initial harvesting of three thousand six hundred tones (3,600 tones) of tilapia fishes at a table size of between 250g to 400g within the first year of production; and thereby growing to seven thousand two-hundred tones (7,200 tones) in the second year of production and capping at fourteen thousand four-hundred tones (14,400 tones) in the third year of production using both internal sources of funding as well as external financial support from financial institutions if required.

This business plan is for the sole purpose of Membi Fisheries Limited to acquire debt financing from a reputed financial institution/individual investor for the purpose of facilitating a large-scale modern tilapia aquacultural farm in the district of Ukerewe. This modern tilapia aquaculture project will adopt an integrated approach towards production of the fishes from experienced aquaculture management and sustainable harvesting methodologies which are ecofriendly. The production process will entail a mixture of machinery, permanent as well as casual employees.

1.1.2 Funding Requirement Overview

Funding Type	Nationality
Equity Contribution	1.320 billion
Debt Contribution	33 billion
TOTAL	**34.32 billion**

1.1.3 Project Rationale

This modern state of the art tilapia aquaculture setup is being setup for the following reasons:

- Conducive investment climate in Tanzania where economic growth has been substantial to support economic returns, especially in the productive sectors such as aquaculture where the demand continues to grow.
- Investment in agriculture and aquaculture directly supports the Tanzanian efforts to eradicate poverty under the National Strategy for Growth and Reduction of Poverty especially in the rural areas. This project will invest significantly in construction of infrastructures including buildings and aquaculture systems for high quality production.
- This project will employ significant numbers of people from local communities in the rural areas as well as developed areas.
- Currently, a large proportion of fish is imported to reduce the deficit. The production of tilapia fishes from this project will reduce national dependency of importation from foreign countries, saving hard-currency as well as improving balance of payments.

1.1.4 Project Country

Tanzania is located in the eastern side of Africa at longitude 29° and 41°, East and Latitude 1° and 12° South. It shares borders with Burundi, Kenya, Malawi, Mozambique, Rwanda, Uganda, Zambia and the Indian Ocean with a coastline of 1,424km. Tanzania is the largest country in East Africa both in land area as well as population having 883,749km^2 of land and approximately sixty-million people.

During the last two decades, Tanzania has been transformed from a centrally planned economy to a market-oriented system through the successful implementation of trade liberation measures. The government has taken deliberate steps to encourage private sector led growth through restoration of market forces and less interference in commercial activities. These measures including privatization of state-owned companies, reduction in tariff and non-tariff barriers and fiscal/monetary reforms have opened doors for expansion of private sector operations in Tanzania.

Tanzania is emerging as a high growth potential. This is also seen after the World Bank declaring Tanzania to become a lower middle-income country earlier this decade. Whilst the economy is relatively diversified, a number of opportunities remain untapped in various sectors in the country. In an attempt to make Tanzania the preferred destination for foreign direct investments, continuous improvements towards the creation of an enabling environment have been made.

FUTURE PROSPECTS FOR TANZANIA

The economy of Tanzania has excellent prospects. Strong growth potential, a boom in various services, continued donor support and a relatively favorable investment climate all underscore the forecast of a strengthened economy in the future. However, the main constraints to growth are weak infrastructures, which holds back economic development in various sectors such as transportation, service-oriented industries and banking sectors which does hold back investments in other sectors such as agriculture, aquaculture.

Business opportunities in the aquaculture sector are numerous especially in ensuring that the country achieves poverty reduction through food and nutrition security. There is a vast and limitless opportunity to participate in the development of aquaculture in Tanzania with the correct investment, strategy and implementation plans. Government support has been offered; hence Membi Fisheries wants to capitalize on government efforts to invest in this modern state of the art tilapia fishing farm for the production of high-quality fish for the consumption of the Tanzanian citizens.

1.2 Project Sponsors

The project is promoted by Membi Fisheries Limited; a private company owned and registered in Tanzania, East Africa. The company was registered under the Companies Act 12 of 2020, with a Taxpayer Identification Number **163-748-304** on the **27 February 2023** in Geita. The main objectives of the company include aquaculture and fisheries.

The authorized share capital of the company stands at **Tanzanian Shillings Six-billion only (TZS 1,000,000,000 only)** comprising of 100,000 ordinary shares valued at par with **Tanzanian Shillings Sixty-thousand only (TZS 60,000 only)**. From the 100,000 ordinary shares, only 60,000 shares have been allocated to the two directors and 40,000 shares remain unallocated.

1.2.1 Directors of Membi Fisheries Limited

NAME	Nationality	Shareholding %	No. of Shares
Ezra Lazaro Membi	Tanzanian	30%	30,000
Frank Finihas Machumu	Tanzanian	30%	30,000
Unallocated Shares	-	40%	40,000
TOTAL		**100%**	**100,000**

Ezra Lazaro Membi	An entrepreneur and businessman with over 25 years of experience in mining and construction sector. He provides mining supply, transport and logistics solutions across the lake zone. He has substantial operating capacity, powered by a team of highly professional staff with high level of experience in the industry.
Frank Finihas Machumu	Motivated challenge-seeking expert with more than 10 years of experience in aquaculture industry. He has comprehensive background in Tilapia and catfish farming with strong problem-solving skills and understanding business development issues. He has also demonstrated leadership and management competencies.

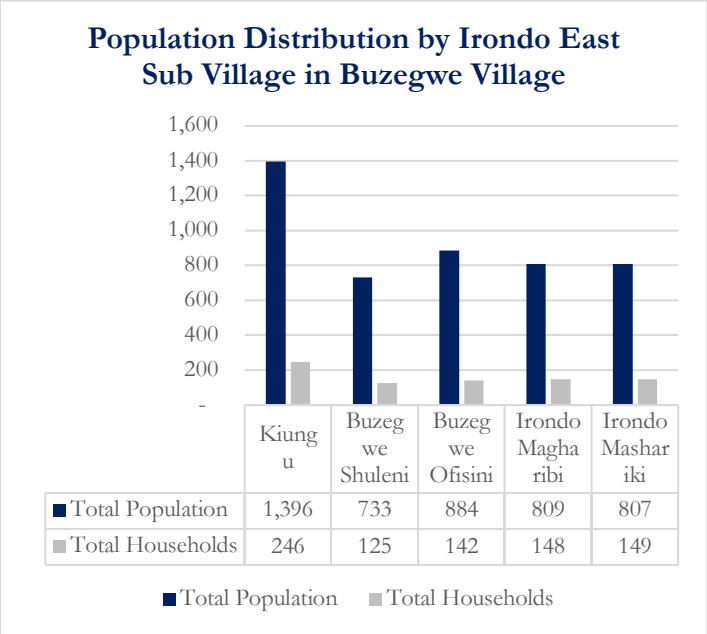
2 MARKET OVERVIEW

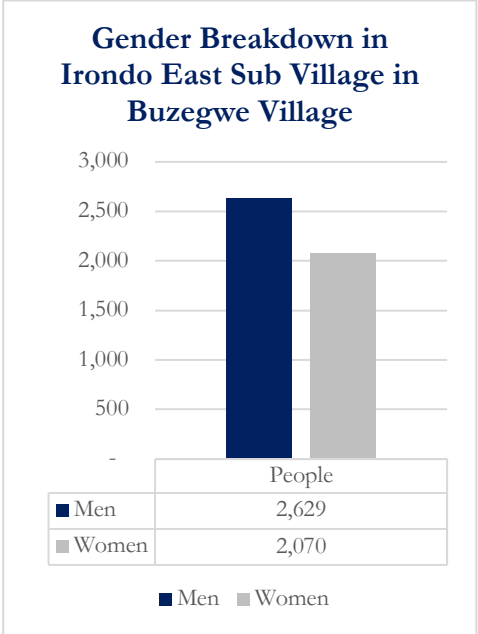
2.1 Project Economy

The region covers an area of 25,233 square kilometers (9,743 sq mi), of which 13,437 km² (5,188 sq mi) is water and 11,796 km² (4,554 sq mi) dry land. Mwanza Region is home to Ukerewe Island, the largest lake island in Africa as well as Saanane Island National Park, the smallest national park in Tanzania. The major rivers found in the region are; Moame River, Isanga River, Mirongo River, Nyarua River and Ndemabolia River. The region is situated between 1200 and 1,400 meters above sea level on Lake Victoria's southern shore. The area is primarily flat, with little mountains and hills made of granite stone strewn about. Rainwater from the plains flows into Lake Victoria in the north. The "mbuga soil" ranges in texture from sand to sandyloam to sand-clay or loom-clay.

2.2 Demographics

The data that was obtained at the Village Executive Office indicates that the total population of Buzegwe village amounts to four-thousand six hundred ninety-nine (4,699 people) and broken down into **two-thousand six hundred twenty-nine (2,629 females)** and **two-thousand and seventy (2,070 male)** across **eight-hundred ten (810 households)**. The population distribution across the Buzegwe village of Kagunguli ward are as follows:





2.3 Global Trade Analysis

The global tilapia market enjoys a value of **US$ 14.1 billion** and is forecasted to reach a size of **US$ 22.3 billion** by the end of 2033. The global demand for tilapia fish is projected to increase at a compounded annual growth rate of 4.6% over the next ten years.

The Asian-Pacific region accounts for nearly seventy-percent of global tilapia production at present and this trend is expected to extensive throughout the forecasted periods. Growing establishment of new fish farms with high product standards, adaptation of advanced aquaculture techniques and technologies, supportive government initiatives to boost production of tilapia fishes, minimizing environmental impacts of these processes, following safety guidelines and implementation of regulatory guidelines to promote sustainable aquaculture are key prospects that are anticipated to boost tilapia demand in the Asian Pacific region through the year 2033.

The region is also home to China, who are the leading producers of tilapia in the world, followed by Egypt. India and Indonesia are also anticipated to witness a notable hike in tilapia production over the coming years owing to support initiatives, better quality control and advancements in fishery services.

2.3.1 Demand in the United States of America

In recent years, focus on health and fitness has boomed in the United States which was stimulated due to the rise of chronic diseases; primarily the cardiovascular disorders. This increase in health and fitness has led to drastic changes in dietary choices of people in the country; subsequently resulting into a higher demand of different types of fish as a healthier protein alternative compared to red meat. Moreover, advancements in the fishing industry in the country and the adoption of advanced aquaculture technologies are also projected to boost tilapia farming in the country.

Increasing awareness of white fish consumption benefits and the growing popularity of seafood-based cuisines are also other prospects that are expected to strengthen the growth of tilapia consumption in the country. Considering the demand and consumer choices of food; frozen tilapia is expected to be on the rise.

2.3.2 Japan and Korea

Japanese and Korean diets are heavily influenced by seafood since both these countries are abundant in the supply of seafood; primarily due to their geographic location. However, due to the increased rate of urbanization and the influence of Western culture have resulted in reduced consumption in Japan as well as Korea; which is expected to negatively affect the demand of tilapia during the forecasted periods.

On the other hand, increasing efforts to promoting seafood consumption and the growing popularity of benefits associated with white fish consumption are expected to create opportunities for tilapia manufactures in Japan and Korea over the next decade through 2033.

2.3.3 The EU Market

Just like the United States of America, the growing prevalence of chronic diseases and lifestyle disorders is a strong lifestyle shift and increased demands of healthy food alternatives in various European countries. Consumers in Europe just like the west opt for healthy fish meat to safeguard from any adverse effects of red meat and poultry consumption. High incidence of cardiovascular disorders, change in dietary preferences, increase in the popularity of eastern cuisines, growing availability of tilapia fish are projected to govern the shipment of tilapia into the European region.

Amongst the European channel, Germany, France, the United Kingdom and Spain are anticipated to be strong market attractions for tilapia manufacturers and vendors over the next decade. Nile tilapia is anticipated to be the most popular species of tilapia fish in Europe throughout this forecasted period.

2.4 Tanzanian Trade Analysis[1]

Tanzania's fish farming sector offers great potential for economic growth and providing food security. The country's climate is ideal for farming of local species such as tilapia and African catfish. The demand for fish is rising steadily due to population growth and rising incomes.

Yet, despite the fish market demand gap (estimated at a staggering 480,000 tons), the local fish farming sector has not managed to capture a significant part of the market. Aquaculture is responsible for around 1% (or 3,942 tons) of total fish production in Tanzania as consumer still rely on inland fisheries from Lake Victoria (85%) and marine fisheries (14%) for local fish consumption.

Currently, imported frozen fish from China forms a main competitor for local production. In 2017 alone, Tanzania imported 1,636 tons of frozen tilapia, being a 10-fold increase compared to 2014. Practically all imported tilapia comes from China. China has a very competitive industry and brings products on the market for prices which are hard to compete with. As an unpackaged product primarily sold whole in frozen form, consumers have difficulties identifying the difference between Tanzanian produced and imported fish. Yet, consumers are indicating that they are willing to pay between 1,277 TSh /kg to over 6,000 TSh/kg more for Tanzanian tilapia over imported tilapia, if they can be sure of the origin. In other words, if an imported fish would be sold for 6,000 TSh/kg, it is estimated that Tanzanian customers are willing to pay 7,277 TSh/kg to 12,000 TSh/kg for Tanzanian fish.

Replacing food imports by local production is one of the key priorities of the Tanzanian government as the local aquaculture value chain creates quality jobs, economic growth, and food security. The Tanzanian government has thus taken important steps to increase production as well as limit imports to support domestic aquaculture growth.

[1]https://www.agroberichtenbuitenland.nl/landeninformatie/tanzania/achtergrond/latest-developments/fish-marketing-to-highlight-tanzanian-production-for-the-tanzanian-market

However, as access to markets and receiving the right price for farmed fish is essential for a thriving fish farming sector, farmers themselves must also position their fish well in the market as they compete against imported fish. Branding and marketing is important for fish farmers as it will enable them to receive a better price for fresh fish. It will also allow the consumer to differentiate between fresh and imported. However, differentiation is difficult as fish is basically a commodity product.

