Department of Fisheries
Ministry of Natural Resources and Climate Change

NATIONAL AQUACULTURE DEVELOPMENT PLAN

2025-2030

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PREFACE

The National Aquaculture Development Strategy and Action Plan (NADP) (2024-2030) outlines guidance and priority actions for the development of the aquaculture sector of Malawi in line with the Malawi 2063 First 10-Year Implementation Plan (MIP 1) from 2021 to 2030 and the FAO Guidelines for Sustainable Aquaculture. The development process was conducted by the Department of Fisheries under the Ministry of Natural Resources and Climate Change with technical support from the Food and Agriculture Organization (FAO). It is expected that the Plan will guide sectoral development by the Government and its partners including the fish farmers, all actors along the aquaculture value chain, relevant governmental agencies, non-governmental organisations (NGOs), academic institutions and the private sector.

The NADP development process was informed by a review of literature and stakeholder consultations and was conducted in an equitable, participatory and responsible manner. The valuable inputs gathered during pre- and post-validation process led to preparation of this document and its monitoring and evaluation framework. A validation workshop was conducted by the Department of Fisheries in December 2023 and finally with all key stakeholders in September 2024. The Ministry wishes to fully support the implementation of the Plan so that Malawi realises the full potential of the sustainable aquaculture development.

The Plan has been formulated in line with Malawi 2063 and MIP 1 as evidenced by the Chipoka Port Fisheries and Aquaculture Development Programme, as one of the outlined priorities with 'quick win' initiatives under the secondary cities programmes. It is a clear road map for to guide aquaculture development by various partners along the aquaculture value chain (AVC) for the country to attain inclusive food system, better nutrition, poverty reduction and economic development of the country.

Yusuf Mkungula, PhD

Secretary for Natural Resources & Climate Change

FOREWORD

The socio-economic benefits that the aquaculture sector is contributing to Malawi's economy is not yet fully recognised. However, some observations indicate some progress is being made. While the output in terms of farmed fish volume has remained stagnant, the policy reforms imposed by the Government of Malawi (GoM) have been attracting some investors largely in the aquafeeds production and slowly in the fish production. The small-scale aquaculture producers have not yet shown any significant increase, but the knowledge and skills gained from trainings by the government, development partners and non-governmental organisations (NGOs) and the academic institutions is impacting on the way they organise themselves into formal cooperatives. Generally, it is a slowly growing sub-sector with some expectations for an accelerated sector in terms of increased fish supply within the next years. This is due to the policy environment put in place by the Government by responding to demand from the private sector and aquaculture producers.

So far, for the aquaculture sub-sector, the Government has developed the National Aquaculture Strategy (GoM 2020), National Aquaculture Strategic Plan (GoM 2021). Furthermore, the Government has recognised the potential that the aquaculture sub-sector has in contributing to Pillar 1 of the Malawi 2063 and its First 10-year Implementation Plan (MIP 1) under the Agricultural Productivity and Commercialisation. The support from the development partners, NGOs, private sector, and academic institutions is assured for the benefit of the aquaculture industry and its contribution towards the growth of the economy. The enhanced livelihoods and employment opportunities will be created for the rural communities. and incomes. However, some of the key issues to consider include investment to increase supply of quality fingerings (seed), access of capital, enhanced knowledge and skills, and biosecurity issues.

The development of NAPD demonstrates the Government's strong commitment to sustainable and equitable aquaculture development. The Plan will guide implementation of key interventions by all stakeholders with a common vision. mission, purpose and goal. All planned activities will, subsequently, be guided by the objectives of the Plan in priority areas of the aquaculture sub-sector. Of paramount importance will be an inclusive and participatory process in the monitoring and evaluation framework based on the NADP's monitoring and evaluation plan.

For effective implementation of NADP, we will need a biennial stakeholder engagement at both national and district levels. This could involve creating regular joint forums or working groups that allow fish farmers, NGOs, academic institutions, and the private sector to provide ongoing feedback and share best practices throughout the implementation of the NADP. The Government will furthermore strengthen the monitoring and evaluation (M&E) framework to include specific, measurable indicators related to socio-economic outcomes, environmental sustainability, and community impact. Regular M&E reports should be made accessible to stakeholders to ensure transparency and accountability.

There will also be a need to invest in capacity building programs for local fish farmers and stakeholders in aquaculture best practices, sustainable farming techniques, and business management. Collaborations with academic institutions could provide training modules tailored to local conditions and market needs. In addition, it is necessary to ensure that the NADP is implemented along with a comprehensive strategy for climate change resilience in aquaculture practices. Incorporating techniques for adaptive management and contingency planning can help mitigate risks associated with climate variability.

On financial requirement, there is need to establish diverse funding mechanisms to support the implementation of the NADP, including public-private partnerships, international grants, and local investments in addition to increased annual funding allocations and operationaisation of the Fisheries Fund as stipulated in the Fisheries Conservation and Aquaculture Act of 1997. Additionally, there is need to develop a clear financial plan that outlines other potential funding sources and prioritizes investment in critical areas of the aquaculture value chain.

Hastings Zidana, PhD

Director of Fisheries

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The National Aquaculture Development Plan (NADP) has been developed with technical and financial support from the Food and Agricultural Organisation (FAO) of the United Nations through the FAO Multi-Partner Mechanism (FMM), *Supporting Food Systems Transformation through Strengthening Aquaculture Development and Innovative Public Private Partnerships (PPP)*. The programme was implemented in 2023 by the Department of Fisheries under the Ministry of Natural Resources and Climate Change. Therefore, the Ministry wishes to extend its gratitude and sincere thanks to FAO for the timely preparation of the NADP, which will guide implementation of the National Aquaculture Strategic Plan (NASP II) and the entire aquaculture sub-sector. Through the same programme, FAO also supported preparation of other technical documents including the *Tilapia Pond Culture Guidelines, Tilapia Cage Farming Guidelines*, and a *Technical Guide for Enhancing Private Investment in Aquaculture.*

ACRONYMS

ADP	Aquaculture Development Program
AGCOM	Agricultural Commercialisation Project
AGRiTT	Agriculture Technology Transfer
AMR	Anti-Microbial Resistance
AU	African Union
AUC	African Union Commission
AVC	Aquaculture Value Chain
BEWG	Blue Economy Working Group
BMP	Best Management Practices
CCRF	Code of Conduct for Responsible Fisheries
CDF	Constituency Development Fund
CFI	Chronic Food Insecurity
COMESA	Common Market for Eastern and Southern Africa
COMPASS	Community Partnerships for Sustainable Resource Management
CPFADP	Chipoka Port Fisheries and Aquaculture Infrastructure Development Project
CSO	Civil Society Organization
DDP	District Development Plan
DHRMD	Department of Human Resources and Development
DHS	Demographic Health Survey
DoF	Department of Fisheries
EAA	Ecosystem Approach to Aquaculture
EAD	Environmental Affairs Department
EDF	Export Development Fund
EP&D	Economic Planning and Development
FAO	Food and Agriculture Organisation of the United Nations
FCMA	Fisheries Conservation and Management Act
FMB	First Capital Bank
FMM	FAO Multipartner Programme Support Mechanism
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIP	Genetic Improvement Programme
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit

GoM	Government of Malawi
GSA	Guidelines for Sustainable Aquaculture
Ha	Hectare
ICLARM	International Center for Living Aquatic Resources Management
ICT	Information and Communication Technology
IFFNT	Innovative Fish Farmers Network
IIA	Integrated Irrigation-Aquaculture
IP	Implementation Plan
IPC	Integrated Food Security Phase Classification
IYCF	Infant Young Child Feeding
JICA	Japan International Cooperation Agency
LUANAR	Lilongwe University of Agriculture and natural Resources
MAAIC	Malawi Agriculture and Industrial Investment Corporation
MBS	Malawi Bureau of Standards
MCCCI	Malawi Confederation of Chambers of Commerce and Industry
MEAL	Monitoring, Evaluation and Learning
MFI	Micro-Finance Institution
MIP 1	Malawi 2063 First 10-Year Implementation Plan
MIS	Management Information System
MITC	Malawi Investment and Trade Centre
MK	Malawi Kwacha currency
MLF	Micro-Loan Foundation
MNRCC	Ministry of Natural Resources and Climate Change
mt	metric tonnes
MUBAS	University of Business and Applied Science
MUST	Malawi University of Science and Technology
MRA	Mutual Recognition Agreements
MW2063	Malawi 2063 Vision
MZUNI	Mzuzu University
NADP	National Aquaculture Development Plan
NASFAM	National Farmers' Association of Malawi
NAfDP	National Aqua-farms Development Project
NAIP	National Agricultural Investment Plan
NAS	National Aquaculture Strategy
NASP	National Aquaculture Strategic Plan
NBS	New Building Society Bank

NCST	National Commission of Science and Technology
NCHE	National Council for Higher Education
NEEF	National Economic Empowerment Fund
NEPAD	New Partnership for Africa's Development Agency
NFAP	National Fisheries and Aquaculture Policy
NGO	Non-Governmental Organizations
NPC	National Planning Commission
NSA	Non-State Actor
OBP	One Boarder Post
ORT	Other Recurrent Transactions
PFFARS	Policy Framework for Fisheries and Aquaculture and Reform Strategy
PIAD	Presidential Initiative on Aquaculture Development
PO	Producer Organisation
PPP	Public Private Partnership
PPPC	Public Private Partnership Commission Programme
PSIP	Public Sector Investment Programme
RASAP	Regional Aquaculture Strategy and Action Plan
ROI	Return on Investment
SADC	Southern Africa Development Community
SDG	Sustainable Development Goal
SEO	State of the Environment Outlook
SEP	Socio Economic Profile
SEZ	Special Economic Zone
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SME	Small Micro and Medium Enterprise
SOER	State of the Environment Report
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEVET	Technical, Entrepreneurial, Vocational and Education Training
TEVETA	Technical Entrepreneurial, Vocational, Education Authority
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNIMA	University of Malawi
USAID	United States Agency for International Development
VAT	Value Added Tax

GLOSSARY

Anchor fish farms: Big aggregate fish farms and/or cooperatives that best unleash the potential production and productivity of commercial small-scale farmers to generate surplus and raw materials for industrialization.

Aquaculture parks: A shared facility, purpose-built for aquaculture research, education and commercial development.

Aquaculture: the planned and controlled farming of aquatic organisms including fish, mollusks, crustaceans and aquatic plants.

Area management plan refers to a plan of the designated area for aquaculture where the farmers undertake aquaculture in accordance with agreed strategies, management practices, and codes of conduct, and manage production in order to reduce and manage risk posed by disease and parasites, including cumulative environmental impacts and social conflicts.

Better management practices (BMPs) aim to improve the quantity, safety and quality of products considering animal health and welfare, food safety, environmental and socio-economic sustainability.

Cage culture is the rearing of fish and other aquatic organs in closed systems immersed in water for purposes of rearing the organisms in captivity in open water bodies.

Capture fisheries: This refers to the harvesting of fisheries resources from the natural water bodies such as lakes and river systems by using various fishing gears and vessels.

Climate-smart approaches in aquaculture address three key objectives, namely sustainable food systems, adaptation and mitigation. In particular, the first objective is connected to the overarching goal of achieving sustainable food systems, which encompasses the environmental, social and economic aspects of aquaculture. The second objective focuses on the need for adaptation to climate change, including climate-induced extreme events and disasters by reducing the sector's vulnerability and increasing resilience. The third objective is to enable the sector, where possible, to contribute to the mitigation of greenhouse gas emission (FAO, 2024).

Culture based fishery is a fishery in which the use of aquaculture facilities is involved in at least part of the lifecycle pf fish. In this case aquaculture could be usually be applied for initial hatchery phase and the growth part be done by realising the fry or fingerlings into the natural or modifies habitats.

Ecosystem approach to aquaculture is a strategy for integrating aquaculture within the wider ecosystem such that it promotes sustainable development, equity, and resilience of interlinked socio-ecological systems (FAO 2024).

Gender refers not to male and female, but to masculine and feminine – that is, to qualities or characteristics that society ascribes to each sex (FAO 2024).

Gender equality is when women and men enjoy equal rights, opportunities and entitlements in civil and political life, in terms of access, control, participation and treatment (FAO ,2024).

Gender equity refers to fairness and impartiality in the treatment of women and men in terms of rights, benefits, obligations and opportunities.

Hatchery: This refers to an installation for housing facilities for breeding, nursing and

Integrated fish farming: System of producing fish in combination with other agricultural/livestock farming operations centred around the fish pond.

Intensive farming: Means raising fish under controlled growing process and production conditions where their growth is completely dependent on externally supplied fish feed.

Mega fish farm: center of large-scale fish production and serve as an anchor for other farmers in surrounding communities by attracting private markets for inputs and outputs.

Stakeholder(s) refers to any individual, group or organisation with interest in or a stake, or who can influence or is affected, positively or negatively, by a process or management decision.

EXECUTIVE SUMMARY

The development of the National Aquaculture Development Plan (NADP) follows approval of the National Aquaculture Strategy (NAS) and National Aquaculture Strategic Plan (NASP) in 2020 and 2012 respectively with a goal to sustainably increase fish production from aquaculture by small- and large-scale enterprises and the private sector The rationale behind the preparation of the NADP is to ensure a more elaborate technical guidance for implementation aquaculture in Malawi. In line with the Malawi 2063 and its First 10-Year Implementation Plan (MIP I), the NADP focuses on aligning its planned aquaculture activities within the Agricultural Productivity and Commercialization Pillar I. The Plan highlights key activities, socio-economic analysis and a few projects that are prioritized from 2024 to 2030. Of particular importance is the Chipoka Port Fisheries and Aquaculture Infrastructure Development Project (CPFADP) that is the first project within the Blue Economy (BE) and the National Aquafarm Development Project (NAfDP) within the Public Sector Investment Programme (PISP) that the Government of Malawi (GoM) approved in 2023 and now under implementation.

Malawi in endowed with water resource that are suitable for aquaculture production thereby having potential to contribute significantly to the growth of Malawi's economy. The suitable soils, topography and water availability in some areas of the country provide suitable conditions for the production of fish through pond aquaculture. In addition, Lake Malawi is the national asset that can offer an opportunity for sustainable cage farming investment considering environmental issues. The aquaculture production could compliment the capture fisheries and other fishery enhancement measures within the Blue economy for the transformation of the aquaculture sub-sector. However, the extension and community outreach services are inadequately done with limited access to modern technologies and insufficient knowledge transfer to small-scale fish farmers. Hence NADP encourages strengthening of the Malawi College of Fisheries to provide practical, hands-on training on Best Management Practices (BMPs), disease control, and market analysis. There is also need to strengthen public-private partnerships to enhance knowledge sharing and technology dissemination.

NADP will ensure provision of appropriate framework conditions to catalyse growth of the sector. As outlined in the Malawi 2063 First 10-Year Implementation Plan (MIP 1) from 2021 to 2030, fish production from both aquaculture and capture fisheries could reach 350,000 tonnes per year by 2020. This means aquaculture only has to contribute 100,000 tonnes per year by 2030 if all necessary measures were put in place from 2021. As of recent, there are some measures that are being taken by the Government in the transformation of the aquaculture sub-sector. These measures include policy reforms like tax waivers, development of appropriate infrastructure such as establishment of mega aquafarms within the Blue Economy and establishment of One-Boarder-Posts to facilitate fish trade. Other on-going programmes being undertaken are biosecurity, fish breeding and private sector participation mainly in fish and aquafeed production.

The human population in Malawi is putting pressure on fish. Considering that fish production has been averaging 180,000 tonnes per year of which only 10,000mt constitutes aquaculture for the past five years, the per capita fish consumption has declining been declining to 10kg. In addition, with the declining land holding sizes and soils that are becoming infertile, climate change and environmental degradation, agricultural yields are similarly experiencing a decreasing trend. Consequently, the country is experiencing food and nutritional insecurity challenges. However, aquaculture has potential to contribute to the supply of the healthy aquatic foods from ponds, cages and other extensive production systems. There is need to look at policies, strategies and plans to ensure a conducive environment for aquaculture investment and trade.

NADP recognises that farming of fish and the auxiliary activities in the aquaculture value chain are first and foremost economic activities. In this regard, the Plan further reinforces the fundamental focus on solid and logical sound commercial perspective, in order to transform subsistence fish farming into market-led small- and large-scale enterprises. Therefore, this Plan contains seven priority areas that focus on: (a) Aquaculture Governance; (b) Sustainable Aquaculture Production; (c) Research, Technology Development and Dissemination; (d) Gender-responsive Aquaculture Supply and Value Chains; (e) Capacity Strengthening; (f) Climate-smart Aquaculture; and (f) Monitoring, Evaluation and Learning (MEAL). Finally, the Plan has an implementation plan as well as a monitoring and evaluation plan.

1 INTRODUCTION

The document presents the National Aquaculture Development Plan (NADP) from 2024-2030. The Government of Malawi (GoM) through the Department of Fisheries (DoF) under the of Ministry of National Resources and Climate Change (MNRCC) has developed the Plan to effectively guide implementation of aquaculture sub-sector activities for the next six years. Specifically, NADP seeks to guide implementation of technical services, institutional capacity building, budgetary processes and policy direction of the aquaculture sub-sector. The development of the Plan was conducted based on the realisation of the potential of the aquaculture sub-sector to the Malawi's economy. The Plan falls under Pillar 1 (Commercial Agricultural Productivity and Industrialization) of the Malawi 2063 and the First 10-year Implementation Plan (MIP 1) (GoM, 2021). The sub-sector is one of the means to diversity the economy with increased production of fish from aquaculture for domestic and export markets.

Thus, considering the suitable natural conditions like abundant water resources and suitable soils that Malawi is endowed with, the Plan focuses on the following priority areas: transformation of small-scale aquaculture into market-led SMEs; technological innovations; capacity strengthening; (d) market efficiency; climate resilience and environment; institutional capacity enhancement; and the monitoring and evaluation. On policy coherence, NADP is aligned to several policy and strategic documents both at national, regional and continental levels. This is to ensure that activities are in line with strategic interventions that recognise fish as a key commodity with a high demand for both domestic and export markets and also a commodity with potential for regional integration. The Plan has also recognised the need for gender mainstreaming, climate change and integrated environmental management to catalyse progressive and sustainable aquaculture sub-sector in Malawi.

The development process was participatory. There was stakeholder engagement from problem identification, prioritisation of the issues to when the validation of the draft NADP was done. The stakeholders were identified along the aquaculture value chain like fish producers, hatchery operators, feed producers and some consumers. Service suppliers were also identified like input suppliers, academic institutions; civil society organisations; the private sector as well as the Ministries, Department and Agencies (MDAs). The Food and Agriculture Organisation (FAO) was also engaged to review how certain elements of the Plan are in line with the Guidelines for Sustainable Aquaculture (GSA).

1.1 Background

1.1.1 Situational Analysis of the fisheries sector in Malawi

The economy of Malawi has been heavily dependent on few agricultural exports; largely tobacco, sugar, tea, coffee and cotton (GoM, 2021). With the abundant water resources (about 20% of Malawi's surface area of about 18,484 km^2), which is in form of lakes, wetlands, rivers, and floodplains and over 800 small water bodies (reservoirs). (GoM 2016; FAO 2005). These water bodies provide opportunities for the

growth of the fisheries sector. The fisheries sector in Malawi is broadly categorized into capture fisheries that includes aquarium trade, aquaculture, and recreational or sport fishery, which for the past three decades has remained dormant. The capture fisheries sector is the largest composed of subsistence or small-scale commercial and industrial fishers.

The fisheries sector (fisheries and aquaculture) generates a range of socio-economic benefits for Malawians that include food and nutrition security, livelihoods, exports and source of biodiversity. In terms of capture fisheries, fish production averaged 180,000 metric tonnes between 2017 and 2022 while aquaculture production has been estimated at 10,000mt per year as Figure 1 shows.