Currently, farmers and traders lack the strategies and tools to effectively position their local fish on the market. There is much room for improvement regarding marketing & branding, both online and offline. This improvement should be based on the premise that locally produced fish for the local market should be recognizable to the consumer as such.

Both the Tanzanian and Dutch government recognize the potential of aquaculture in Tanzania. The Netherlands has been actively supporting the aquaculture industry of Tanzania since 2018. As part of this support, in 2019 the Dutch government asked Larive International in partnership with ABC Bros to develop a fish branding strategy for fish farmers and traders.

2.5 Fish Consumption Trends (2016 to 2020) in millions

Category	2016	2017	2018	2019	2020
TZ Population size (mil)	44.92	48.67	48.67	55.89	57.63
Fish/fish imports (kg)	13.917	22.961	22.752	5.977	5.330
Natural Fisheries Production (kg)	362.59	362.64	387.54	470.31	473.59
Aquaculture Production (Tilapia and others – kg)	5.677	11.000	16.288	18.061	17.254
Export of fish/fish production (kg)	39.691	36.063	44.939	45.775	40.477
Aquaculture exports mainly prawns (kg)	0.140	0.201	0.244	0.336	0.029
National fish consumption (kg)	342.36	385.24	370.21	442.28	473,568.99
Per capita fish consumption (kg)	7.6	7.91	7.84	7.91	8.22

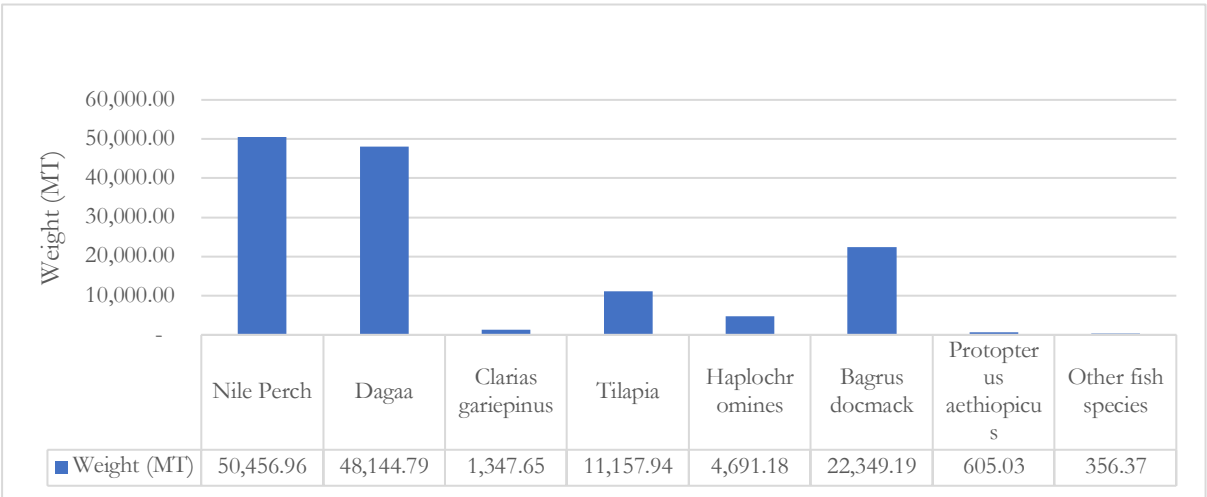
2.6 Tanzania Fish Production in 2020

2.6.1 Fish Production in Tanzania

Based on the annual landings in fish production in the year 2020, it was recorded at **Four hundred seventy-three thousand five hundred ninety-six metric tons (473,592 MT)** worth approximately **TZS 2.37 trillion (FY2019: 470,309.23 MT [TZS 2.210 trillion])**. The biggest share of fish catch was observed in Lake Victoria contributing to over fifty-eight percent of the total fish landings. The catch percentage share of each water body in Tanzania is summarized in the table below:

WATER BODY	NUMBERS		NUMBERS		% Share
	Fishers	Fishing Vessels	Catches (MT)	Values (MIL)	
Lake Victoria	109,397	31,773	274,888	1,374,444	58.0
Lake Tanganyika	26,612	11,506	104,178	520,894	22.0
Lake Nyasa	5,550	2,632	8,252	41,264	1.70
Lake Rukwa	3,428	1,786	5,240	26,200	1.10
Mtera Dam	2,369	1,238	7,046	25,234	1.50
Nyumba ya Mungu Dam	1,269	860	9,696	48,480	2.0
Minor water bodies	879	321	524	2,623	0.1
Small scale marine	53,035	9,242	63,763	318,819	13.5
Total	**202,539**	**59,358**	**473,592**	**2,367,961**	**100.0**

2.6.2 Fish Production Mwanza Region (by weight)



3 PROJECT DESCRIPTION

3.1 Project Outline

3.1.1 Project Site

Membi Fisheries Limited's project plan is located in the rural area of Buzegwe village in the district of Ukerewe in Mwanza. As a new company, the land in possession of the company stands at **6.3-million square meters (6,300,000 sqm)** of the Lake Victoria area (water) and **eighteen-thousand eight hundred forty-nine square meters (18,849 sqm)** of land for building and constructing administrative controls for the newly established business.

3.1.2 Water Quality Parameters

3.1.2.1 Physio-Chemical Parameters

The recorded temperatures, pH-levels and dissolved oxygen within the site measured values that were recommended optimal levels for aquaculture. The average levels were recorded at the following:

- Temperature: 25.45 ± 0.18°C
- pH Levels: 7.08 ± 0.39
- Dissolved Oxygen Levels: 8.72 ± 0.71 mg/L.

Water temperatures for fish is extremely essential in controlling metabolism, oxygen consumption and feed conversion as well as the fish growth management. Higher pH-levels indicate heightened rates of photosynthesis which is a result of anaerobic respiration; which causes increased concentration of acidic carbon dioxide in the water. It is studied that; most fish species grow slowly and become more vulnerable to diseases when water pH-levels are **below 6.5 and above 11**. The feasibility study conducted resulted that there is no distress on the pH-levels along Lake Victoria and accommodates the idea for aquaculture.

Water clarity was also measured to be optimal which stood at 60.83 ± 17.44mg/L (Total Dissolved Solids: TDS) and 122.50 ± 19.17 µS/cm (Electrical Conductivity: EC). It was noted that the TDS was considerably higher that the respective minimum recommended margins which stand at **under 40mg/L**.

3.1.2.2 Nutrient Levels

Total Nitrogen (TN) and Total Phosphorus (TP) are necessary nutrients of an aquatic ecosystem's primary functionality. The feasibility survey report recorded TN values of **2.62mg/L to 2.92mg/L**, with an average value of **2.79 ± 0.15mg/L**. TP values ranged from **51.0 µg/L to 97.0 µg/L**, with an average value of **79.0 ± 0.02 µg/L**. This level is considered suitable as it falls within the recommended levels of **under 100 µg/L**.

COMBINED SUMMARY RESULTS FOR KEY PHYSIO-CHEMICAL PARAMETERS AT THE SITE

PARAMETER	Recorded Range	Recommended Range	Remarks
pH-Levels	6.4 – 7.4	6.5 – 9.0	Ideal Level
Temperature (°C)	25.2 – 25.7	20.0 – 30.0	Ideal Level
Dissolved Oxygen (mg/L)	7.6 – 9.7	≥ 5	Ideal Level
Conductivity (EC, µS/cm)	95 – 140	75 – 150	Ideal Level
TDS (mg/L)	40 – 90	< 40	Management Needed
Secchi (Transparency)	1.8 – 2.2	> 0.7	Ideal Level
Total Depth (m)	0.5 – 25.4	> 5	Ideal Level
Total Nitrogen (mg/L)	2.62 – 2.92	0.3 – 2.0 to 4.0	Ideal Level
Total Phosphorus (µg/L)	51.0 – 97.0	< 100	Ideal Level
Chlorophyll-a (Chl-a µg/L)	6.8 – 8.2	< 75	Ideal Level
TSS (mg/L)	1.5 – 2.0	< 10	Ideal Level
Fecal coliform (cfu/100mls)	2.0 – 24.0	≤ 100	Ideal Level

3.2 Social Acceptability

These are directly relevant to this project in order to create harmony between the project and the community around. This initiative is key to ensure the sustainable development of aquaculture at the site in the long term.

Communication, information and transparency has been used to establish and foster friendly dialogues amongst stakeholders and ensure social acceptability of the project. Acceptance and rejections of dialogues or plans were carefully analyzed and re-represented during local community meetings to attain approval levels. As aquaculture is still not known to many, efforts have been made to create robust quality image for aquaculture by investing in communication and educative

meetings to improve the community's understanding of the site selection and aquaculture processes and benefits to the surrounding environment.

3.2.1 Precautionary Guidelines

In the implementation of our social acceptability efforts within the surrounding community, we ensured that the following guidelines were met in order to smoothen the acceptability process as follows:

1. Precautionary guidelines were applied in decision making processes aquaculture site selection and management which fell within the frameworks of the ecosystem approach and in conjunction with other participative approaches. This allowed the team to take for decisions even though not all relevant scientific data were available and helped the feasibility team take a straightforward approach to the selection and management.
2. The precautionary actions also took into account all available forms of information; not limited to scientific and traditional knowledge, on an appropriate temporal and spatial scale. The better the decision-makers are informed, the more appropriate the site selection process can be planned in view of the risks that may be incurred.
3. Potential growth opportunities were also considered at the outset of the site management and selection process. This creates a long-term view of the project for the promoters in future development of the aquaculture farm and will enable the workforce team to overcome further foreseeable mismatches between activities and surrounding systems.

As part of the efforts in communicating, the promoters have invested approximately **Tanzanian Shillings Twenty-Four Million Five-Hundred Thousand (TZS 24,500,000.00)** in land compensation costs as well as social acceptability costs such which included meetings with local governments and community members, educative presentations that allowed the community to be at peace and provide support in the implementation of the aquaculture project.

3.3 Services and Utilities

3.3.1 Health Facilities

There is only one known dispensary in the area registered under the name of Buzegwe Dispensary. The dispensary has one building for outpatient services and another building dedicated for labor care. The most common ranked diseases in the area are malaria; followed by intestinal worms, diarrhea, urinary-tract infections, typhoid and amoeba. According to the locals, health services in the village area are constrained by the following factors:

1. Inadequate number of healthcare professionals;
2. Inadequate medication;

3. Lack of water and other supplies in the dispensary; and
4. Inadequate laboratory equipment for health testing.

3.3.2 Educational Facilities

There are two official primary schools in the area namely; Kirongo Primary School which has a record of 8 teachers and 775 pupils as well as Buzegwe Primary School which has 9 teachers and 893 pupils. The village area has only one government owned secondary school registered under the name of Cornel Magembe Secondary School.

3.3.3 Water Facilities

The dominant and only source of water in the Buzegwe village is from the lake. The water serves both the human settlements as well as the livestock around the area. However, it has been noted by the community health workers that majority of the families do not treat the water before consumption which does lead to diseases mentioned earlier in this chapter.

3.3.4 Transportation and Telecommunication Facilities

The Ukerewe district has tarmac as well as gravel roads. Being isolated as an island, Ukerewe is connected to the neighboring districts through water transportation. Currently, there are three ferries connecting the district, two from Mwanza and the other ferry through Kisorya which is in the Bunda district. Overall, the transportation infrastructure in the area is poor and requires work. The dominant means of transport in the village area are: motorcycles, bicycles and foot. Other forms of motor vehicles are very few.

The aquaculture site is covered by a range of mobile phone networks such as: Vodacom, TiGO, Halotel as well as Airtel. However, its stability can be questioned. Majority of the members of the village rely on radio networks for information instead of modern sources of information such as television; which are only owned by a handful of individuals.

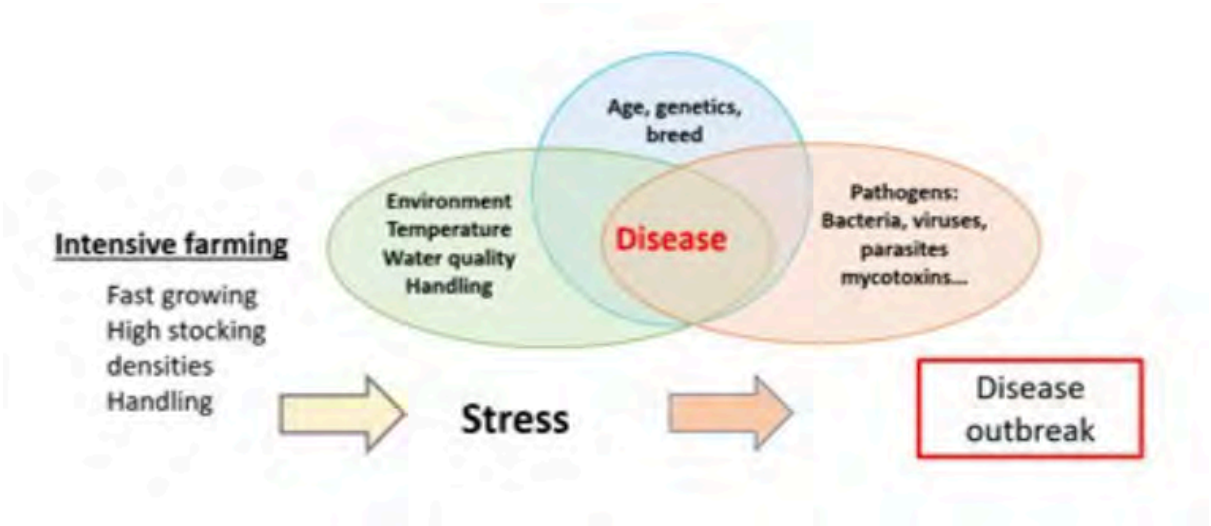
3.4 Tilapia Fish – The Product

3.4.1 What is Tilapia

The culture of Nile tilapia (*Oreochromis niloticus*) can be traced to ancient Egyptian times as depicted on bas-relief from an Egyptian tomb dating back over 4000 years, which showed the fish held in ornamental ponds. While significant worldwide distribution of tilapias, primarily *Oreochromis mossambicus*, occurred during the 1940s and 1950s, distribution of the more desirable Nile tilapia occurred during the 1960s up to the 1980s. Nile tilapia from Japan were introduced to Thailand in 1965, and from Thailand they were sent to the Philippines. Nile tilapia from Cote d'Ivoire were introduced to Brazil in 1971, and from Brazil they were sent to the United States in 1974. In 1978, Nile tilapia was introduced to China, which leads the world in tilapia production and consistently produced more than half of the global production in every year from 1992 to 2003.