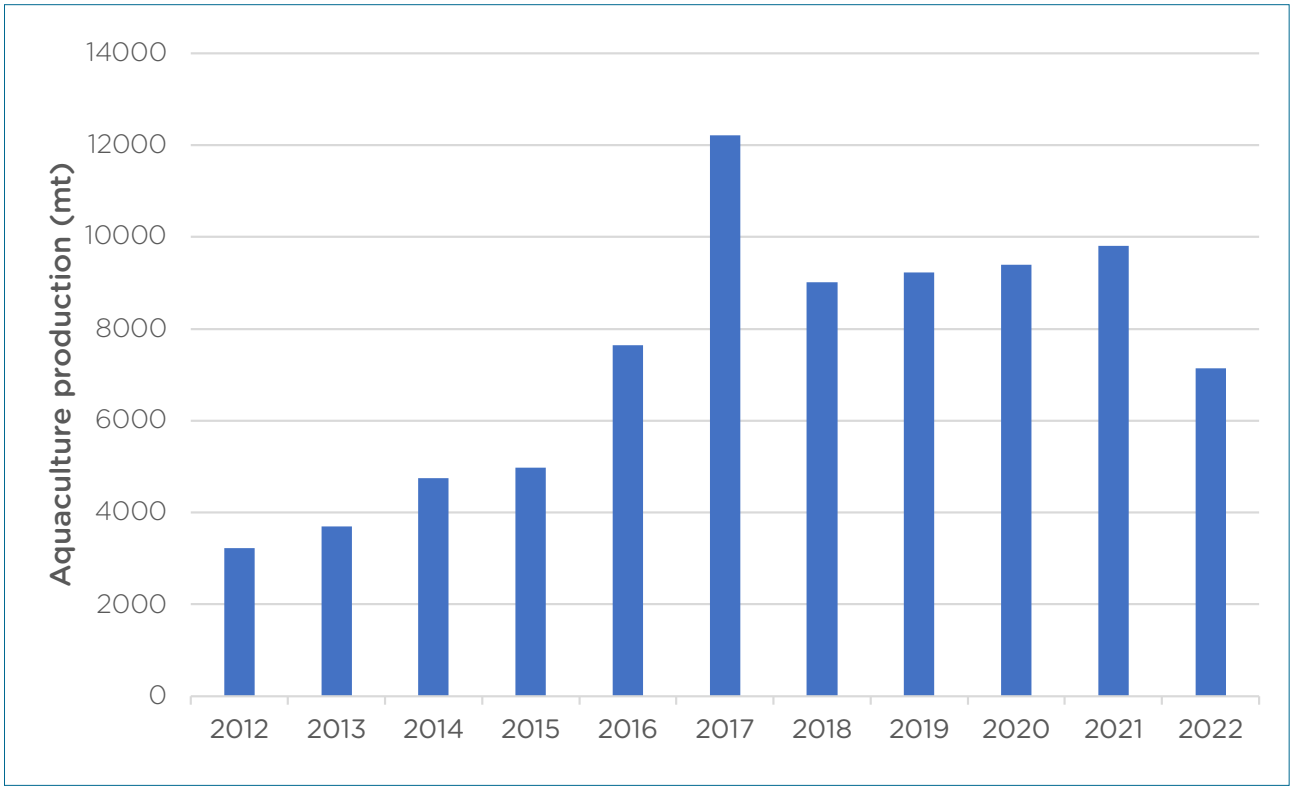

Figure 1: Production of farmed fish (mt) at national level from 2012 to 2022
Source: GoM (2023)

The sector contributes 4% to the Gross Domestic Product and employs directly over 75,000 fishers while fish farmers are approximately 15,465 of which 62% are males and the rest are women (GoM 2021). The total recorded number of ponds is currently at 10,007 countrywide representing a total pond area of 351.59 ha (Chimatiro, 2021). By 2019, the per capita consumption of Malawi was 10 kg (Government of Malawi 2019).

While there has been an increasing trend on fish production to around 180,000 mt from capture fisheries and aquaculture at national level, this is mainly due to an increase in *Engraulicypris sardella* (Usipa). The commercially valued *Oreochromis shiranus* (Chambo) has been declining from Lakes Malawi and Malombe since the 1970s and 1980s from around 18,000 mt to less than 2,000 mt (FAO 1993: GoM 2023.

Some of the key challenges in capture fisheries include overfishing, weak infrastructure, climate variability, environmental degradation, loss of aquatic habitats, and poor infrastructure. In aquaculture, the major factors include poor quality seed and aqua feeds; limited participation of the private sector, limited access to financing opportunities and weak linkages to markets. Despite the challenges, there are several opportunities for enhancing fish production and productivity from aquaculture to catalyze inclusive wealth creation and self-reliance, including: an enabling and supportive policy and legislative frameworks; availability of developed technologies; a youthful population in need of employment opportunities; and existence of supportive Government and development partners in the sector (GoM 2021). The recent economic analysis on aquaculture and fisheries sub-sectors shows a positive cost-benefit ratio of 1:3 (GoM, 2022). Furthermore, over 300,000 job opportunities can be generated.

Adoption of the best management practices in aquaculture, is therefore, critical to the achievement of the MIP 1 which demands a shift from low productivity and subsistence-oriented aquaculture to a highly productive and commercialized aquaculture with production and marketing linkages. This will attract investment in value feed production, table fish production, processing, including cold chain value addition, aqua-processing; resulting in the inclusive creation of employment, wealth and ultimately economic self-reliance. A rise in agricultural production and productivity above the subsistence requirement will result in an increase in the volume of marketable surplus, thereby propelling value-addition and industrialization. Malawi will be much more food secure as a nation if most workers are able to find non-agricultural jobs that offer important advantages over those obtainable currently under farming. Furthermore, sustainable practices as those outlined in the Guidelines for Sustainable Aquaculture (GSA) published by FAO (2024). For example, there are several recommended practices like good governance, reduction in the use of antimicrobials and other veterinary medicines, biosecurity, reduction in the use of wild fish as feed, recommendation to promote environmental complexity and biodiversity in aquaculture systems, and recommendation to establish aquaculture funding and investment rules and processes that are transparent and environmentally sustainable. In addition, application of the Ecosystem Approach to Aquaculture (EAA) is necessary.

1.1.2 Relevance of aquaculture to Malawi

Food insecurity and malnutrition are critical in Malawi (IPC 2022). In 2023, about 5.4 million people based in rural and secondary urban centres in Malawi were recorded to face moderate or severe chronic food insecurity (IPC CFI Levels 3 and 4) due to abject poverty and recurrent shocks, among other drivers of the 18 million people were facing hunger in Malawi (Ibid). It is on record that over 70% of Malawi's population of about 19.1 million people is living below the international poverty line of $1.90/day (Ibid). In the 2023 Malawi was ranked 88th out of the 125 with a score of 21.1 on the Global Hunger Index, which

was a level of hunger that was serious[1] (Concern Worldwide and Welthungerhilfe, 2023). Furthermore, the country has high levels of stunting among under-five children, which is an indication that chronic food and nutrition insecurity are prevalent. The high prevalence of malnutrition has impacted greatly on education and health outcomes. Some of the ways to address food insecurity and nutrition is consumption of healthy diets which may contain fish. Moreover, fish is the preferred and cheapest source of animal protein, and about over 70% % of the total annual supply in the country is consumed locally (GoM, 2022).

Therefore, increasing aquaculture production can be one of the strategies to offer nutritive and diversified foods thereby contributing to the achievement of Sustainable Development Goals (SDGs)[2]. The development of the sustainable aquaculture sub-sector has significant linkages and bearing for most SDG of the 2030 Agenda. The SDGs of high bearing are: SDG 1 (end poverty in all its forms everywhere); SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture); SDG 5 (achieve gender equality and empower all women and girls); SDG 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all); SDG 12 (ensure sustainable consumption and production patterns); SDG 13 (take urgent action to combat climate change and its impacts); SDG 14 (Conserve and sustainably use the oceans, seas and marine genetic resources for sustainable development); SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt biodiversity loss, halt and reverse land degradation; and SDG 17 (Strengthen the means of implementation and revitalize the global partnership for sustainable development) (United Nations, 2023).

Furthermore, the Malawi 2063 and its associated First 10-Year Implementation Plan (MIP 1) (2021-2030) highlights aquaculture production. Under Pillar I of the MIP 1, whose objective is: "To have an optimally productive and commercialized agriculture, with the following focus areas" with a focus on Agriculture diversification which states "A strong diversification programme backed by effective extension services into the production of high value crops (including horticulture), livestock and fisheries with niche products largely destined for the export market" (GoM: 2021). Box 1 outlines the priority areas of Pillar 1 related to aquaculture, considered as one of the sub-sectors to diversify the economy.

1 Concern Worldwide and Welthungerhilfe, 2023. www.globalhungerindex.org
2 United Nations https://sdgs.un.org/goals

Box 1: Priority Areas of Aquaculture highlighted in the MIP 1:

To have an optimally productive and commercialized agriculture sector, MIP-1 will focus on the following priority areas in which the game changing interventions are embedded:

Agricultural diversification: A strong diversification program backed by effective extension services into production of higher value crops (including horticulture), livestock and fisheries; with niche products largely destined for the export market.

Anchor farms: Big aggregate farms and/or cooperatives that best unleash the potential production and productivity of commercial smallholder farmers to generate surplus raw materials for industrialization.

Agricultural inputs: A sustainable high-quality input supply and access system.

Farm mechanization: Increased mechanization and use of modern technologies (including digital) that can also make agriculture attractive to young people.

Structured markets: Ensuring well functioning structured agricultural markets that can generate high farmer incomes, release agricultural labour and stimulate demand in the other sectors of the economy.

Agricultural inputs: A sustainable high-quality input supply and access system.

Research, Innovation and Dissemination: Investing in genetic improvement programs for generation of high yielding crop varieties, fast growing animal and fish breeds and scaling up seed and multiplication.

Irrigation Development: Investments in sustainable irrigation systems to optimally harness the productivity and commercialization drive while averting adverse climatic variability.

Hence, the Government approved the Chipoka Port Fisheries and Aquaculture Infrastructure Development Project concept. Aquaculture is also outlined as the second pillar within the National Fisheries and Aquaculture Policy of 2016. The intuitive shows that a commercially-oriented aquaculture is being promoted in addition to the small-scale aquaculture. The recently developed Blue Economy (2024-2030) also highlights capture fisheries and aquaculture as important sub-sectors to unlock and accelerate economic growth, create jobs, alleviate poverty, increase incomes and help conserve and protect the aquatic environments.

1.1.3 Upgrading of the current value chain

The Plan aims to promote upgrading of the value chain by (i) reducing fragmentation of the value chain; (ii) formalising off-taking markets by linking farmers to established food retailers (i.e. off-take agreement) such as supermarkets in urban centres, and mainly the engagements with informal traders who typically purchase the harvested fish at the farm gate at a reduced price; (iii) strengthen business management capacity of farmers and off-takers (i.e. to keep bank traceability records); (iv) improve logistic capacity both infrastructure (cold chain) and services (transport, supply-chain finance, wholesale distribution centres); and strengthen institutional capacity of fish farmers in order for them to form cooperative societies that can provide extension and logistical services to their members. Details can be seen in the Working Paper.

1.1.4 Assessment of best management practices in aquaculture

As defined by Chimatiro (2021) Best Management Practices (BMPs) in aquaculture refers to an application of sound management practices that promote the sustainable growth of the industry whilst achieving the minimum of harm to the environment. This is done through the application of cost-effective and continually assessed management measures. Drawing on lessons from other countries, the NADP will recognize the importance of BMP to Malawi's aquaculture by including interventions that should be made to optimise performance across a range of areas including water management, fish health, species, production system, feed management and business management. Separate guidelines have been produced to outline the BMPs for pond based and cage aquaculture.

A successful fish farming business requires (i) nutritionally balanced diets, (ii) good husbandry skills, and (iii) good business management. However, good quality feeds are paramount, the production of nutritionally balanced diets for fish requires research, quality control, and biological evaluation (Chimatiro 2021). Key factors to successful fish farming include (i) quality ingredients, (ii) nutrient requirements of the fish, that is affected by digestibility and the balance of those nutrients; (iii) good husbandry skills coupled with management influences the performance of the fish under a particular diet; (iv) fish growth (and productivity) together with feed conversion are greatly influenced by feed intake and water quality; (v) these factors in turn affect the nutritional requirements and dietary levels of nutrients; (vi) water temperature influences metabolic rate and energy expenditure; and (vii) financial inputs, including duty on imports, have a major bearing on the profits of the farm business. The Plan recommends that the Department of Fisheries develops training materials on BMPs and deliver training to extension workers, hatchery operators, on-farm fish feed manufacturers, and fish farmers, in order to enhance their knowledge of commercially and environmentally viable fish production practices. Furthermore, FAO (2024) in its Guidelines for Sustainable Aquaculture, recommends a sector that fosters social responsibility,

decent work and gender equality. This is achieved by enhancing social responsibility, decent livelihoods, working conditions and gender equality for sustainability.