The uncontrolled breeding of tilapia in ponds, which led to excessive recruitment, stunting and a low percentage of marketable-sized fish, dampened the initial enthusiasm for tilapia as a food fish. The development of hormonal sex-reversal techniques in the 1970s represented a major breakthrough that allowed male mono sex populations to be raised to uniform, marketable sizes. In addition, research on nutrition and culture systems, along with market development and processing advances, led to rapid expansion of the industry since the mid 1980s. Several species of tilapia are cultured commercially, but Nile tilapia is the predominant cultured species worldwide.

3.4.2 Diseases Common to Tilapia



Industrial production of tilapia favors the presence of various predisposing factors that lead to disease outbreaks, particularly those related to stress. Membi Fisheries Limited understand that these factors can be environmental-related, animal or to the pathogen and impairs the functioning of the fishes' immune system, a situation used by microorganisms present in the environment or the animal to cause a disease outbreak. In some cases, paying attention to environmental conditions, such as temperature, or the production stage in which diseases appear can help in reaching a diagnosis.

3.4.2.1 Tilapia Lake Disease Virus (TiLVD)

Figure 1 (left). Nile tilapia (Oreochromis niloticus) field outbreak confirming of TiLV infection with clinical signs of corneal opacity and skin erosion. Figure 2 (upper right). Red hybrid tilapia (Oreochromis spp.) field outbreak sample associated with TiLV infection showing skin redness, erosion, hemorrhage, and exophthalmos. Figure 3 (bottom right). Red hybrid tilapia (Oreochromis spp.) laboratory challenge with Tilapia Lake Virus (TiLV) showing clinical signs of skin hemorrhage, exophthalmos, and abdominal swelling. Photos courtesy of Dr. Surachetpong [6], who gave permission to use them and their descriptions.

This disease was first described in Israel in 2009 and is caused by a virus of the Orthomyxoviridae that is already present in several parts of the world.

It usually affects tilapias during the first production stages. The most common sign, apart from **acute mortality** that can affect up to 90 percent of the tilapias, is **skin discoloration** that starts in **the tip of tail and fins.**

Eye lesions (cataracts, exophthalmia) and loss of the ocular function can be observed in affected animals, as well as dermal erosions and multifocal ulcers, necrotic areas in the liver and hemorrhages in the brain.

Diagnosis should be based on observation of clinical signs and RT-qPCR in affected liver, brain, spleen and/or kidneys. If the PCR is positive, histopathology or isolation of the virus in a cell culture will confirm the diagnosis.

3.4.2.2 Infection Spleen and Kidney Necrosis Virus

According to FAO's report, this is an emerging disease caused by a megalocytivirus (DNA virus) that mainly affects fries and fingerlings. Despite it was described in the 90s, it was not until 2016 when it was isolated in the Middle East, the United States, Thailand, among other countries.

It produces notorious signs such as **ascites**, exophthalmia, lethargy and erratic swimming, apart from gill paleness and tail necrosis (rottenness). Mortality can affect all stages and be above 50%. Diagnosis is be based on clinical signs and viral identification with PCR or isothermal amplification (LAMP) in the affected tissues.

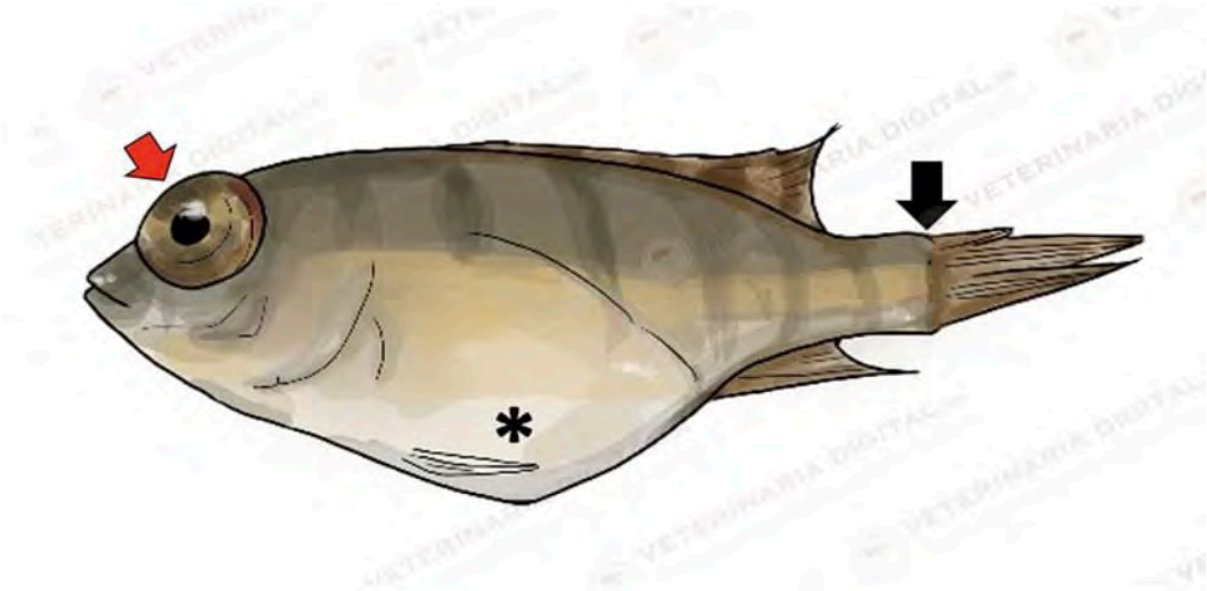


Figure 5. *Nile tilapia juvenile with exophthalmia (red arrow), ascites (asterisk) and loss of scares, excel of mucus and hemorrhages (black arrow).*

3.4.2.3 Bacterial – Streptococcus SPP

It is one of the bigger threats for tilapia production that produces a **granulomatous septicaemia.** The main species involved are *S. agalactiae, S. iniae* and *S. dysgalactiae*; which are usually present in the environment and take advantage of predisposing factors to cause disease.They can affect tilapias **during all the cycle**, though it has been reported that, outbreaks typically appear during the latter stages in tilapias vaccinated during early in the production cycle.

The most characteristic signs are **granulomatous lesions in the internal organs**. Other signs include eye problems, such as exophthalmia, skin hemorrhages, ascites, meningoencephalitis, pericarditis, skin darkening and erratic or circular swimming. Mortality can be up to 75 percent.

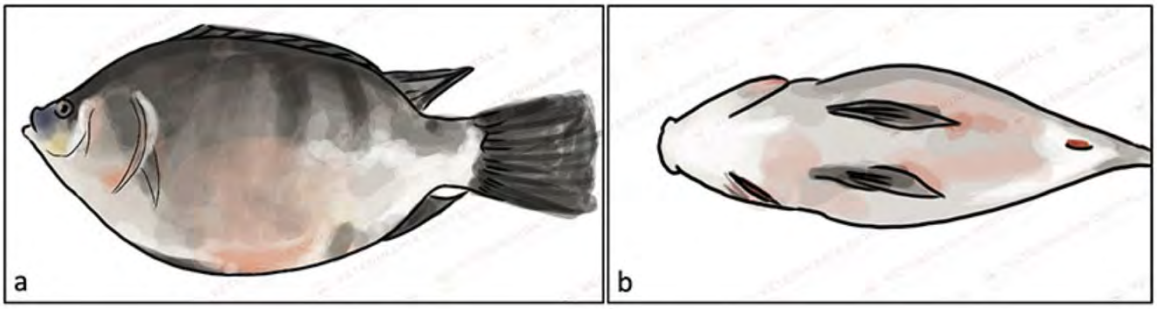


Figure 7. *Macroscopic lesions caused by Streptococcus sp. in tilapia: (a) skin hemorrhage; (b) abdominal and anal hemorrhages.*

Diagnosis is usually based on the identification of the pathogen with microscopy or PCR in samples of affected tissues. It is a zoonosis that can affect manipulators by infecting the wounds in their hands.

3.4.2.4 Bacterial – Francisella SPP

This disease caused by *Francisella noatunensis* supesp. *orientalis* can affect tilapias during all the productive cycle, despite it is more frequent in the **initial stages** and is particularly related to **cold stress** (20-25°C). The **temperature is the differential factor** for the granulomatous lesions caused by *Edwarsiella*.

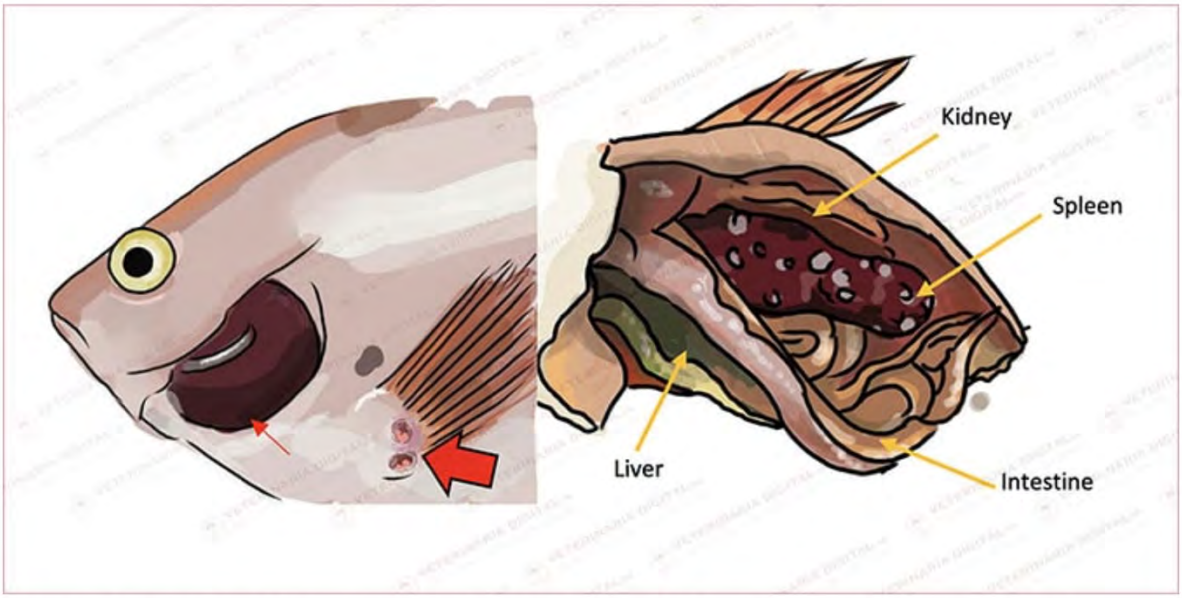
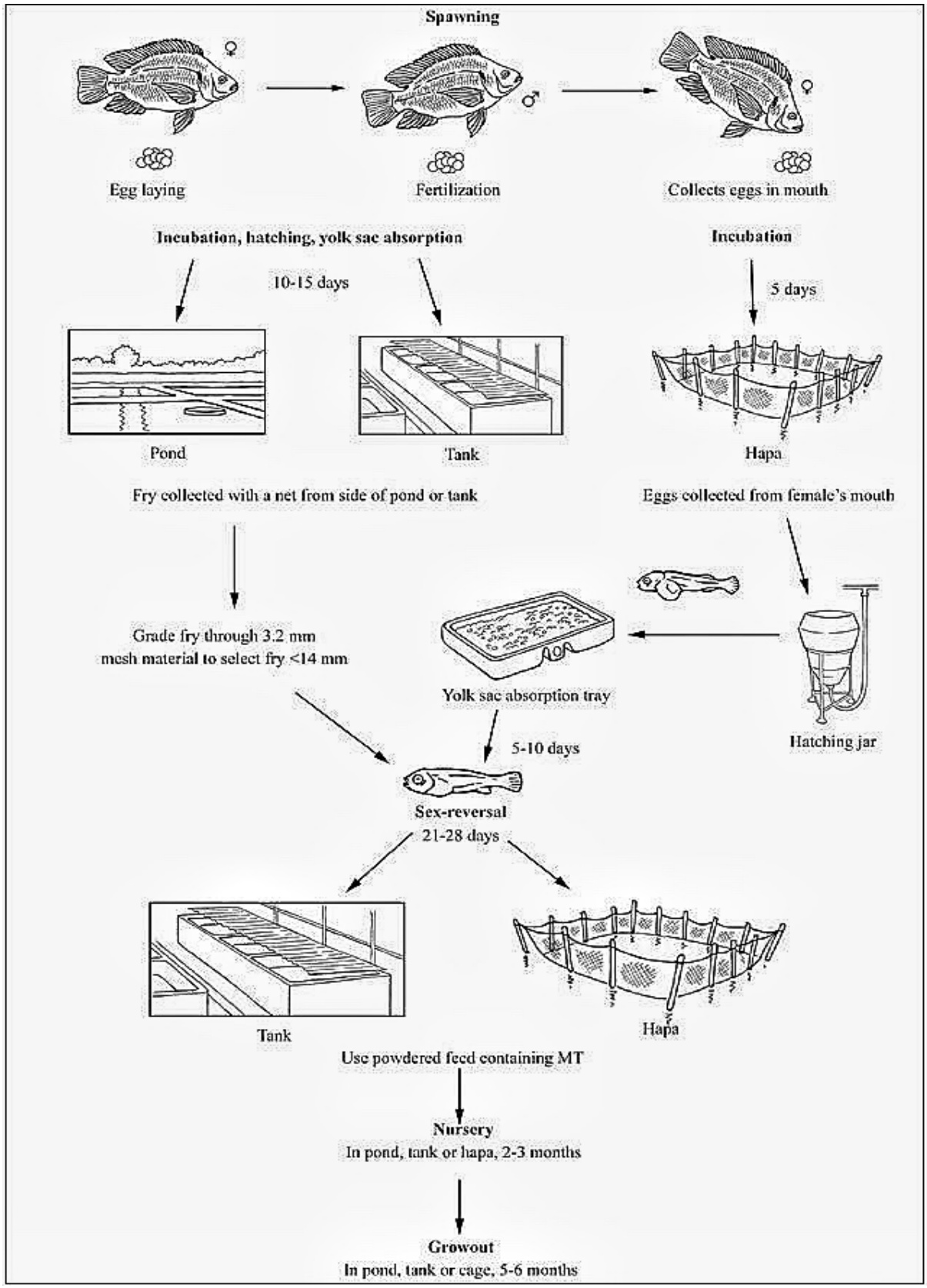


Figure 8. *Illustration of the macroscopic lesions observed in tilapias affected by Francisella and Edwarsiella: skin erosions (big red arrow) and gill infarction (small red arrow); splenomegaly with multiple white nodules.*

The most characteristic lesions are **granulomas in the gills, spleen, and kidneys.** Affected tilapia are lethargic, show erratic swimming, anorexia, and even fusion of the gill laminae. Mortality be up to 40-50 percent.