1.1.5 Commercialisation perspectives of aquaculture in Malawi

The NADP will explore options to create financially independent fish producers who would be able to derive most of their incomes from aquaculture (Chimatiro 2021). While many farmers have moved to become commercial since 2005, some still operate at sub-optimal commercial level, according to field work conducted by Chimatiro (2021). Therefore, the Plan will have activities that will transform subsistence fish farmers to middle and large-scale levels. In this context the focus will be on encouraging Small Micro and Medium Enterprise (SMME) investments by (i) determining the supply-demand dynamic up to 2030, in line with the MIP 1 at district levels, and (ii) determining financial viability of the SMEs. The possible financing sources include the following: increased Government funding through Other Recurrent Transactions (ORT); implementation of the Malawi 2063 First 10-year 1mplementation Plan and the Blue Economy Strategy: Fisheries Fund; financing for District Development Plans and financing from development partners.

1.1.6 Current initiatives and plans

The GoM has approved aqua mega farm investments in aquaculture which are within secondary cities under Malawi Priorities Initiative in 2023. The Chipoka Port Fisheries and Aquaculture Infrastructure Development Project which targeted production of about 700,000 tonnes of fish from both capture fisheries and aquaculture by 2063. The Government has also approved and is implementing National Aqua-farms Development Project (NAfDP) within the Public Sector Programme (PSIP) from 2023 to 2028. These two major programmes will transform aquaculture with funding from the public and private sectors. Furthermore, the GoM approved the Public Sector Reforms (GoM 2021) that have outlined aquaculture production. Apart from aquaculture, the initiative will include fishery enhancement measures including stocking small water bodies and encourage investment in cages culture in other smaller water bodies like Upper and Middle Shire River to increase fish production from various production systems. NADP will aim to achieve production of tilapia and catfish of 100,000mt by 2030. The tax waiver as a policy measure will be reviewed to ensure increased aquaculture investment by the private sector, fish farmer cooperatives and clusters with value addition and better marketing opportunities. For the past 3 years, there has been an increase of aqua feeds investors from almost a single commercial investor to about 4 aqua feed producers.

1.1.7 Aquaculture Production Projections

Aquaculture transformation gives an opportunity to small-scale farmers to take advantage of the expanding aquaculture sector, hence they should operate as businesses (Chimatiro (2021). In this context, the Plan to put in place appropriate activities supporting this initiative thereby contributing to the realisation of the socio-economic potential of the aquaculture sub-sector. There is need to share success stories from lead fish farmers and others, which show that small-scale fish farming is an attractive baseline business case with operational margin of 35% from first year, The Plan recognizes the need to increase productivity of aquaculture from the current maximum yield of 10,000 tonnes/ha to over 100,000 tonnes/ha by 2030. The pond area will also increase from the current 251.59 hectares to around 800 hectares considering establishment of a 180-ha mega farm at Kasinthula; 10 ha at Limphasa; 80 ha land under pond aquaculture in 20 districts; 20 ha in other government owned farms and 200 ha cage farm area on Lake Malawi.

In terms of economic analysis, Chimatiro (2021) reported a Return on Investment (ROI) and break even at year 3 and an IRR of 39% over 10 years as demonstrated by government fish farms. However, for small-scale fish farmers to realise this potential, the Plan needs to adopt best practices like tax waiver on imported capital items in aquaculture, promoting establishment of farmer schemes, building capacity of actors, enhancing networking through cooperatives to improve farm management and fish husbandry; deepening ponds to ensure water supply through the year, access and use of high quality of fingerlings; and access and use high quality feeds (preferably formulated ones). Furthermore, better retains can be achieved with expanded pond sizes from an average of 600m^2 to 2000m^2. Table 1 below shows projected production of aqua feeds and seed (fingerlings to achieve annual yield of 100,000 mt by 2030 based on demonstrable production of fish from aquaculture at Mzuzu Aquaculture Centre (Mbamba, 2024),

Table 1: Projected requirements for fish production (market size) (mt), number of fingerlings and feeds (mt) from 2025 to 2030

Item	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Table Size Production	Fish in metric tons	10,000	14,000	19,000	24,000	30,000	97,000
Fingerlings Stocked	Tilapia fingerlings ('000)	50,000	70,000,	95,000,	120,000	150,000	485,000
Feed requirement	Floating feeds with 1.8 FCR	18,000	25,200	34,200	43,200	54,000	174,600

2 PROCESS OF NADP FORMULATION

The process of preparing this National Aquaculture Development Plan was coordinated by the Department of Fisheries under the Ministry of Natural Resources ad Climate Change. The Food and Agriculture Organisation (FAO) of the United Nations (UN) provided technical and financial support for the development of the NADP through the FAO Multipartner Programme Support Mechanism (FMM).

Information gathering for the Plan included review of literature and some consultative field meetings with selected aquaculture fish farmers, hatchery operators and other investors and banks and micro-finance institutions. The review of literature was conducted based on both published and unpublished materials including various policy documents and reports for preparation of a situation analysis on the extent of aquaculture development in Malawi. Specifically, the situational analysis outlined challenges to the development of aquaculture, both for pond aquaculture and cage farming. It also described the potential and opportunities for other production systems involving culturing of Tilapia and other species especially cat fish. Finally, the situation analysis highlighted technical gaps on aquaculture.

Subsequently, based on a participatory process, a national validation workshop was held from 21st to 22nd December, 2023 in Mangochi. There were 40 participants to the workshop drawn from government including NADP Task Force, fish farmers, aquaculture investors, micro-finance institutions (MFIs), commercial banks, academic institutions, civil society organizations (CSOs), non-governmental organizations (NGOs), independent consultants and project partners on aquaculture. It was also attended by officials from FAO. A presentation of draft NADP was made followed by discussions in plenary. Consequently, three groups were formed to discuss and on the draft. The workshop participants then agreed to validate vision, mission, immediate outcomes and outputs, purpose, expected outcomes, outputs, long term objectives, immediate objectives, prioritised issues and actions. Finally, they also validate indicators, time-frame, responsible institution, and budget.

The second validation workshop was conducted in September 2024 with participation of the FAO that made a presentation on Guidelines for Sustainable Aquaculture (GSA). The workshop recommended alignment of the Draft NADP to the GSA. This involved drawing certain elements of the Guidelines and incorporate them in the NADP which was subsequently done. Another recommendation was to have targets and performance indicators done on a yearly basis for proper monitoring,

2.1 Rationale for the National Aquaculture Development Plan

Aquaculture in Malawi is faced with a number of challenges that lead to sub-optimal and non-profitable sector growth, and the impact of the effect includes reduced profitability and competitiveness of the sector, and increased livelihoods and food security losses of fish farmers as reflected in the Problem Tree (Chimatiro, 2021) that was used when preparing the National Aquaculture strategic Plan (NASP II). There are several factors that affect the slow growth of the aquaculture sub-sector in the country.

Firstly, there is increasing pressure on the natural sources of fish due to the growing demand, thus leading to low supply, loss of biodiversity and limited local farmers' competitiveness. Consequently, to meet this high demand for fish, there are fish imports thereby contributing to shortage of foreign exchange. Considering the potential of aquaculture, for operational reasons, there is a need for sustainable aquaculture based on priorities that are based on the needs of the stakeholders and to guide the Government on public investments. Apparently, Malawian fish farmers need to take advantage of the business opportunity presented by the huge domestic and regional (SADC, COMESA, etc) fish supply shortfall (Chimatiro, 2022).

Further analysis of the problem builds on the recently developed NAS and NASP by Chimatiro (2020; 2021). The problem analysis was done in two parts. Firstly, this focused on the general challenges of aquaculture sector growth in Malawi; and this revealed the technical constraints that have led to Malawi's slow growth of aquaculture sub-sector. Secondly, the analysis determined the institutional challenges that have resulted from limited alignment of the Fisheries and Aquaculture Policy of 2016 with the SADC regional Protocol on Fisheries and other global instruments.

Based on the Problem Tree and SWOT analysis carried out when developing National Aquaculture Strategy (NAS) and National Aquaculture Strategic Plan (NASP) (Chimatiro 2021; 2022), the prioritized issues in aquaculture were in a consultative process as outlined below.

a. Weak governance: Some of the key elements of good governance in Malawi's aquaculture have not been adequately applied. For example, limited sectoral collaboration; limited integration of environmental, social, and economic considerations into aquaculture plans and policies; fostering practices that do not minimize environmental impacts, such as pollution and habitat destruction; and limited capacity on social networks.

b. Weak institutional capacity: This refers to, among others, inadequate human resources, limited infrastructure like feed mills and hatcheries, inadequate support to enable small-scale aquaculture actors to graduate to market-led operations, inadequate linkage to the regional aquaculture value chain, limited expertise and strategy for aquatic animal health,

c. Limited access to aquaculture inputs: Farmers face problems in importing aqua-feeds from other countries, which are uneven distributed to all parts of the country.

d. Limited access to financing: Farmers has limited access to capital which they could obtain from micro-finance institutions (MFIs) and commercial bank due to collateral and high interest rates

e. There are limited incentives for aquaculture investors along the value chain which has led to low private sector investment. While the Government has made some policy reforms in aquaculture like duty waiver on the importation of capital items for the sub-sector, there are still some items that are not considered. This makes aquaculture products not competitive on the market.

f. Climate variability and disasters: Climate variability impacts water availability for aquaculture, especially pond culture. Natural risks and disasters have also been experienced by aquaculture producers in ponds and cages. For example, between 2017 and 2023 Malawi has been experiencing tropical cyclones like Kenneth, Gombe, Ana, Idai, and Freddy thereby resulting in loss of fish and infrastructure like ponds.

g. Limited access to aquaculture technologies: Inadequate awareness on the sub-sector among the public, leads to low uptake of aquaculture information and technologies for investment.

h. Poor linkage between research/ technology development and extension.

i. Inadequate and inconsistent implementation, monitoring and evaluation of policies ad strategies: Usually due to funding constraints, Department of Fisheries does not systematically implement its work plans.

j. Potential aquaculture sites remain unidentified. The potential sites refer to land for pond aquaculture and water for cage farming systems, Identification of the potential aquaculture sites is crucial for both public and private investments or public-private partnerships (PPP).

k. Diseases: Malawi's aquaculture is largely threatened by Epizootic Ulcerative Syndrome, which has sporadically been experienced since 2019. Another disease is Tilapia Lake Virus (TLV).

3 RELEVANT DEVELOPMENT POLICY FRAMEWORKS

Effective implementation of this Plan will require strong cooperation, collaboration, coordination and investment across a range of entities based on a well-structured and participatory approach. At national level, the Plan is in line with major policy frameworks and guidelines including Malawi 2063, Malawi 2063 First Ten Years of Implementation Plan (MIP 1), Public Sector Reforms Strategy National Fisheries and Aquaculture Policy (NFAP), Fisheries Conservation Act, Blue Economy Strategy, National Aquaculture Strategy, National Agriculture Policy National Agriculture Investment Plan (NAIP), National Aquaculture, National Aquaculture Strategy (NAS), National Aquaculture Strategic Plan (NASP) National Environmental Policy, National Gender Policy, Labour Act, Water Resources Act, National Water Resources Policy, Land Act and National Irrigation Policy. At continental and regional levels, the Plan is in line with the Policy Framework for Fisheries and Aquaculture and Reform Strategy (PFFARS) (AUC-NEPAD, 2014) and the Southern Africa Development Community (SADC) Protocol on Fisheries and the Regional Aquaculture Strategy and Action Plan of (RASAP 2016-2026) (SADC, 2016), respectively.

At global level, NADP is prepared in consideration of gender and social inclusion, climate variability as well ecosystem and environmental concerns, which is in line with the Guidelines for Sustainable Aquaculture by FAO (2024) on issues like good governance, reduction in the use of antimicrobials and other veterinary medicines, biosecurity, reduction in the use of wild fish as feed, recommendation to promote environmental complexity and biodiversity in aquaculture systems, and recommendation to establish aquaculture funding and investment rules and processes that are transparent and environmentally sustainable. Challenges encountered in aquaculture such as water access, greenhouse emissions and pollution may require solutions some of which are nature-based like water recycling and nutrient recovery. The GSA also take note of effective management of the aquatic biodiversity and genetic resources in various water bodies like Lake Malawi and other aquatic resources for ecosystem health, national well-being and efficient aquaculture production systems. Furthermore, NADP is aligned to the FAO Blue Transformation Roadmap with a pillar focusing on sustainable aquaculture intensification and expansion. The Plan is also aligned to the Guidelines for Responsible Aquaculture by FAO (2024) by recognizing linkages with other sectors like fisheries, agriculture, forestry, wildlife, tourism, and transportation.

The GSA further considers integration of aquaculture products into nutrition-sensitive and sustainable food systems. Other relevant elements include social responsibility, equity and decent livelihoods being necessary for sustainable sector recognizing the role of women, youth and vulnerable groups (YWVGs), indigenous communities, small-scale farmers and people with disabilities being active along the aquaculture value chain. Market access, value addition and fish quality are critical and require participation of the public-private partnerships. Finally, effective monitoring, evaluation and learning MEAL matrix is shared among all stakeholders. This will ensure management of natural resources and enterprises sustainably, considering ecosystem conservation; climate change and mitigation; and resiliency.

4 GUIDING PRINCIPLES

Implementation of the National Aquaculture Development Plan will require strong cooperation, collaboration, coordination and investment across a range of entities based on a well-structured and participatory approach. The Plan will be guided by the following principles:

a. **Good governance:** A focus will be participation, transparency sustainability, accountability, and equity principles as highlighted in the FAO's principles for sustainable aquaculture. Of particular importance is the strengthened stakeholder engagement mechanisms by ensuring that marginalized groups, particularly women and youth, are actively involved in decision-making processes. In addition, establishment of structured forums and participatory platforms for inclusive governance will be necessary.

b. **Scalability:** Activities, wherever possible, must be designed to be suitable for use at different scales, for example at local and national scales and regionally. Scaling must be attained by replication (in different places), and by modification and adaptation of initiatives for different contexts.

c. **Sustainability:** Application of EAA and international BMP will guard against undesirable bio-ecological and socio-economic outcomes.

d. **Accountability:** stakeholders including and non-State actors must own the process of implementing the strategy and be held responsible for their decisions and actions.

e. **Transformation**: This involves transforming small-scale aquaculture producers to middle- to large-scale producers

f. **Equity and equality:** Decision-making processes must be inclusive, fair and transparent, non-discriminatory to women, youth, vulnerable and disadvantaged/marginalised groups and subject to clear and consistent rules and procedures.

g. **Self-development:** Plans are of little value in the absence of supporting political will and financial resources. Government will provide an enabling environment for stakeholders to successfully implement NADP.

h. **Transparency and accountability:** Stakeholders, including and non-state actors, must be transparent in their decision-making processes and own the process of implementing the NADP and be held responsible for their decisions and actions.

i. **Results-oriented implementation**: The Plan will be monitored and evaluated at regular intervals with set indicators and targets to track progress of aquaculture production whole considering environmental monitoring and addressing bio-security issues

5 GOAL, PURPOSE AND OBJECTIVES

5.1 Goal

The goal of NADP is to sustainably increase fish production from aquaculture by small- and large-scale enterprises including the private sector.

5.2 Purpose

To realise potential of sustainable aquaculture production from 10,000 mt in 2024 to 100,000 mt by 2030 fish production

The following are the specific objectives of NADP

a. To strengthen aquaculture governance at national and district levels.
b. To have an optimally productive and socially equitable small- and large-scale businesses.
c. To develop research, technology and innovations for increased profitability, sustainable environment and socially equitable aquaculture sub-sector growth.
d. To promote gender-responsive input-output markets, supply chains and product diversification to achieve wealth creation.
e. To strengthen institutional capacity and knowledge and skills of actors based on gender at all levels in order to attain higher productivity and competitiveness.
f. To enhance climate-resilience and environmentally sound aquaculture investments.
g. To ensure that an effective Monitoring, Evaluation and Learning (MEAL) framework is developed with clear targets, indicators and budget at national and district levels.

6 OUTLINE OF THE PLAN

The National Aquaculture Development Plan outlines the following: gap analysis that specifies priority issues and challenges experienced in the aquaculture sub-sector; opportunities for aquaculture development based on national and sectoral objectives; Priority areas and activities necessary for strengthening the role of aquaculture within Malawi's economy; and an implementation plan with objectives, outcomes, outputs, and responsibility. Other key issues include organisational capacity and institutional arrangements and communication are also contained herein. Specifically, these organisational and institutional issues include skilled manpower, infrastructure and enabling environment for doing aquaculture businesses.

7 PRIORITY AREAS OF NADP

The Plan has seven priority areas based on the analysis of key issues and gaps on aquaculture. The key priority areas include: (a) Aquaculture Governance; (b) Sustainable Aquaculture Production; (c) Research, Technology Development and Dissemination; (d) Gender-responsive Aquaculture Supply and Value Chains; (e) Capacity Strengthening; (f) Climate-smart Aquaculture; and (g) Monitoring, Evaluation and Learning. The priority area objectives and expected outcomes are outlined below.

PRIORITY AREA 1: GOOD GOVERNANCE

Good governance in aquaculture is essential for ensuring sustainable development, environmental protection, and socio-economic benefits. Effective governance frameworks encompass a range of principles and practices that facilitate responsible management of aquatic resources. The aquaculture sector has potential to significantly contribute to the economy and livelihoods of the farmers, hence there is now increasing investments by the Government, non-state actors and private sector. There is also investment support towards aquaculture by the development partners. Despite the growing investments and support in the sector, aquaculture production has remained low and its potential is not yet realised. The aquaculture sector is still informal with low participation of large-scale investors and only 50 formally recognised active cooperatives. Generally, the aquaculture sector is characterized by low productivity; limited access to quality seed (fingerlings); and low-quality aqua feeds; lack of information system; and low adoption of technologies, ICT and innovation. However, good governance in aquaculture is essential for ensuring sustainable development, environmental protection, and socio-economic benefits. Effective governance frameworks encompass a range of principles and practices that facilitate responsible management of aquatic resources.

In practising good governance in aquaculture, it refers to a set of processes which defines how aquaculture stakeholders participate in making and implementing decisions affecting the development of aquaculture (FAO, 2024). In this context, power dynamics characterises how the Government and other partners mainly the actors along the value chain make their decision (Njaya et al. 2009). Governance frameworks determine how decision-makers are held accountable to aquaculture stakeholders and ensure observance and enforcement of applicable laws and regulations in collaboration with national and district organisations including non-state actors thereby fostering adherence to the rule of law. (FAO, 2024).

Therefore, this NADP notes that having and enforcing implementation of good aquaculture governance frameworks is one of the necessary conditions for the sector to fully realise its potential for growth and prosper over time.

Such frameworks, which should be comprehensive and inclusive, take into consideration the specificities and complexities of the social-technology, scale, practices and ecosystem services, and should include policy, institutional and administrative and legal and regulatory frameworks.

In order to remain relevant to the Malawi's development narrative, NADP must contribute to the Malawi 2063. Therefore, the Plan provides the effective institutional framework for aquaculture governance and sector growth by ensuring that the Department of Fisheries (i) puts in place and implements a coherent regulatory framework that serves a viable aquaculture industry, (ii) realises efficient organisational operations, (iii) guides mainstreaming of aquaculture to achieve efficient development, (iv) enhances aquaculture governance at all levels, (v) domesticates the SADC Protocol on Fisheries; and Guidelines for Sustainable Aquaculture (GSA).

Objective 1.1: To strengthen good governance in aquaculture sector at national and district levels

Outcome 1.1.1*: Strengthened good governance in aquaculture at community, district and national levels achieved by 2030*

1.1.1.1 Jointly develop area management plans based on holistic food system perspective, EAA, and specific biological needs of the aquatic organisms

1.1.1.2 Involve local fish farmers and stakeholders in the implementation of NADP

1.1.1.3 Create transparent and social networks along aquaculture value chain

1.1.1.4 Create inclusive platforms and networks along the value chain to transparently make decisions and share needs and respond to issues encountered along the value chains

Outcome 1.2.1 *Integrated aquaculture policy and legislative frameworks with other sectors achieved by 2030*

1.2.1.1 Implement National Fisheries and Aquaculture Development Policy of 2016

1.2.1.2 Scale up integration of aquaculture into Malawi's food systems

1.2.1.3 Build coherence between NADP and other relevant sectors to provide environment for investment strategies

1.2.1.4 Develop and operationalise strategy on integration of aquaculture products into safe and nutritious aquatic foods in national food diets, guidelines and school feeding programmes

1.2.1.5 Align public incentives with National Fisheries and Aquaculture Policy

1.2.1.6 Enhance coordination and cooperation among various authorities competent on different aspects relevant for aquaculture development

1.2.1.7 Encourage industry players to adopt voluntary codes of conduct that promote ethical practices and environmental stewardship.

1.2.1.8 Strengthen access to data and information related to aquaculture practices, market trends, and environmental impacts.