For the final diagnosis, the microorganisms can be isolated from samples of affected tissues.

4 PRODUCTION PLAN



4.1 Brief of the Production Plan

Set number of brooders is determined by the quantity of fry produced per annum. A set of brood stock (i.e.: 1 male:3 female) is capable of producing a minimum of 7,500 fry per year. The production plans for Membi Fisheries Limited is to produce **twenty-four million (24,000,000) fry** per year. In this production plan, the required sets for the production of the abovementioned target is 3,200 males to 9,600 females.

1year = 30 Cycle
1Cycle= 10-12days
To cover a full month, we need 3 cycle=36 days
1 month = 36 days = 3 cycle
1set= 7,500fry per 30 cycle
1 set= 250-300 Fry per cycle

4.1.1 Brood Stock Supply

Brood stock, or in other words; brood fish are a group of mature fish used in aquaculture specifically for breeding purposes. Brood stock can be a population of animals maintained in captivity as a source of replacement for, or enhancement of, seed and fry numbers.

Tilapia are asynchronous breeders. As a result, Til-Aqua; the supplier will not use hormones will not be used to induce spawning, which occurs throughout the year in the tropics. Temperature change is expected in the first days after hatching which will be used to change sex from male to female.

The end product of the YY-technology is a complete normal male with normal XY-chromosomes. This is in contrast with the hormone sex-reversed tilapia where fifty percent of the phenotypically males are still generically female with XX-chromosomes. The use of YY-technology is seen to be a common and new technology practiced in Mexico and Ghana especially in restocking programs and some small scale and basic aquaculture operations. However, the culture of mono sex progeny, preferably males in tilapia species grow faster to a larger size compared to the female tilapia. This

is the most effective solution to the widespread problem of early sexual maturation and uncontrolled reproduction in tilapia farming.

The YY-technology which will be used in this modern aquaculture project by Membi Fisheries Limited has the potential to address issues whereas providing other benefits for the environment, the industry (including fisheries and aquaculture) and their ever more demanding domestic and international markets in search for sustainable sources of high-quality tilapia fish.

4.1.1.1 Brood Stock Management

Brood stocks will be grown up to 150g with normal feed per recommended protein level depending on their age and weight, in attainment of the 150g. The pairing of the tilapia will follow the principle of 1:2:3. In managing the brood stock, the production process will use special feeds which will enhance the quality of eggs produced.

In order to prevent any external threats, the brood stock will be secured with a predator net which will prevent marine life capable of harming the brood stock; or marine life who are carriers of various diseases which would affect productivity output.

4.1.1.2 The Incubation System

The capacity of the incubation system will be positioned proportionally with the capacity of the fry produced in the hatchery. This will allow the production team to have clear insights to determine the numbers of jars supposed to be in production plan. Additionally, the following will be considered in the incubation system:

1. Hatching Jar: The production team will take clear consideration on the quality and the capacity of the hatching jar which will hold different number of eggs depending on the liters of water that the jar can hold. For example: the McDonald Jar is capable of holding between 20,000 – 60,000 eggs per cycle whereas the eco-aquaculture jar is capable of holding twice the number of eggs at 120,000. This project will utilize the McDonald Jar which would accommodate four ponds (one cluster).
2. The incubation system will have a pre-installed filtration and ultraviolet system for disinfecting the system from any harmful bacteria; thereby reducing the risks of early development related diseases which have been discussed in this report.

4.1.2 Production of Fingerlings

It is our intention to produce fingerlings for our own consumption, as well as to sell them as seeds to other farmers for commercial purposes. In order to meet our own needs, we plan to produce fingerlings in sufficient quantity to cover our own consumption. Additionally, by selling the fingerlings as seeds, we can provide a valuable service to other farmers by helping them to establish their own fish farms with our fingerlings. Since we will be using YY-technology in our production process, we can reasonably assure that 99.9% of our fingerlings will be males.

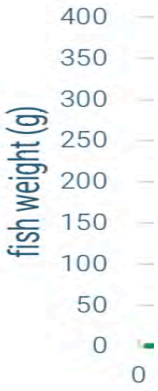
During the nursing period, all of the fingerlings will be given proper nutrition and care so as to attain a weight of 5-10grams in order to be consumed for our internal consumption after 8 weeks of nursing.

As part of our project, we will build and install a modern hatchery for the production of fingerlings. This hatchery will allow us to produce fingerlings in a controlled environment, which will help to ensure a consistent quality and quantity of fingerlings. The hatchery will also reduce the risk of disease and reduce the amount of time and energy required to produce fingerlings. It is anticipated that our hatchery will be able to produce 2 million fingerlings per month once it is fully operational. We plan to consume 42.5% of our fingerlings for our own consumption and sell 57.5% of our fingerlings for use as seed for other farmers. There will be brood stock ponds nearby the hatchery where broods will be reared. It is for this reason that we do this in order to maintain the seed at any given point in time. The brood stock we use in our fish production are all natural Nile tilapia fish.

This helps to ensure the sustainability of the seed stock and to maintain the quality of the fish being produced. By keeping a brood stock of natural Nile tilapia, we can ensure that the fish being produced are of the highest quality and nutritiously rich for the supply to the local community members.

4.1.3 Stocking and Feeds Management

Tilapia
East Africa
cage



Production data	
Number of stocked fish	53,694
Fish size at stocking in g	0.30
Fish size at harvest in g	350

Value data	$
purchase price ($/kg fish)	0
sales price ($/kg fish)	2
Cycle production days	153

Performance

Product	Pellet size (mm)	Protein (%)
ALLER PARVO EX GR	0 gr	44
ALLER PARVO EX GR	1 gr	44
ALLER PARVO EX GR	2 gr	44
ALLER PARVO EX GR	2 gr	44
ALLER PARVO EX GR	3 gr	44
ALLER TIL-PRO	2	40
ALLER TIL-PRO	2	40
ALLER TIL-PRO CAGE	3	36
ALLER TIL-PRO CAGE	3	36
ALLER TIL-PRO CAGE	4	34

Fish production (t netto)	
Fish production (t brutto)	
total feed costs ($/kg fish harvest)	
Cycle production value ($)	
Cycle feed costs ($)	
Cycle operational margin ($)	
Contribution margin ($/kg fish)	
Contribution margin ($/kg feed)	

4.1.4 Feeds, Sampling and Harvesting

4.1.4.1 Feeds

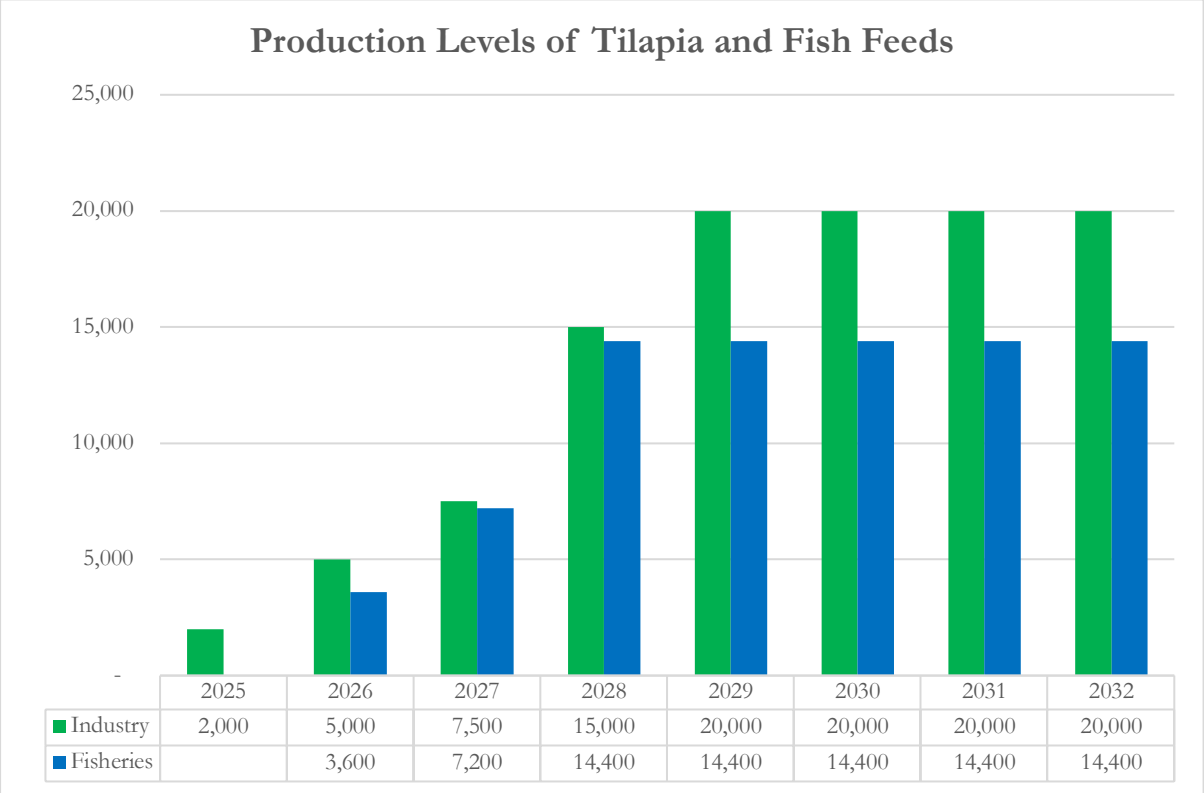
A critical component of cage culture is ensuring that high-quality feed is provided in the correct quantities to the caged fish. The feed must be nutritionally complete, supplying essential vitamins and minerals. It will be sourced from Zambia in pellet form, designed to float for approximately 24 hours, allowing twice-daily feedings. Floating feed enables close monitoring of the fish's feeding response and is effectively contained within a feeding ring.

Daily weighing of feed quantities is essential to ensure accuracy. Feeding rate schedules or programs will be implemented to make periodic adjustments to the daily feed portions. Adjustments may be made on a daily, weekly, or biweekly basis. According to this projection, each fish is estimated to consume 337 grams of feed until harvest.

4.1.4.2 Sampling and Harvesting

Fish will be raised in cages for five months before harvest, achieving a target weight of 400 grams. Once this weight is attained, the fish will be sold to the market. During the harvesting process, cages will be partially lifted from the water, and fish will be captured using a dip net.

4.2 Overall Production Levels of Tilapia and Fish Feeds



	2025	2026	2027	2028	2029	2030	2031	2032
Industry	2,000	5,000	7,500	15,000	20,000	20,000	20,000	20,000
Fisheries		3,600	7,200	14,400	14,400	14,400	14,400	14,400

5 QUALITY MANAGEMENT

5.1 Introduction

The aquaculture facility will adopt a resilient quality assurance system necessary to provide adequate confidence that the tilapia fish produce will satisfy the requirement for quality which has been ordained in accordance with the conditions set out in the sale agreement between Membi Fisheries Limited and Alphakrust Limited. Quality Management will consist of the operational techniques and activities that are used to fulfill the prerequisites.

It is under the directives of the Chief Operating Officer to manage the quality assurance function whose responsibility is to establish policies, adapting programs to meet established goals and provide confidence to the production function that quality control procedures are being consistently applied.

5.2 Stages of the Quality Control Management System

Membi Fisheries Limited is determined to ensure that the tilapia produce is delivered in the best quality output as per the requirement signed in the sale agreement with Alphakrust Limited. The quality control stages that will be administered by the respective departments shall be as follows:

5.2.1 Identification of Tilapia Specifications

The tilapia specification is included into the sale agreement covered which details the quality factors that the tilapia should possess. The tilapia to be supplied to Alphakrust Limited will not undergo any form of processing, however stored in a cold room to ensure freshness is maintained.

The major specification of the tilapia supply will be focused on the table size of the fish; ranging between 250g and 400g per fish.

5.2.2 Process Specifications

During the design phase of the process specification aspect of the quality control management, the respective team will ensure that the minimum standards for process specifications will undertake the following headers.

5.2.2.1 Timing

Not all the processes in the operations will be described for disclosure. Only important aspects of the product specification will be disclosed. Because fish is so perishable, it is will be of paramount importance to transfer all harvested fish into the cold storage room; as soon as possible, thereby engaging systematic checks on the fish. The rate of spoilage of wet fish is known; thus, it is possible to specify a maximum allowable time in order to keep spoilage to a minimum level.

5.2.2.2 Temperature

Wet fish will be held as much as possible to a 0ºc temperature throughout its handling, process and distribution in order to minimize any risks of spoilage. During the operational structuring, where the temperature of 0ºc may not be maintained, then a maximum permissible amount will be given and accordingly maintained by the handling team.

5.2.2.3 Contamination

Because tilapia can be contaminated in various ways during handling and storage; for example, by dirty, scales, bones, blood, water, lubricating oil, unpleasant odors and flavors or even hair. The process will include details on the main methods that avoids contaminants coming into contact with the tilapia harvest.

5.2.2.4 Damage and Deterioration

A wide range of protective measures against damage or deterioration will come under this section where damage control protocols will relate to instances to prevent the harvested tilapia being trodden on, knocked, bruised, pierced with hooks or sharp objects, bent while stiff in rigor, or squished. Protection against freezer burns will also be included in this area of the report which may also outline humidity levels.

5.2.2.5 Hygiene and Sanitation

Fish is food, and must be handled hygienically. Hygiene will be addressed as part of quality control protocols; which will include cleaning and sanitation procedures.

5.2.3 Operational Checks

The operational checks are a critical component of quality control that will deal with the audit of critical points at which operations and production should be checked on a continuous basis. This will also be independently reported by the internal audit function who will have their own criteria for conducting not only financial audits, but operational as well as compliance audits to internal as well as external requirements.

In the case of having operational checks, there will be two forms of operations – the work of the operatives as well as the settings on various equipment. Instructions about how to make operational checks will be prescribed by the internal audit function and the independent units that will arrange for such checks. Internal personnel who will conduct these checks will be supervisors as well as quality control officers.

5.2.4 Inspection of Harvested Tilapia

Methods of inspection of harvested tilapia are of two main types, sensory tests and instrumental tests. The first type employs human senses of sight, smell and touch; whereas the second employs instruments like thermometers and chemical apparatus which are largely dependent on human responses. Generally, the common use of testing in a large industry such as this one is the sensory methods. The inspection process of tilapia is usually focused on delivering the confirmation of the following sets of outcomes:

5.2.4.1 Freshness

This is the most important quality factor to the consumer; thus, this assessment is vital in quality control management. Freshness means how much of the tilapia has been spoiled when held in a wet state; when applied into cold storage.

In general, the sensory methods of assessing freshness is the best at present for quality control management purposes. As fish spoils, its smell, taste and appearance and feel go through characteristic and well-defined stages that our experts will consistently recognize.

5.2.4.2 Condition and Texture

The assessment of condition and texture of tilapia fish includes factors such as plumpness, thinness, toughness, softness, oiliness, wateriness and the presence of roe or milt. Most of these can only be assessed subjectively, and this is all that is necessary.

5.2.4.3 Off Odours and Flavours

Fish with strong objectionable odors will be detected and discarded immediately. Badly stored fish in particular is usually susceptible to two kinds of odor and flavor; these are the so-called cold storage odor or flavor of white fish, and rancidity in fatty fish. Sensory scoring systems are available and may be specified for the assessment of these and similar defects.

5.2.5 Recording, Reporting and Action-Plans

Decisions taken as a result of quality control can be important and occasionally may be vital; it is therefore important to keep adequate records. These might include completed check lists, tables of measurements and results, record charts and control charts; ideally they should be in an agreed standard form. What is recorded and in what form will depend on particular requirements, and it may be necessary to take statistical advice. The quality control team and its records are means not ends, and should only be sufficient to meet clearly defined purposes; records will not proliferate, and they will be sent quickly in understandable form to those who will make the decisions.

The person responsible for taking action on quality control findings varies between companies, depending on their management organization and attitudes. Sometimes the quality controller is allowed to take some decisions himself; sometimes it is his responsibility to report to line management, for example the farm manager, so that decisions can be made. The decision may be to take action or to take no action; for example it may be decided to discontinue buying raw material that does not meet the specification, or to correct a faulty process, or not to dispatch faulty products to Alphakrust Limited.

Since the aims of quality control management and production staff sometimes conflict, it may be expedient to allow the quality control team to report to a higher level than the production staff, to ensure that the best decision is made.

Whatever arrangements are decided for reporting and action, they should be laid down in advance, clearly understood, and agreed by all concerned including top management. Otherwise the effort put into quality control is wasted and staff are frustrated. The efficient use of this management tool depends upon good liaison between the quality control management and other staff.

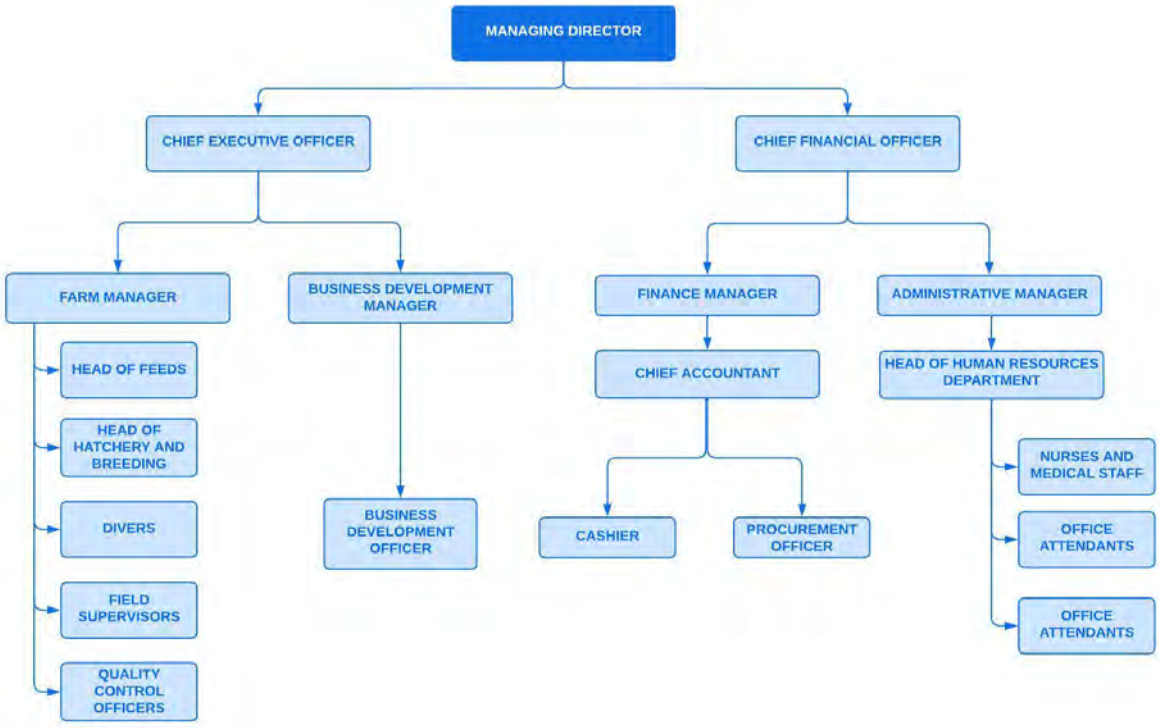
6 OPERATIONS AND MANAGEMENT PLAN

6.1 Organisational Structure

Membi Fisheries Limited understands that the success of this project will depend on the quality and competence of the management and the workforce. Therefore, the board of directors will systematically direct and work closely with the value generating units to ensure that the strategic objective is implemented as agreed from a technical and commercial sense. The day-to-day operations of the aquaculture site will fall under the farm manager. The directors will recruit and appoint a well-qualified and experienced farm manager with extensive experience in the technical and quality management aspects of the aquaculture site. The farm manager will be supported by various managers across the feeding unit, cage, hatchery and breeding as well as quality control management. The organizational chart below shows the proposed structure in which the company will operate.

Due to the nature of the project, the farm will require large and several stores and warehouses. An independent unit under the farm general manager will be included in the organization to deal with storage of the tilapia before distribution. An independent group of internal auditors will also be appointed by the board. The internal audit team will functionally report to the board and administratively report to the Chief Financial Officer.

The following page shows the proposed organizational chart for Membi Fisheries Limited:



6.2 Staffing Plan

Based on the proposed organizational structure above, it is estimated that there will be a total of 100 staff members reaching the maximum production levels of the forecasted period. During the construction period, an expected of between 30 and 35 staff will be hired to set processes and systems accordingly and prepare for production. The below table shows the proposed staffing plan over the forecast period:

DEPARTMENT	SECTION	Y1	Y2	Y3	Y4	Y5	Y6
C-SUITE LEVEL	Chief Executive Officer	1	1	1	1	1	1
	Chief Financial Officer	1	1	1	1	1	1
	Chief Operations Officer	1	1	1	1	1	1
MANEGERIAL LEVEL	Farm Manager	1	1	1	1	1	1
	Business Development Manager	1	1	1	1	1	1
	Finance Manager	1	1	1	1	1	1
	Administrative Manager	1	1	1	1	1	1
OPERATIONAL LEVEL	Divers	4	8	16	16	16	16
	Head of Feeds	1	1	1	1	1	1
	Head of Hatchery and Breeding	1	1	1	1	1	1
	Quality Control Officer						
	Field Supervisors	5	10	20	20	20	20
	Business Development Officer	1	2	4	4	4	4
	Accountant	2	2	4	4	4	4
	Cashier	1	2	4	4	4	4
	Procurement Officer	1	1	2	2	2	2
	Information Systems Officer	1	1	2	2	2	2
	Human Resource	2	2	3	3	3	3
TACTICAL LEVEL	Feeds Assistants	2	4	8	8	8	8
	Plumbing and Electrical Technician	2	4	8	8	8	8
	Stores and Inventory Officer	2	2	4	4	4	4
	Office Attendants and PAs	3	3	3	3	3	3
	Drivers	4	6	8	8	8	8
	Nurse and Medical Assistant	2	2	4	4	4	4
	Receptionist	1	1	1	1	1	1
TOTAL STAFF MEMBERS FROM Y1 TO Y6		**42**	**59**	**100**	**100**	**100**	**100**

6.3 Staff Remuneration

The company proposes four levels of hierarchy as per the staffing plan. Each level will their own salary and benefit structures as well as increment pays of approximately 5 percent to 10 percent based on performance. This also means that a staff will be required to hold their position and deliver results required for a minimum of five years before they are selected for a promotion. Higher achievers may be promoted through a fast-track or annual rewards given to compensate them for their efforts. The approximate basic pay band is shown in the table below.

In addition to the basic salary payments, the company will also contribute a 10 percent of the staff's salary to their employee's social contributions and pay any annual leave equivalent to one month's salary. Salaries will be paid in equivalent to Tanzanian Shillings (TZS). Details of the staffing payments are shown in the financial projection breakdown of this business plan report.

	Workforce Level	USD ($)
1	C-Suite Level: CEO	10,000.00
2	C – Suite Level: CFO and COO	7,500.00
3	Managerial Level	2,000.00
4	Operational Level	300.00 – 800.00
5	Tactical Level	300.00 – 400.00

In addition to the permanent employees that will be hired at different levels of the company, the aquaculture operations will also require to employ temporary basis of casual labor during busy seasons especially in the farm management section which is headed by the farm manager. It is estimated that a proportion of 10 percent of the permanent workforce would be additionally accounted for as temporary workforce.

6.4 Human Capital Policy Briefing

Membi Fisheries Limited takes care to ensure that the company's workforce is diligent and is compensated well in order to provide excellent services and outputs. Whilst a detailed company policy has not been prepared at this stage of the project, the directors of the company are driven to ensure that the policies revolve around the following principles:

6.4.1 Remuneration Policy

The current remuneration of the workforce in the agriculture sector in Tanzania is very low and non-competitive with other sectors. To ensure that Membi Fisheries Limited addresses this problem of adequacy compensation, the company will adopt and implement effective motivational and encouraging pay structures for the workforce. Adequate salaries and other staff benefits will be provided to the workforce based on their hierarchy and on a non-discriminatory and inclusive basis. The directors believe that this will be a key component in retaining and motivating staff to carry out their roles and responsibilities diligently.

6.4.2 Recruitment Policy

The recruitment policy process will be fair and transparent which priority given to the local Tanzanian communities. Top level management will be recruited on the basis of their qualifications, competence as well as experience; whilst the jobs that do not require specific skills (i.e.: non-skilled laborers) will be filled with a large number of individuals from surrounding communities to boost income streams.

6.4.3 Capacity Building

The recruitment plan is to recruit competent and skilled staff as well as maintain their capacities against change in technologies, new customer servicing techniques, regulatory frameworks, accounting and tax structures as well as the general business environment. This project will endeavor to ensure that the workforce at all levels is provided with the necessary skills and training to maintain high quality outputs in the long term as well as short term facets of achieving organizational goals.

7 IMPLEMENTATION PLAN

7.1 Time Schedules

The initial project plan in Table 8.1 will take about six months before the initial process of tilapia production. The critical factors to the project will be the completion of the detailed drawings and engineering specifications (which have been submitted with this business plan), securing funds and the commencement of the construction phase. The implementation plan is designed in a way that the first produce harvest will be falling in the year 2024. The calendar months to be determined when the funds have been secured.