Outcome 1.3.1: *Effective coordination among actors along aquaculture value chain achieved by 2026*

1.3.1.1 Mobilise farmers into clusters

1.3.1.2 Establish producer organisations to link farmers to markets, anchor farms and individual off takers

1.3.1.3 Support mobilisation of a national fish farmers organisation aligned to NAFAM/FUM to provide a platform for actors along the value chain

1.3.1.4 Conduct regular joint aquaculture sector review meetings

1.3.1.5 Conduct annual fisheries and aquaculture meetings with exhibitions

PRIORITY AREA 2: SUSTAINABLE AQUACULTURE PRODUCTION

While growth of aquaculture in Malawi has been slow, there seems to be some investments like in selective breeding, feed and private sector including SMEs. This has been noted especially since 2016, when implementation of the National Fisheries and Aquaculture Policy started in which Aquaculture was recognised as Policy Area 2. However, aquaculture production and productivity has still remained low and its potential not yet realised considering the increasing demand from domestic and export markets. Aquaculture transformation is, therefore, necessary to optimally contribute to the achievement of MW2063. To achieve sustainable growth in aquaculture, there is need to adopt the FAO Guidelines for Sustainable Aquaculture (GSA). This implies a shift from low productivity and small-scale aquaculture to a highly productivity and commercialised aquaculture levels with adoption of best management practises, upgraded value chain and marketing linkages. This will attract investments in value addition and fish-processing; resulting in the inclusive wealth creation, employment opportunities, and sustainable economic growth of the country. Thus, NADP emphasises market-led commercialisation of the sector.

A rise in aquaculture production and productivity above the subsistence requirement will result in an increase in the volume of marketable surplus, thereby propelling value-addition and industrialization. This will require various investments by actors along the aquaculture value chain like input and output supplies, hatchery and aqua feeds, and value addition. NADP will aim to increase production from 10,000tmt in 2024 to 100,000mt by 2030. Apart from realising expanded pond size areas by small- and large-scale fish farmers either as individuals or cooperatives, intensification of aquaculture will be pursued with promotion of public-private investments by focusing on anchor farms and mega farm projects. There is also a need to integrate aquaculture with agriculture and other sectors thereby promoting diversification in food production and incomes while considering governance and planning issues as well as sustainable resource use, ecosystem and farm management as highlighted in the GSA (FAO, 2024). Furthermore, culture-based systems should also be promoted to consider promoting growth of fisheries and aquaculture in Malawi's aquatic systems while being cautious of the environment and biodiversity.

Sustainable aquaculture production holds significant potential for meeting Malawi's protein demands while safeguarding the environment and supporting livelihoods. By focusing on these areas, stakeholders can help to develop a more sustainable aquaculture sector that benefits both Malawians and ecosystem. Collaboration among governments, industry, researchers, and communities is essential to drive the transition towards sustainable practices in aquaculture. Several issues need to be considered including environmental impact, resource management, economic viability, regulatory measures, and climate resilience.

Objective 2.1: To have an optimally productive and socially equitable small- and large-scale fish farms achieved by 2030

Outcome 2.1.1: *Increased aquaculture production from 10,000 tonnes/year to 100,000 tonnes/year by 2030*

2.1.1.1 Establish 7 mega aqua farms operational by 2030 through PPP by partial capitalisation through financial resources by Government in the arrangement

2.1.1.2 Establish 120 anchor farms by 2030 through PPP

2.1.1.3 Produce fingerlings from 8 hatcheries (publicly and privately owned and individual farmers) by 2030

2.1.1.4 Produce and supply floating feeds through agro-dealers in cluster markets

2.1.1.5 Collect data on fish harvest (mt)

2.1.1.6 Conduct field days in clusters on tilapia and catfish demonstrated best management practices and importance of fish nutrition

2.1.1.7 Update record of subsistence and small-scale fish famers by cluster and gender

2.1.1.8 Provide support to subsistence/ small-scale fish farmers access information on aquaculture business case model

2.1.1.9 Establish clusters of fish farmers in all suitable areas

2.1.1.10 Design and implement strategies that enhance market-led transformation based on gender

2.1.1.11 Adopt best practices in aquaculture (e.g. deepening fish ponds and increasing pond sizes and waste water in ponds)

Outcome 2.1.2: *Designated suitable pond sites, cage sites and aqua parks for aquaculture available by 2030*

2.1.2.1 Identify high potential aquaculture sites (zoning)

2.1.2.2 Identify farmer cluster sites (for pond-based farmers) or associations (for cage farmers) for targeted extension messages

2.1.2.3 Carry our environmental, social and impact assessment (ESIA) studies in the aquaculture sites

2.1.2.4 Secure, equitable and socio-culturally appropriate tenure rights to aquaculture designated sites (and water) and adjacent land for long-term leases

2.1.2.5 Conduct pre-feasibility/feasibility studies to promote aquaculture investments in feed, hatcheries, fish production, supply chain (distribution of inputs and outputs)

***Outcome 2.1.3**: Scaled up visibility of the aquaculture industry by 2030*

2.1.3.1 Create public awareness on viability of aquaculture investments

2.1.3.2 Participate in business meetings to attract aquaculture investors

2.1.3.3 Demonstrate economic and financial viability of aquaculture enterprises at various levels

2.1.3.4 Conduct farming community awareness on demonstrated best management practices and importance of fish nutrition through various platform and channels

2.1.3.5 Disseminate aquaculture research, technologies and innovation

2.3.1.6 Conduct civic education on consumption of fish-based diets among children, adolescent girls and boys and pregnant and lactating mothers within 1000 days of life to improve cognitive development

2.1.3.7 Develop aqua-business investment portal

2.3.1.8 Conduct Round Table Dialogues (discussion platforms) involving Blue Economy Working Group (BEWG) e.g. NPC, MCCCI, EDF, PPP Commission, MAAIC, MITC), MFIs, banks and large-scale investors to showcase on-farm tested technologies with financial analysis to attract investment and financial access models

2..1.3.9 Develop special economic zones where aqua-feeds production can be located for ease access to farmers

***Outcome 2.1.4:** Increased fish production from natural and man-made small water bodies by 2030*

2.1.4.1 Undertake an inventory of natural/man-made irrigation dams and reservoirs

2.1.4.2 Stock small-water bodies including reservoirs and dams.

2.1.4.3 Establish tenure arrangement of the stocked water bodies based on by laws and cultural systems

PRIORITY AREA 3: RESEARCH, TECHNOLOGY AND DISSEMINATION

Focusing on research, technology, and dissemination in aquaculture is essential to enhance productivity, ensure sustainability, and improve the livelihoods of those involved in the sector. By fostering innovation and collaboration, the aquaculture industry can meet the growing global demand for seafood while minimizing environmental impact. Specific research areas will include developing innovative practices, environment and sustainability; nutrition and feed formulation for certain fish species like tilapia and catfish; and genomic and biotechnological approaches. Furthermore, technology and integration will focus on automation of smart farming; data analytics; and identifying alternative protein sources into feed ingredients. NADP will also encourage research on dissemination of knowledge in specific areas like education and training programmes; collaborative networks; extension and community outreach services; and public awareness. Policy and governance research will cover issues like regulatory frameworks and funding mechanisms. On regional and global cooperation, specific research areas will centre on regional and international research collaboration and sharing of success stories and best practices.

Objective 3: To develop research, technology and innovations for increased profitability, sustainable environment and socially equitable aquaculture sub-sector growth

Outcome 3.1: *Scientifically proven and demand driven research, technologies and innovations produced in aquaculture done by 2030*

3.1.1.1 Assess community needs on aquaculture best management practices and importance of fish nutrition

3.1.1.2 Conduct census of fish farmers to update record

3.1.1.3 Design and conduct priority research for appropriate technologies and innovations

3.1.1.4. Develop aquaculture research that is responsive to gender and industry

3.1.1.5 Conduct aquaculture research on technologies and innovations that are responsive to climate variability

3.1.1.6 Conduct genetically improved fish strains

3.1.1.7 Conduct aquaculture research that is responsive to gender and industry

3.1.1.8 Disseminate aquaculture research, technologies and innovation

3.1.1.9 Develop climate-smart and gender-based technologies and innovations

3.1.1.10 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses

3.1.1.11 Develop ICT and other innovations in aquaculture

3.1.1.12 Scale-up and harmonise fish harvest methodologies

Outcome 3.2.1: *Increased institutional capacity for effective implementation of aquaculture research, technology and innovation programmes*

3.2.1.1 Operationalise bio-safety measures at national and regional levels

3.2.1.2 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses

3.2.1.3 Equip and rehabilitate aquaculture research centres with necessary laboratory equipment and other infrastructure

3.2.1.4 Provide public and private sector support to Genetic Improvement Programmes (GIPs)

3.2.1.5 Support local innovation including information and communications technology (ICT) e.g. development of aquaculture equipment and manufacturing and digitalised feeding.

3.2.1.6 Train scientific human capital in various specialised disciplines (biology, ecology, genetics economics, fish disease diagnosis, nutrition, gender)

3.2.1.7 Review curricular various training institutions including university to respond to the aquaculture industry needs

3.2.1.8 Develop innovation hubs for young scientists and innovators in aquaculture for internships

3.2.1.9 Develop gender-responsive climate-smart technologies and innovations

3.2.1.10 Conduct joint field days involving researchers and extension agents to demonstrate aquaculture technologies and financial viability as guided by the research agenda (e.g. feeding, hatchery, mono-sex culture, poly-culture, integrated aquaculture agriculture (IAA), integrated irrigation

3.2.1.11 Establish and operationalise joint research-extension committee involving experts from various sectors/sub-sectors e.g. fisheries and aquaculture; environment, early warning, climate change and adaptation; agriculture and veterinary and trade

PRIORITY AREA 4: GENDER-RESPONSIVE AQUACULTURE SUPPLY AND VALUE CHAINS AND DECENT WORK

Aquaculture has potential to contribute to food security, economic development, and job creation in Malawi. However, the involvement and empowerment of women and marginalized groups within aquaculture supply and value chains remain vital to sustainably harnessing its potential. A gender-responsive approach is critical to ensuring equitable access to resources, opportunities, and decision-making which, in turn, leads to greater economic resilience, social inclusion, and sustainability.

Aquaculture development requires access to markets and market-led tools that could be applied to improve the sustainability of aquaculture (FAO, 2024. Subsequently, trade and market entry are facilitated by promoting Mutual Recognition Agreements (MRAs), adoption of voluntary standards, equivalence and transparency of standards and technical regulations based on regional and global agreed norms and on scientific evidence using the risk assessment methodology and recognized institutions

The small-scale fisheries sector has an essential role in transforming Malawi's food system by contributing to ending poverty and hunger through healthy and sustainable diets and equitable livelihoods. Of concern is the gender equality, which is a basic human right and it is fundamental to achieving gender-equitable small-scale fisheries in Malawi. A substantial number of women depend on the sector for their livelihoods (Manyungwa et al., 2019), as more than 70,000 women are estimated to depend on small-scale fisheries in Malawi (FAO, Duke University and WorldFish, 2022). Although women are less present in the harvesting phase of the value chain due to restrictive gender norms, they are largely engaged in the post-harvest activities such as processing and trading.