WORKPLAN CHART		YEAR 1				YEAR 2			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.0	**LAND DEVELOPMENT**								
1.1	Clearance and leveling								
1.2	Digging and Excavation								
2.0	**CONSTRUCTION PHASE**								
2.1	Building of Hatchery								
2.2	Building of Brood stock ponds								
2.3	Fencing the facility								
2.4	Building of warehouses								
2.5	Building of accommodation								
2.6	Other buildings								
2.7	Assembling of cages and floating houses								
2.8	Workshops and warehouses								
2.9	Installation of CCTV & LAN								
3.0	**PROCUREMENT OF ASSETS**								
3.1	Cages, nets, mooring materials & floating houses								
3.2	Aquaculture Cages								
3.3	Fry feeds								
3.4	Equipment and furniture								
3.5	All feed types for fish								
3.6	Motor Vehicles								
3.7	Hatchery Equipment								
4.0	**PROJECT MANAGEMENT**								
4.1	Recruiting employees								
4.2	Training and supervision								
4.3	Commencement of Production								
4.4	Grow-out phase								
4.5	Spawning and nursing new fingerlings								
4.6	Stocking fingerlings for grow-out								
4.7	Harvesting and selling								

7.2 Risk Analysis

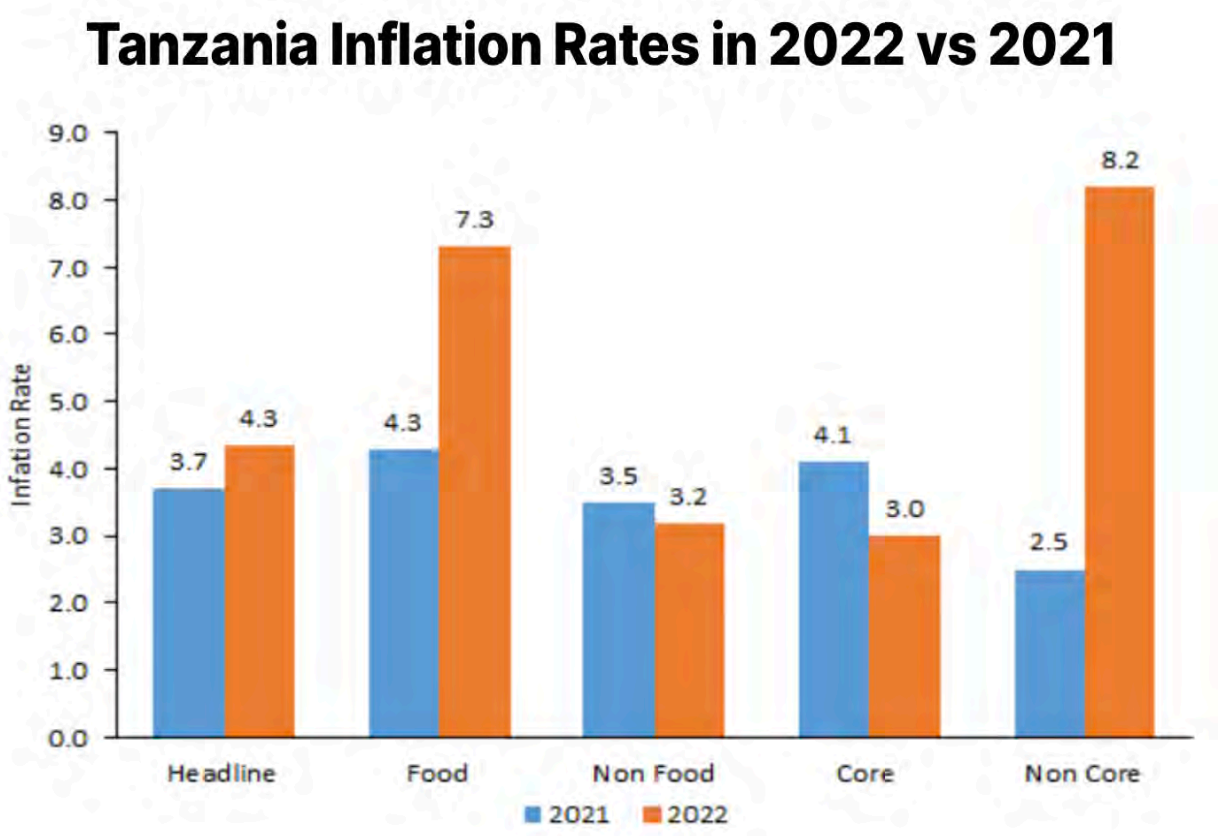
There are several risks the aquaculture project that are known due to the nature of the industry. However, in the following paragraphs the most important risk factors are highlighted, which the Membi Fisheries Limited are aware and necessary precautions to reduce are taken into account during project management and operational plan.

7.2.1 Inflation Risks

In the first four three of 2023, Tanzania's annual headline inflation rate was 4.9 percent in January, 4.8 percent in February, and 4.7 percent in March. Inflation in Mainland Tanzania eased for the third month in a row to 4.3 percent in April 2023, remaining below the target of 5.4 percent for 2022-2023. In Zanzibar, inflation rose to 7.5 percent in April 2023 from 7.1 percent in March 2023, remaining above the medium-term target of 5 percent, largely due to an increase in the prices of food.

In 2022 (January to December) the average annual headline inflation in Tanzania was 4.3 percent. In 2021 it was 3.7 percent and 3.3 percent in 2020. However, the trend is clearly upward, with annual inflation reaching a five-years in October 2022 at a rate of 4.9 percent and slightly going down only in December 2022 at 4.8 percent. Still, it remains within the target range of 3.0 percent – 5.0 percent, over the medium term included in the Tanzania Five-Year Development Plan

(FYDP III). It also falls below the EAC inflation target of 8 percent and the SADC region which ranges between 3 percent and 7 percent



7.2.2 FOREX Rate Risks

Significant amount of capital expenditure required for setting the modern aquaculture set up would be imported; therefore, the project is exposed to a moderate exchange rate risk in Tanzania. Tanzanian shilling depreciation against other major currencies may impact the investment and in debt financing of the project. The current exchange rate is about TZS 2,430 per 1 USD. Given that Tanzanian inflation is consistently higher than USD inflation, then it is expected that Tanzanian shilling will continue to depreciate against USD. The expected devaluations have been reflected in projections for this business plan.

Below is a graphical representation of the FOREX rate movements between the USD and TZS rates from the FYs 2019 to 2023.

7.3 Risk Evaluation

The table 8.3 below shows a brief analysis of the risk evaluation as a calculated risk factor (score). Each risk element has been assigned magnitude and its potential impact on the project should the potential risk mature. The impact is assessed in terms of the probability of the occurrence and its weight is assigned in relation to the significance of the risk to the aquaculture project. The final result of this risk score is used to discount the project's cash flows to determine its lucrativeness. Given the assessments and assumptions carried out by the technical team, the risk level of this project is considered at **10.25 percent**. Considering the risk level, the magnitude of the project and the management team; the risk score is considered acceptable within the current operating environment.

TABLE 7.3: RISK FACTOR FOR THE AQUACULTURE SETUP

Risk Element	Impact	Probability	Risk Weight	Risk Factor Score
Inflation Risk	50%	0.3	0.2	**3.00%**
Foreign Exchange Risks	35%	0.5	0.1	**1.75%**
Political Risks	50%	0.1	0.2	**1.00%**
Market Risks	50%	0.1	0.3	**1.50%**
Project Delays	50%	0.2	0.3	**3.00%**
Projected Risk Levels				**10.25%**

8 FINANCIAL INFORMATION

8.1 Introduction

This section presents financial plan, results of the financial analysis and future projections for the business plan. The main objective of the financial analysis is to examine both commercial profitability and economic viability of the proposed project. In other words, it examines whether the proposed investment would be able to generate adequate returns relative to its investment costs to cover operational and financial costs and undertake further investments.

The section begins by introducing the methodology, the basic assumptions of the model and the financing plan, which is followed by a descriptive analysis of the value drivers that determine project profitability. A summary of profitability analysis based on the projected financial statements is presented, followed by an economic viability assessment. Finally, the resulting financial projections are provided thereon.

8.2 Financial Projections

8.2.1 Methodology

In preparing the financial forecasts, a value driver methodology has been used, which is also consistent with modern corporate financial theories. This methodology is a powerful tool for analyzing the financial feasibility and economic viability of investment projects. Under this approach, the shareholders' value in terms of the expected free cash flow is evaluated based on three generic key value drivers of business: growth, returns and risks. In turn, these generic value drivers are analyzed to identify specific value drivers of particular business, taking into account the prevailing economic situation, its industry structure and the regulatory environment.

The shareholders' value analysis uses the Discounted Cash Flow (DCF) methodology. Under this methodology, the projected free cash flows, which depend on business value drivers, are discounted at a rate that reflects the level of risks associated with the investment (the cost of capital). The final value, which is also known as Net Present Value (NPV), is a robust yardstick for project's economic viability. A positive NPV means that the project is economically viable. In order to supplement the NPV criterion for evaluating projects viability, the Internal Rate of Return (IRR) and the Profitability Index (PI) are normally used.

The IRR is used to benchmark result of a project against management's minimum required rate of return (hurdle rate). A project considered economically viable if its IRR is greater than the cost of capital, which is the discount rate applied on the projected free cash flows. The PI measures the rate at which expected future cash flows will exceed the initial capital investment. A project is considered to be economically viable if the PI index is greater than one. The value driver methodology has been used in analyzing the financial feasibility of the proposed project.

8.2.2 Financial Modelling

The financial model is a powerful tool for assessing the management's market and operational assumptions and for understanding how different business decisions may impact the project's performance. Therefore, based on investors' business assumptions, the financial model has been used to map out the cause-effect relationships of value drivers and present them in the projected set of financial statements and performance measures, which are Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI) and Payback Period (PBP).

In this analysis, the financial model was built over 6-year duration. The period of 6-year is inclusive of the development plan as shown in this report. Being a long-term investment a projection period of 10 – 15 years would be more appropriate. However, a 6-year period has been chosen to demonstrate to the project evaluators that under the long-term plan that the project is viable and potential for higher returns. The 6-year period covers the construction period (in year 1) and the production period (part of year 1 and the remaining 5 years). All financial values presented are denominated in the local currency (TZS).

8.2.3 Basic Assumptions in the Financial Information

Financial modelling of future business operations depends on a number of key assumptions. There are some underlying macro level assumptions, such as inflation, taxation and exchange rates, which are beyond the control of the management. Further, there are also some basic assumptions, which depend on management capacity to prepare and implement business policies and strategies. Below is a brief description of the major assumptions used in this financial model.

- Real GDP growth – throughout the projected period, it is assumed a constant minimum gross domestic product (GDP) rate of 5.1 percent per annum. The aquaculture sector growth rate is also assumed to grow around 5.1 percent per annum.
- Inflation - the inflation is expected to be around 5.4 percent per annum for the local currency (TZS) and around 3.0 percent for the foreign currency (USD) over the duration of projection period i.e., 6 years. However, the projections were made on constant prices exclusive of inflation rates.
- Taxation – It is assumed that the corporate tax rate of 30% to prevail throughout the projection period
- Exchange Rates - the prevailing inflation rate differential between Tanzanian Shilling (TZS) and USD is assumed to be the best proxy for the future exchange rates determination. In this regard, the base period (2023) exchange rate is assumed to be TZS 2,430 to a US dollar and the future exchange rates are determined by the difference in inflation rates of TZS to USD.

- Depreciation - The depreciation charges have also been built in the financial model. These charges are used to accumulate surplus reserves from internal cash flows, which could be used for future replacement of various assets.
- Discounting Rate – The weighted average cost of capital in TZS was assumed at 22 percent based on constant prices i.e., no inflation used on projections. The rate of 22 percent has been used to factor into account various unforeseen challenges that may occur such as volatility in operational costs, market fluctuations as well as the generic industry risk of managing biological inventory (tilapia fish).

8.3 Source of Funds

Membi Fisheries Limited intends to fund this capital requirement through a combination of equity and a long-term loan from financial institutions. The total funding for the project is estimated at **TZS 33 billion (approximately $12 million)**, with a 15-year repayment plan. The interest rate is capped at low of 4 percent per annum which makes the source of funding very cost effective for a strategic development project.

Although the project has the potential to repay the loan within eight years, the company plans to reinvest these funds to improve cash flow management, reduce risks, and provide a buffer for any contingencies.

8.3.1 Equity Capital

The promoters have committed a total of **TZS 1,320,490,000.00** into this project over its lifetime. This amount is categorized into cash contributions, asset contributions as well as resource contribution. The breakdown of the contributions is shown below as follows:

8.3.1.1 Breakdown of the Capital

(E1)	NATURE OF EXPENSE	DAILY COST	DAYS	TOTAL COST
1.	Motor Vehicle Rentals	200,000.00	485	97,000,000.00
2.	Fuel cost	50,000.00	485	24,250,000.00
3.	Driver per Diem	60,000.00	485	29,100,000.00
			Sub-total	**150,350,000.00**

(E2)	NATURE OF EXPENSE	DAILY COST	DAYS	TOTAL COST
1.	Land Compensation			110,900,000.00
2.	Social Acceptability Costs			12,500,000.00
3.	TAFIRI Water Suitability tests			4,850,000.00
4.	TAFIRI Report Facilitation			2,000,000.00
5.	Local Boat Rental Surveys	160,000.00	4	640,000.00
6.	NEMC Research and St. Fees			12,700,000.00
7.	Architectural drawings			64,200,000.00
8.	L. Victoria Basin Commission			500,000.00
9.	License Facilitations			1,500,000.00
			Sub-total	**209,790,000.00**

(E3)	NATURE OF EXPENSE	ASSET COST	QUANTITY	TOTAL COST
1.	Scania Truck	50,000,000.00	1	50,000,000.00
2.	Mercedes Benz Truck	40,000,000.00	1	40,000,000.00
3.	Canter Truck	40,000,000.00	1	40,000,000.00
4.	FUSO Truck	25,000,000.00	1	25,000,000.00
			Sub-total	**155,000,000.00**

(E4)	NATURE OF EXPENSE	DAILY COST	DAYS	TOTAL COST
1.	Research and Consultancy	850,000.00	200	320,350,000.00
			Sub-total	**320,350,000.00**

(E5)	NATURE OF EXPENSE	DAILY COST	DAYS	TOTAL COST
1.	Director time contribution	500,000.00	485	242,500,000.00
2.	Director time contribution	500,000.00	485	242,500,000.00
			Sub-total	**485,000,000.00**

8.3.1.2 Directs Contribution Details

1. Expense codes (E1), (E2) and (E4) have been paid in cash consideration by the directors.
2. Expense codes (E3) and (E5) have been contributed in kind by the directors for this project.

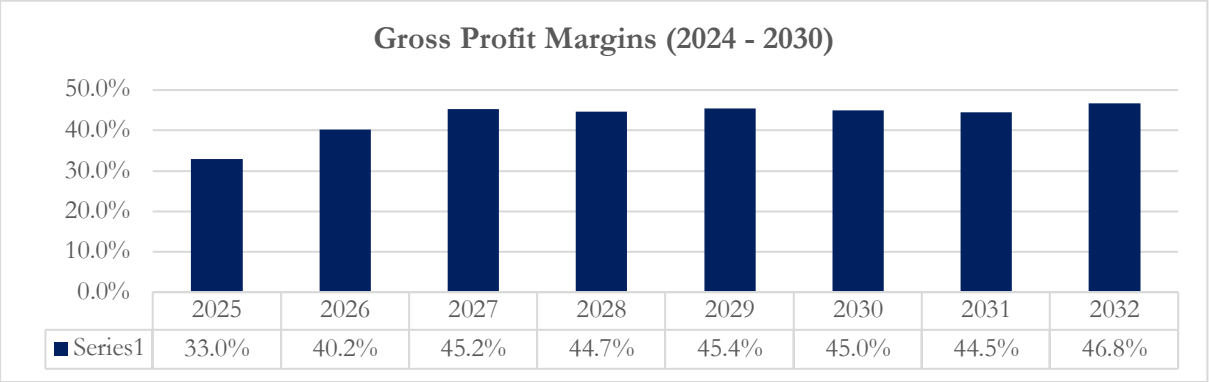
8.3.2 Financing Assumptions

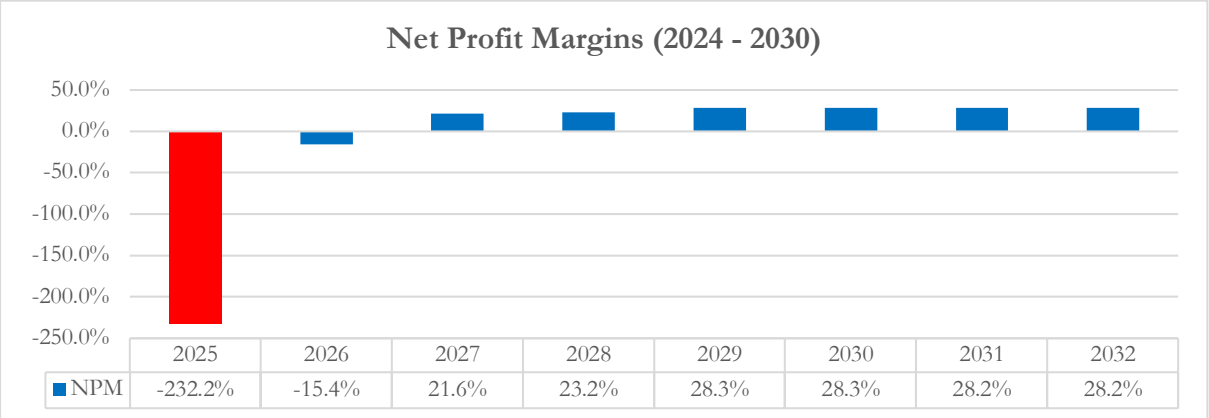
The basic projection assumptions for the proposed project include:

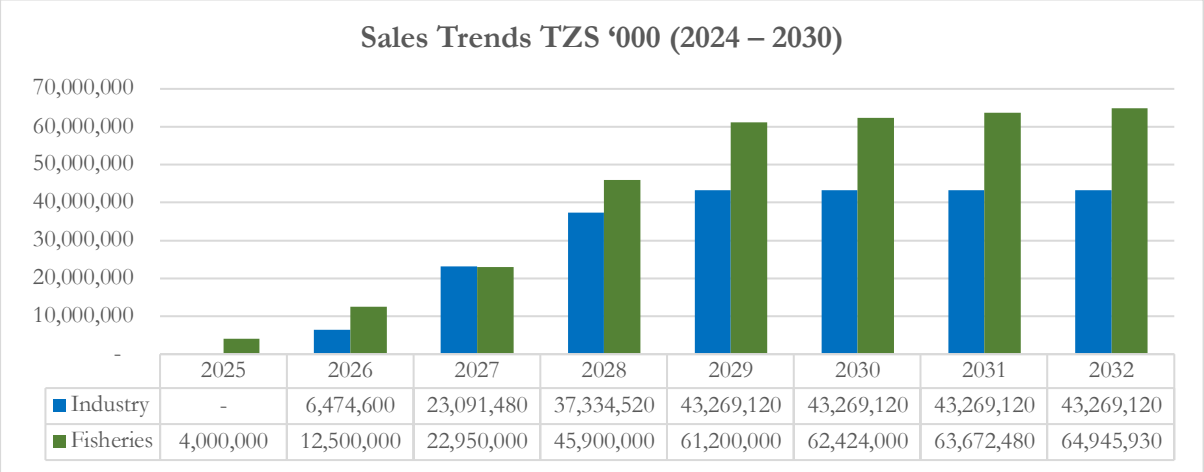
- In this report, it is assumed prudently a maximum interest rate of 4 percent per annum. The loan repayment is assumed to be over a 5-year period with a grace period of one year.
- It is assumed that Interest charge on borrowed funds (debt capital) during construction and the development period will be waived off to reduce any extended periods of leverage in this aquaculture project.
- There will be no payment of dividend included in projections on the assumption that, the projected period will focus on completion of the construction as well as the servicing of debt financing.

8.4 Projected Financial Statements

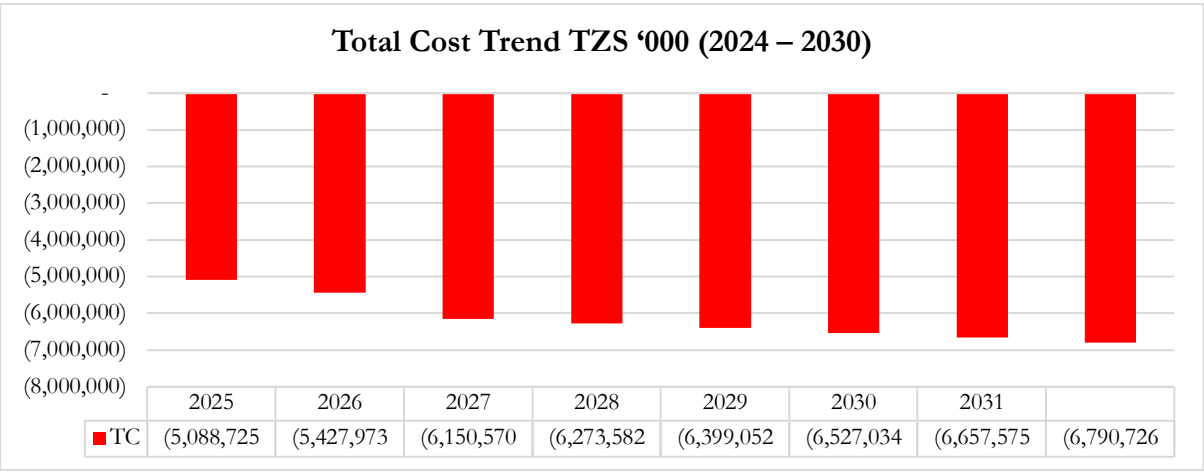
8.4.1 Projected Profit or Loss for the Project





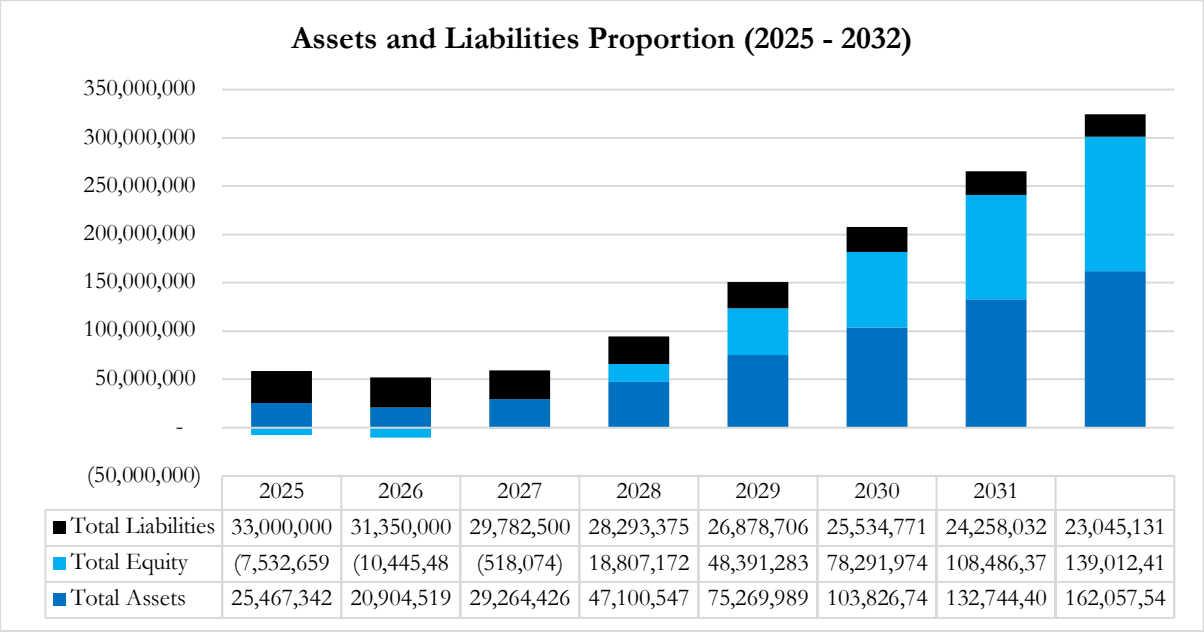


	2025	2026	2027	2028	2029	2030	2031	2032
Industry	-	6,474,600	23,091,480	37,334,520	43,269,120	43,269,120	43,269,120	43,269,120
Fisheries	4,000,000	12,500,000	22,950,000	45,900,000	61,200,000	62,424,000	63,672,480	64,945,930

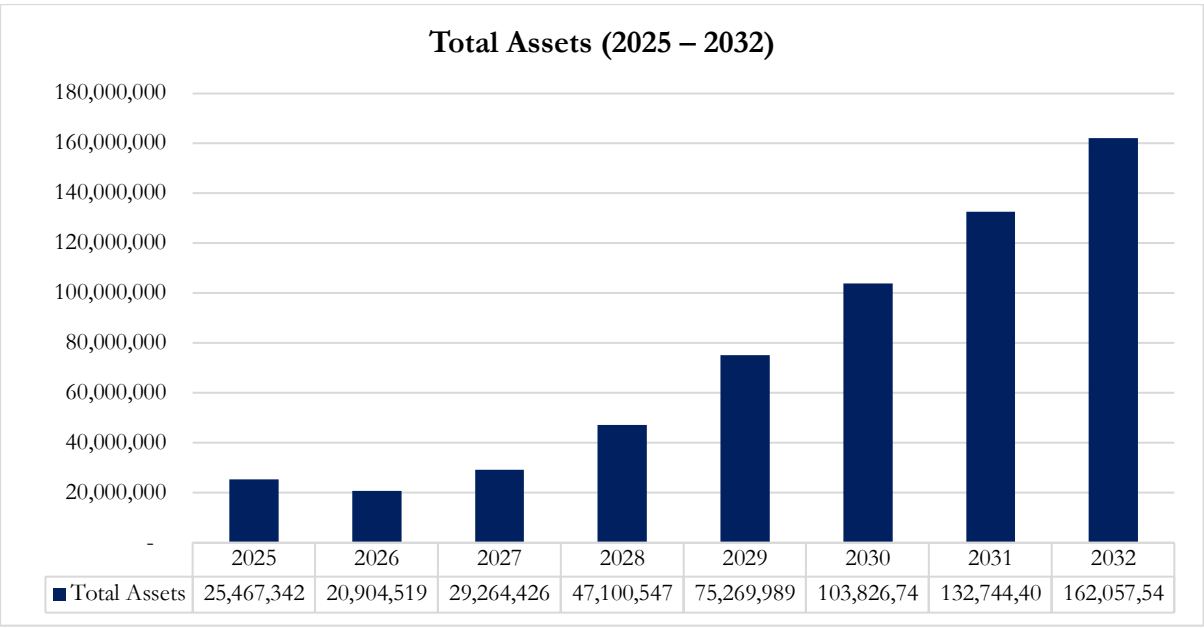


	2025	2026	2027	2028	2029	2030	2031	
TC	(5,088,725	(5,427,973	(6,150,570	(6,273,582	(6,399,052	(6,527,034	(6,657,575	(6,790,726

8.4.2 Projected Asset and Liabilities Movement for the Project



	2025	2026	2027	2028	2029	2030	2031	
Total Liabilities	33,000,000	31,350,000	29,782,500	28,293,375	26,878,706	25,534,771	24,258,032	23,045,131
Total Equity	(7,532,659	(10,445,48	(518,074)	18,807,172	48,391,283	78,291,974	108,486,37	139,012,41
Total Assets	25,467,342	20,904,519	29,264,426	47,100,547	75,269,989	103,826,74	132,744,40	162,057,54



	2025	2026	2027	2028	2029	2030	2031	2032
Total Assets	25,467,342	20,904,519	29,264,426	47,100,547	75,269,989	103,826,74	132,744,40	162,057,54

9 ECONOMIC EVALUATION

This section describes briefly the economic evaluation beyond the investors expected financial results for the proposed aquaculture project. The assessment of the economic viability of the proposed project is based on the financial benefits measured in monetary terms. The projected results will have direct and indirect impacts towards the economic and social welfare of large stakeholders than the financiers of the project. This section presents a high-level assessment of key stakeholders who will benefit as a result of establishing the large-scale aquacultural setup in Buzegwe village.