Objective 4.1: To promote gender-responsive input-output markets, supply chains and product diversification to achieve wealth creation

Outcome 4.1.1: *Building resilience of gender-sensitive aquaculture enterprises along value chain*

4.1.1.1 Scale-up gender-transformation in decision processes regarding production, processing and marketing

4.1.1.2 Undertake action to address barriers along the value chain from production from production to consumption

4.1.1.3 Entrench gender transformative approach in aquaculture planning and policy recommendations at all levels.

4.1.1.4 Provide support to women and youth in aquaculture cooperatives and enterprises jointly with other partners e.g. TEVETA, universities and NGOs.

4.1.1.5 Mainstream gender into production, value addition and trade

4.1.1.6 Establish industrial supportive and strategic facilities/infrastructure in designated areas of secondary cities for niche products and value chains like fish (fish landing and processing facilities)

4.1.1.7 Ensure one-broader post facilities are operational

4.1.1.8 Promote BMPs to prevent fish loss and waste along the AVC (e.g. duty waiver, schemes, deepening ponds, training, associations, networking, EUS/TLV control)

Outcome 4.2.1 *Decent working conditions in aquaculture ensured*

4.2.1.1 Enable fish farmers, workers and business stakeholders to earn a fair return from the labour

4.2.1.2 Create adequate working conditions

4.2.1.3 Create conditions for men and women in aquaculture to work in an environment free from gender abuse

4.2.1.4 Promote apprenticeship or vocational skills for youth engagement in aquaculture

4.2.1.5 Set up targeted investments for youth and women

PRIORITY AREA 5: CAPACITY STRENGTHENING

Responsive market-led aquaculture can only be facilitated and not hindered by coherent regulatory frameworks that serve the industry. Consultations with stakeholders has revealed that the Department of Fisheries has achieved a lot in mainstreaming aquaculture in the district development process. However, human resource capacity at the district level remains limited.

As Chimatiro (2021) observe, compared to crop farmers, most fish farmers are not well covered by extension workers. And because they are not organised in producer organisations, they cannot easily exchange knowledge. Therefore, most fish farmers lack technical and managerial skills, leading to the sector being unproductive.

Therefore, effective capacity strengthening of individual fish farmers and non-state actors along the AVC is necessary for addressing the specific needs of the fish farming communities as noted by (FAO 2024). The strengthening of capacity has to be considered in terms of finances, skilled human resource and equipment. The capacity strengthening will prepare the future workforce for aquaculture development in Malawi by developing technical skills and competencies that are adapted to the modern information technology.

Objective 5.1: To strengthen institutional capacity, and knowledge and skills of actors based on gender at all levels for higher productivity and competitiveness

Outcome 5.1.1: *Functional gender-responsive frameworks and tools for effective knowledge and skills generation, dissemination and uptake achieved by 2030*

5.1.1.1 Train DoF and its partners to support development of commercial fish farming

5.1.1.2 Regularly conduct Joint Aquaculture Sub-Sector meetings involving relevant stakeholders at cluster, district and national levels

5.1.1.3 Revise modules and curricular various training institutions including MCF, universities and TEVET Authority (TEVETA) responding to the aquaculture industry needs

51.1.4 Recruit adequate skilled extension workers in district

5.1.1.5 Review aquaculture extension system for effective delivery systems and outreach services

5.1.1.6 Operationalise one-stop-shop for all aquaculture business application procedures established

5.1.1.7 Train farmers and actors along value chain and supply in business management and entrepreneurial skills

5.1.1.8 Conduct internships and famer field schools to over 8,000 farmers by 2030

5.1.1.9 Mobilise fish farmers into cooperatives

5.1.1.10 Train fish experts in diagnosis, parasitology and treatment of fish diseases

5.1.1.11 Provide training to women cooperatives to women actors along the aquaculture value chain

5.1.1.12 Provide mentorship to enhance youth aquaculture entrepreneurship through an incubation programme targeting 250 incubates at National Aquaculture Centre (NAC), Mzuzu Aquaculture Centre (MAC) and Kasinthula Aquaculture Centre (KAC)

5.1.1.13 Conduct specialised training for hatchery operators (catfish and tilapia) to increase fingerling production

5.1.1.14 Conduct specialised training for catfish management especially breeding

5.1.1.15 Invest in hatcheries through PPP

5.1.1.16 Operationalise procured 2 feed mill through PPP for MAC and DAC

Outcome 5.2.2: *Enhanced capacity of aqua businesses achieved by 2030*

5.2.2.1 Jointly work with agri-business experts in districts to support aquaculture businesses

5.2.2.2 Recruit aqua-business officers to support aquaculture investors

5.2.2.3 Strengthen public-private partnerships to enhance knowledge sharing and technology dissemination

PRIORITY AREA 6: CLIMATE-SMART AQUACULTURE

Globally, aquaculture continues to significantly expand its production, making it the fastest-growing food production sector. For the recent times, GoM has also considered aquaculture sub-sector as one of its priority areas as stipulated in the MW2063 (GoM 2021). However, the sustainability of the sub-sector is being threatened by the predicted effects of climate change that are not only a future but also a present reality. In a review by Maulu et al. (2021), their findings confirmed existing potential effects of climate change on aquaculture production and its implications on the sector's sustainability. Several issues of climate variability, such as rising temperatures, sea-level rise, diseases and harmful algal blooms, changes in rainfall patterns, the uncertainty of external inputs supplies, changes in sea surface salinity, and severe climatic events were reported. Adapting to the predicted changes in the short-term while taking mitigation measures in the long-term was recommended to be the only way toward sustaining the sector's production. Thus, successful adaptation will depend on the adaptive capacity of the producers. On the other hand, there is also potential of aquaculture bringing adverse effects on the environmental sustainability. For example, effluents from the farms, fish disease outbreaks and introduction of invasive species. Therefore, planning, designing and implementation of aquaculture projects will need consideration of social, economic, biological and environmental safeguards and sustainability.

The benefits of climate-smart aquaculture include: increased resilience through strengthening of the resilience of aquaculture systems to climate variability and extremes; food security, which is achieved by sustainably increasing aquaculture productivity and diversifying seafood sources; economic viability by enhancing the economic sustainability of aquaculture operations by reducing costs associated with feed, energy, and water use and environmental Protection: Minimizing the environmental footprint of aquaculture practices through effective resource management and conservation efforts.

However, integrated farming, as means to increase resilience of communities and individuals to risks in general by diversifying food sources and livelihood options (FAO 2014). There is also a need to increase the resilience of communities through climate responsive technologies like deepening ponds, selecting fish species that can survive under harsh weather conditions like catfish. For improved policy coherence, resilient livelihoods can be achieved by diversifying food sources and introducing climate change adaptation

(CCA) and disaster risk management (DRM) measures into aquaculture to reduce the risks in times of crisis. For example, the recently occurred cyclone disasters caused heavy losses to fish farmers as the stacked fish escaped due to floods in the southern districts of Zomba, Chiradzulu, Mulanje and Phalombe. In response the Government supported the affected farmers to rehabilitate their ponds and stock fingerlings through Post Cyclone Idai Emergency Recovery and Resilience Project funded by the AfDB (GoM, 2022).

Increasing seasonal and annual variability in rainfall and resulting flood and drought extremes are likely the most significant drivers of change in capture fisheries and aquaculture (WorldFish 2007). As Malawi intensifies aquaculture investments on both land and cage aquaculture on Lake Malawi, environmental impact of such expansion is likely to present major challenges to sustainable aquaculture production. Many farmers reported that climate change was already affecting water availability on their farms. The Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries (CCRF) emphasises the need for countries to develop responsible aquaculture while ensuring environment and transboundary waters. At the continental level, the Joint Ministerial Conference on Agriculture, Fisheries and Aquaculture, which was held in Addis Ababa in 2014, recommended to: *"Urge Member States to include fisheries/aquaculture in existing Climate Change Adaptation (CCA) and mitigation, and Disaster Risk Management (DRM) Policy and Strategy" (African Union 2014).*

While the National Fisheries and Aquaculture Policy (2016) clearly provides guidance on climate change, it omitted Disaster Risk Management (DRM); however, recently Malawi has been affected frequently by tropical cyclones like Kenneth, Gombe, Ana, Idai, and Freddy for the past seven years. Farmers lose their fishponds due to flooding or drought (Chimatiro 2021). Therefore, NADP aims to ensure that the aquaculture industry is made resilient to future shock that could come from climate change and weather uncertainty. There could be increased virulence of pathogens and diseases, reduced ecosystem productivity in warmer waters, and adverse impacts on livelihoods and extreme weather conditions could cause destruction of cages, with escapees, possibly leading to loss of biodiversity and cause water stress. Hence, there is need to implement climatic smart aquaculture mitigation measures.

Objective 6.1: To enhance climate-resilience and environmentally sound aquaculture investments

Outcome 6.1.1 *Increased aquaculture resilience achieved by 2030*

6..1.1.1 Assess vulnerability of fish farming.

6.1.1.2 Implement disaster risk management and mitigation measures for aquaculture.

6.1.1.3 Increase access to information (potential impacts of climate change, early warning, climate variability and disaster risks)

6.1.1.4 Establish early warning systems for use by farmers

6.1.1.5 Provide diversified value chains and equal access to fish markets

6.1.1.6 Reduce post-harvest losses by adopting climate-smart fish processing technologies

6.1.1.7 Increased fish quality and hygiene in fish processing, transportation and marketing

Outcome 6.1.2: *Best management practices for aquaculture responsive to climate variability and disaster risks developed and adopted by farmers by 2030*

6.1.2.1 Adopt best aquaculture management practices that are responsive to climate variability and disaster risk.

6.1.2.2 Ensure access to microfinance and insurance schemes for diversified livelihoods, increased enterprises

6.1.2.3 Develop and share best adaptation practices to increase resilience among fish farmers

6.1.2.4 Apply integrated management approaches e.g. Ecosystem Approach to Aquaculture (EAA)

6.1.2.5 Share lessons on adaptation capacity and risk factors in aquaculture development

6.1.2.6 Mainstream Climate Change Adaptation (CCA) and Disaster Risk Management (DRM) planning frameworks at national level

6.1.2.7 Implement aquaculture interventions outlined in NDCs and NAP.

PRIORITY AREA 7: MONITORING, EVALUATION AND LEARNING SYSTEM

A well-designed Monitoring, Evaluation, and Learning (MEAL) system in aquaculture can significantly contribute to the sector's sustainability and resilience. By focusing on continuous improvement and stakeholder engagement, MEL can enhance the knowledge base, improve practices, and ultimately lead to better outcomes in aquaculture production and community well-being. The integration of adaptive management approaches will ensure that aquaculture systems remain responsive to emerging challenges and opportunities.