9.1 Benefits beyond the Investors

There are various economic and social benefits in the implementation of the aquaculture project. Specific economic and social benefits towards this investment include the following:

9.1.1 Increased Government Revenues

The aquaculture farm as a commercial venture will meet its obligation and remit various tax payments annually. It is expected that employment taxes, withholding taxes, corporate taxes will provide significant revenues to the government. Details of the tax revenue streams can be looked at in the projections of this business plan.

9.1.2 Employment Creation

Following its completion of the setup, a minimum of [the number of employees hired] jobs will be created in the area, where the rates of employment is low. Additionally, there will be various casual employments during the periods to facilitate various other activities through the project's wide distribution network. Membi Fisheries Limited considers job creation and poverty alleviation as a significant milestone towards the contribution of positive government policy reformation. This project anticipates a total of 100 skilled labors at the end of Year 6 and approximately 1,000 unskilled laborers. Out of the total team, there will be 4 expatriates who will provide strategic management to the company.

This project will also create indirect employment in other sectors such as transportation, small business outlets and other players in the value chain.

9.1.3 Transfer of Technology and Knowledge

The aquaculture site will invest in modern technology and the use of improved raw materials and fingerlings to maximize the quality of the produce. In addition, the aquaculture project will use modern technology which surrounding community members will benefit off from. Considering the large magnitude of the demand in tilapia, Membi Fisheries Limited will be the pioneering project managers for this magnitude and set an example of sustainable fishing practices in the area.

All these forms of harvesting technology, machinery, patented formula will be provided by the financier of this project. Hence a significant enhancement of non-financial benefits to the company, the communities surrounding the company and the players in the consumption of the produce.

9.1.4 Economic Linkages

The aquaculture project will purchase various resources from foreign suppliers such as fish feed, fingerlings and other supporting inputs. These will be consumed in production and provide extended market linkages to the local markets for selling and distributing high quality tilapia fish products for local consumption.

9.1.5 Corporate Social Responsibilities

Some of the CSR activities that the project will implement as a result of its operations as well as additional efforts to enhance social responsibilities in the area. The project will on a continuous basis support various initiatives which will be identified on the ground when engaging with community-based organizations and local government agencies.

For the purpose of these projections, CSR costs have not been included as the promoters were unable to reasonably determine the extent of the costs and the nature of the CSR initiatives.

9.1.6 Out growers Scheme

In the long term, Membi Company plans to register and contract small-scale farmers who will rear fish and supply them to Membi Fisheries Limited. This initiative is designed to expand the company's market reach both locally and internationally. By collaborating with selected smallholder fish farmers, Membi will establish an outgrower program that enables these farmers to conduct nursery rearing of sex-reversed fingerlings from the company's hatchery, growing them to a size suitable for cage culture. Membi will provide the necessary inputs and recoup costs upon purchasing the tilapia juveniles from the farmers. Priority will be given to women and youth, emphasizing employment creation and economic empowerment.

This program not only introduces a new income source for farmers around the production area but also enhances the company's production efficiency by reducing mortality rates and investment costs related to fish stocking. To minimize losses during transportation, the initiative will engage approximately 1,000 fish farmers in Ukerewe and neighboring villages within the project area. Additionally, this scheme is expected to curb illegal fishing practices and mitigate HIV/AIDS transmission by encouraging fishermen to stay with their families rather than relocating to distant fishing camps.

9.1.7 Trainings

The company will partner with FETA and relevant district extension services to deliver intensive training to selected farmers on best management practices for nursery culture, ensuring the production of high-quality juveniles suitable for cage stocking. This initiative is expected to develop new fish farmers, enhance the livelihoods of underprivileged households, and protect the environment from overfishing and other harmful activities.

Additionally, the company will offer internship opportunities to university graduates and individuals interested in fish farming, allowing them to gain hands-on experience in the field.

10 CONCLUSION

In conclusion, this project stands at the forefront of a paradigm shift, poised to address the challenges of global food security and sustainable economic development. With a robust business plan that incorporates key macroeconomic factors and leverages a range of strategic advantages, this aquaculture project represents a lucrative and resilient investment opportunity for discerning financiers. The project also aligns with prevailing macroeconomic trends. As the global population continues to surge, surpassing 9 billion by 2050, the demand for protein-rich food sources will intensify. Aquaculture, with its unparalleled efficiency in resource utilization and lower environmental impact compared to traditional livestock farming, is uniquely positioned to meet this escalating demand. Moreover, the rising middle class in emerging economies presents an enormous market potential for high-quality seafood, further bolstering the economic viability of this project.

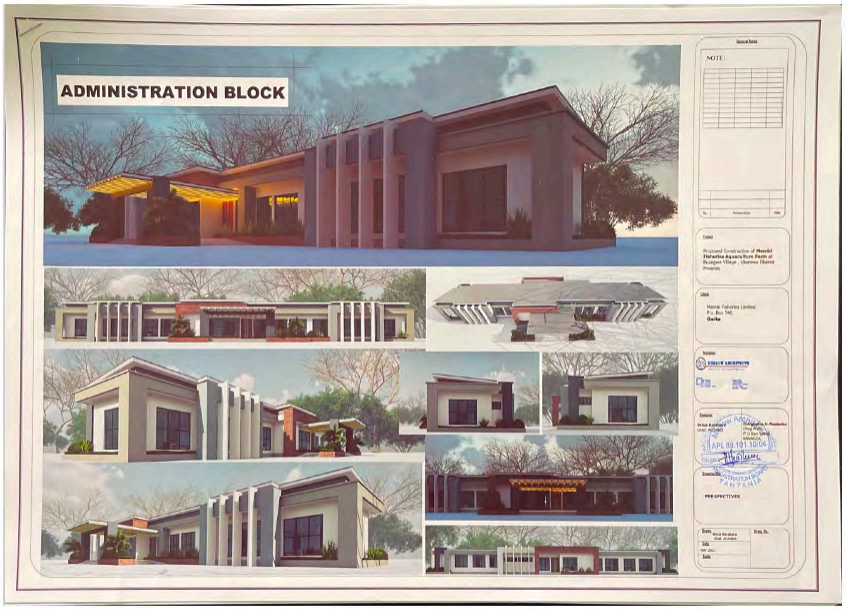
Furthermore, this aquaculture project capitalizes on a range of factors that underpin its potential success. Our comprehensive market research has identified a gap in the market, where consumer preferences for sustainably and locally sourced seafood are on the rise. By implementing state-of-the-art aquaculture practices and adhering to stringent environmental and social standards, this project not only meets the growing demand for seafood but also addresses concerns related to overfishing and ecosystem degradation. This commitment to sustainability will enhance the project's long-term viability and resilience in an increasingly conscious and discerning market.

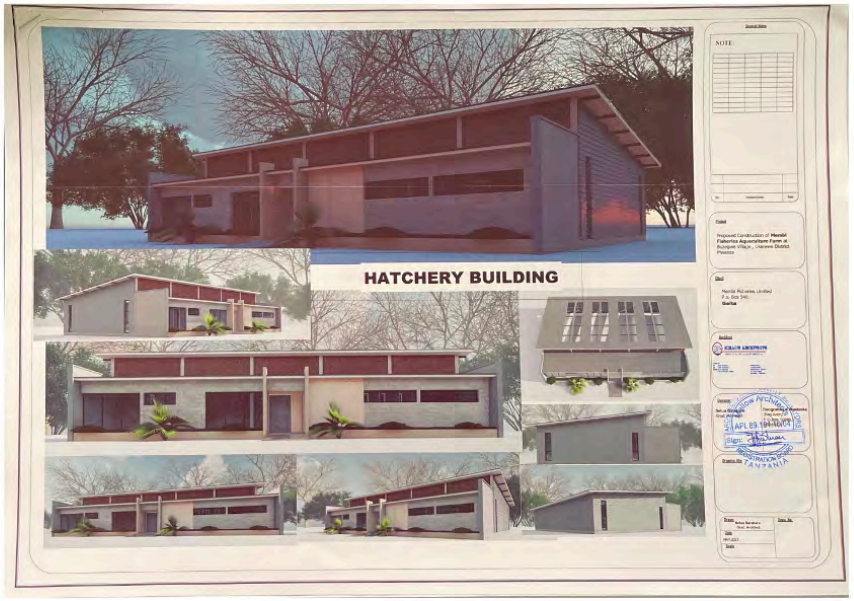
Moreover, the project's strategic location offers a competitive advantage. With access to abundant water resources and favorable climatic conditions, we are well-positioned to optimize production and minimize logistical costs. By leveraging cutting-edge technologies and best practices in aquaculture, we can ensure a consistent supply of high-quality seafood, thereby establishing a strong market presence and cultivating a loyal customer base. This project also demonstrates a compelling return on investment. Our financial projections, incorporating conservative estimates and contingency plans, indicate a steady growth trajectory and attractive profitability margins. With a signed contract between Membi Fisheries Limited and Alphakrust Limited, we mitigate risks associated with market fluctuations and ensure a sustainable revenue model.

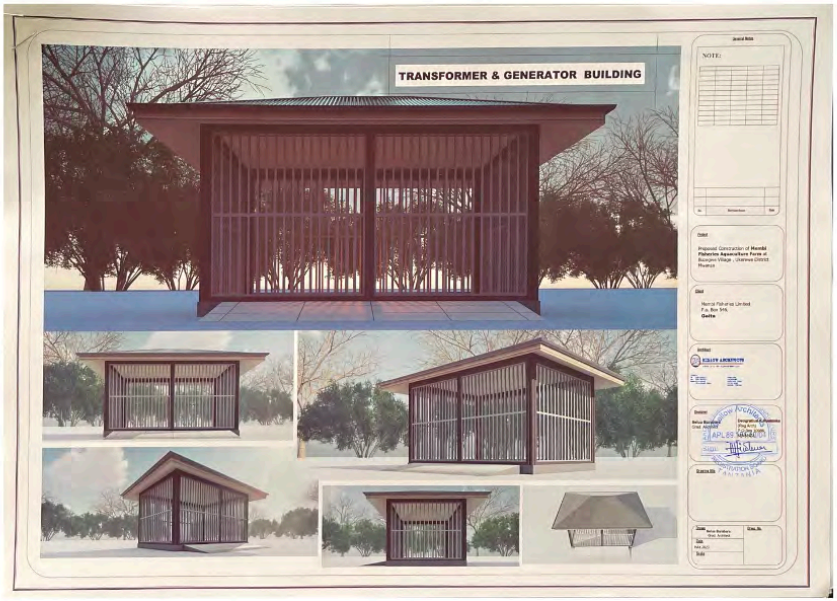
The project is not only an economically viable venture but also an ethical and environmentally responsible solution to the pressing challenges of food security and sustainability in Tanzania. By capitalizing on favorable macroeconomic trends, leveraging strategic advantages, and embracing cutting-edge technologies, this project is well-equipped to deliver impressive financial returns while making a positive impact on society and the planet.

We therefore invite financiers to join us in this transformative journey, confident in the knowledge that they are investing in a project that offers both lucrative returns and the promise of a brighter, more sustainable future.


GODOWNS & OFFICES


ADMINISTRATION BLOCK

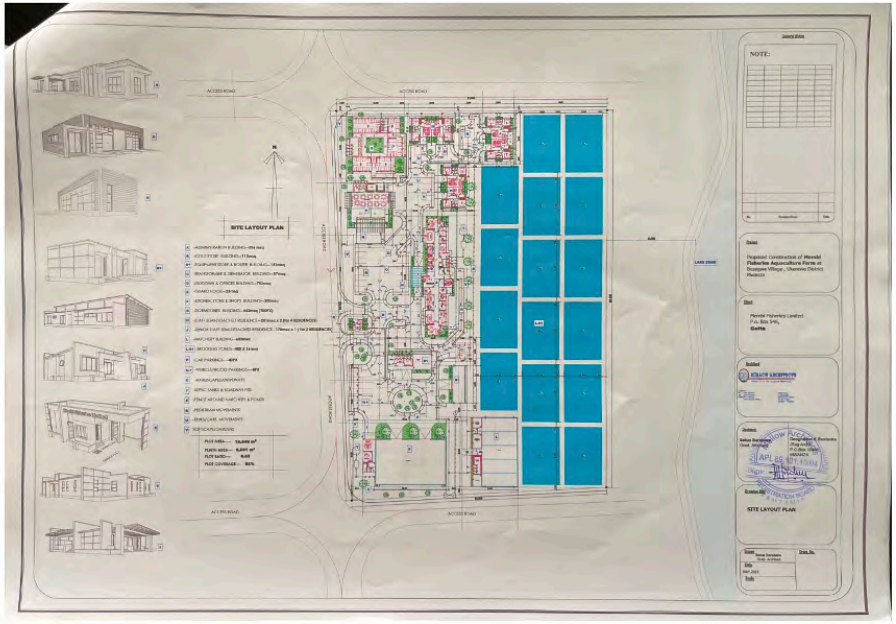

HATCHERY BUILDING


TRANSFORMER & GENERATOR BUILDING


TWO BEDROOM HOUSE
4residences


COLD ROOM


DORMITORIES BUILDING


SITE LAYOUT PLAN