Monitoring should include collection of gender disaggregated data, analysis on aquaculture development, aquaculture performance and the impact of aquaculture on the environment, economies, community and societies at district and national levels. As FAO (2024) recommends, there is a need to establish mechanisms to monitor the implementation of NADP such as workplans, progress reviews, analytic tools and indicator development, application and reporting.

In developing NADP, stakeholders emphasised the need for a proper Monitoring, Evaluation and Learning (MEAL) system to specifically look at sustainability, technical and financial support, coordination, collaboration, and implementation/reporting mechanisms. Furthermore, it was noted that there has been limited management information system in the sector

although some have been developed under agricultural sector. Proposals included ensuring adequate financing and technical assistance; providing capacity-building and guidelines to support implementation; enhancing public-private partnerships; obtaining buy-in from relevant sectors to develop and implement the Plan; and enhancing the links between the Plan and other relevant sectoral policies. Therefore, putting in place gender-responsive policies and programmes with adequate institutional and financial support will help to effectively implement the Plan. The Plan also recommends a coherent management information system (MIS) as it will guide monitoring, evaluation and learning (MEAL) for the NADP.

A participatory MEAL system is essential in the implementation of this Plan. Various stakeholders including government, actors in the use of the aquatic resources, non-state actors, civil society groups and the private sector need to be capacitated with relevant monitoring and evaluation skills. There is a need to transform and task the current Project Review Committee which meets every quarter into a *Joint Aquaculture Sub-Sector Review Committee.* This will be an inclusive stakeholders' platform with membership from the government and non-state actors (NSAs). Its secretariat will constitute DoF, National Planning Committee, and Blue Economy Working Group and donor working group.

Funding sources for NAPD implementation will need to be identified primarily from the Government considering that aquaculture is one of the quick-wins projects within the MW2063 MIP 1 and other sources like Fisheries Fund subventions from (a) the Parliament with an effective monitored fingerings and aqua-feed sales; (b) councils (levies on fish and fish products and Constituency Development Fund (CDF) through by-law formulation and (c) central government through DoF (Other Recurrent Transactions (ORT)) for aquaculture. These measures will ensure sustainable implementation of the Plan. The secondary sources will be technical and financial support from development partners but to be done by targeting programmes specified by the ministry and activities outlined in this Plan.

There is need to build capacity of the implementers to develop frameworks to measure carry out MEAL. The training should be carried out before NADP starts being implemented. Additionally, clearer definitions of roles and responsibilities within the proposed Joint Aquaculture Sub-Sector Review Committee should be formulated by the stakeholders to strengthen accountability and coordination.

Objective 7.1: To ensure that an effective MEAL framework is developed with clear targets, indicators and budget at national and district levels;

Outcome 7.1.1 *Establishment and operationalization of monitoring evaluation and learning framework (MEAL) for aquaculture at community, district and national levels.*

7.1.1.1 Establish Specific, Measurable, Achievable, Relevant and Time-bound (SMART) indicators for effective implementation of policy, strategies and plans

7.1.1.2 Develop a participatory and gender-sensitive monitoring, evaluation and learning system at community, district and national level to track progress on aquaculture development.

7.1.1.3 Prepare participatory climate variability and disaster risk practices monitoring tools for documentation and effectiveness

7.1.1.4 Develop mechanisms and plans to monitor the impacts of the operations on the environmental, social and economic sustainability

7.1.1.5 Inventorise all existing programmes and projects funded by the Government, NGOs and other agencies with their funding portfolios in aquaculture for promotion of good governance, accountability and transparency

7.1.1.6 Conduct census of all actors along value chain

7.1.1.7 Prepare and circulate State of the Environment Outlook (SEO) Reports (SEORs) e.g. Socio-economic Profiles (SEPs) with aquaculture development to all stakeholders with adequate aquaculture inclusion done by 2026.

7.1.1.8 Prepare annual District Development Plans (DDPs) with set targets, indicators and responsible institutions on aquaculture

7.1.1.9 Collect and analyse gender-disaggregated data on aquaculture along the value chain.

7.1.1.10 Apply adaptive MEAL in all programming processes

***Outcome 7.1.2**: Sustainability in aquaculture programmes and projects achieved*

7.1.2.1 Develop resource mobilisation strategy

7.1.2.2 Prepare human capacity development plan

7.1.2.3 Procure necessary infrastructure based on institutional needs

7.1.2.4 Conduct regular joint assessments of the impacts of policies and regulations on aquaculture development to identify best practices while allowing for data-driven adjustments and improvements

***Outcome 7.1.3:** Harmonised management information system within the aquaculture sector achieved*

7.1.3.1 Harmonise management information system within the fisheries/ aquaculture sector and others

7.1.3.2 Train planners at central and district levels on IMS application

7.1.3.3 Revise and implement Fisheries and Aquaculture Communication Strategy

8 IMPLEMENTATION PLAN

The National Aquaculture Development Plan will be implemented from 2024 to 2030 to be in line with MW2063 MIP 1. To track progress towards achievement of the expected outcomes of the Plan, several key expected outcome indicators have been developed under each priority area. A number of actions are also outlined with a time frame against each expected outcome to be implemented by key stakeholders.

8.1 Implementation of the Plan

The Implementation Plan (IP) for NADP should be time bound, with clear strategies, outcomes, interventions, outputs and output indicators, activities and assumptions for implementing each strategic objective (Annexes 1 and 2). A structured approach is recommended for implementation of the Plan. The first phase (2025-2027) will focus on stakeholder mapping; capacity building, which will be an ongoing activity; resource mobilization; and identification of baseline targets. A baseline study will be conducted to comprehensively analyse the sector wand set necessary targets. Based on the baseline targets, the MEAL framework will be jointly reviewed with lessons to similarly review the performance targets. A sustainability plan will be developed in Phase I. The second phase (2027-2028) is for full implementation with active participation of the private sector. As done in Phase I, some lessons will be drawn to make some strategic changes in the MEAL framework in the second phase. Further emphasis will be on putting in place adequate skilled manpower and some relevant partners. The final phase (2029-2030) will be for consolidation of implemented activities. Some evaluation studies on aquaculture value chain will be conducted to track progress based on the performance targets along the value chain.

8.2 Financing the NADP

The Plan is I line with the Malawi 2063. Therefore, the Department of Fisheries must ensure that interventions of the Plan that lead increased productivity and wealth creation should be costed and be implemented as part of the Malawi 2063 First 10-Year Implementation Plan. In addition, the Department of Fisheries will need to undertake rigorous resource mobilisation like operationalizing Fisheries Fund, market levies at district council level, and licensing fee to supplement monthly funding (Other Recurrent Transactions).

The established *Fisheries Fund* in the Fisheries Conservation and Management Act of 1997 should be fully functional with aquaculture benefiting from the Other Recurrent Transactions (ORT) on an annual basis based on an annual work plan and budget and subvention by the Parliament based on the Fisheries Fund processed and procedures. Furthermore, at district council level self-sustaining mechanisms related to fisheries and aquaculture should designed and be function. For instance, fees levied on marketing fish and fish products or on aquaculture permits may be used for aquaculture in such districts.

Furthermore, implementation of the ongoing projects, namely; National Aquaculture Development (NADP), Chipoka Fisheries and Aquaculture Infrastructure Development (CPFAIDP) and Shire Valley Transformation Programme offer a greater opportunity for implementation of this NADP.

National Aquaculture Development Project (NADP)

The NADP is a national project with a total estimated cost (TEC) of MK20.5 Billion from 2023 to 2028. The project is within the Public Service Investment Programme (PSIP) focusing on promotion of aquaculture development in the country and is financed by the Government. It aims to increase fish production from fish farming schemes; enhance fingerling production capacity; improve feed production and supply for improved quality and quantity of farmed fish; enhance aquaculture skills and technology transfer; and improve economic welfare of the fish farming communities.

Chipoka Port Fisheries and Aquaculture Infrastructure Development Project

The cost of CPFAIDP was estimated at K103 Billion and is one of the seven projects under the Chipoka Secondary City Development Programme. The project is in line with the Blue Economy Strategy which focuses on i) Improved trade and productivity; ii) Enhanced maritime transportation and safety of marine life; iii) Improve food and nutritional security through fish production; iv) Improve livelihood through Job Creation which will in turn reduce unemployment rate; v) Enrich achievement of enabler 7 (environmental sustainability) of the Malawi Vision 2063 and vi) Pollution containment.

The project has several benefits, as it focuses on the development of a sector-wide national and regional hub for industrial, commercial and logistical activities, linking to some related key sectors such as tourism, transportation, agriculture, and urban development while facilitating private sector investments and activities. It is expected to transform the existing informal fisheries and aquaculture sub-sectors (valued at $225 million yearly) towards a formalized sector, well linked to industrial, urban and service sectors with projected annual valuation of $1 billion by the year 2033. Furthermore, an estimated 300,000 fishing and aquaculture households will benefit directly from fish value chain activities. Additionally, over 1.5 million households will indirectly benefit from fish-related employment opportunities. The Project will seek to achieve this by advancing the fisheries and aquaculture sector through the development of an industrial and logistical national centre; promoting the vertical integration of activities across related value chains; developing a financially sustainable and diversified model for small farm aquaculture communities, in line with the decentralization policy; and modelling cooperation among ministries, departments and agencies at the national and local levels in partnership with private investors in form of Special Economic Zones.

The private sector plays a greater role for an effective implementation of the project. In general, implementation of the proposed project will result in improved operational efficiency and effectiveness in the fisheries and aquaculture sub-sectors in recognition of other supporting sectors in Salima. The specific impacts include the following: Increased fish production from the current capture fisheries and aquaculture levels averaging 164,000 tonnes to about 729,000 tonnes by 2063 thereby earning over US$ 1 billion per year; increased opportunities for well-paid employment inclusive of women and youth especially those engaged along the fish value chain, supporting creation of 300,000 jobs directly linked to fishing and aquaculture creating an estimated 1.5 million jobs alongside the fish value chain; and restoration of degraded habitats and declined fish stocks.

Shire Valley Transformation Programme (SVTP)

The Shire Valley Transformation Programme (SVTP) is another investment that aims to develop irrigation infrastructure in Chikwawa which is of benefit to Government's owned aquaculture area of approximately 200ha at Kasinthula. The irrigation facility will address water supply challenges for the area which would attract public and private investments including establishment of mega aquaculture farm.

Since the Plan is contributing towards food systems, it is important for DoF to maintain links with the Ministry of Agriculture, through the NAIP. Through implementation of NADP, special efforts must be directed at aligning the implementation of this Plan with the regional, continental and global instruments like SADC Protocol on Fisheries, AU Policy Framework on Fisheries and Aquaculture & Reform Strategy, FAO Guidelines on Sustainable Aquaculture and Blue Economy Transformation Roadmap in order to benefit from technical support that comes with these instruments.

8.3 Human Resource Development Plan

The development of human resources (both in quality and quantity), is pivotal to sustaining aquaculture industry, especially in the climate of changing paradigms affecting the sector (Chimatiro, 2021). It was apparent from the stakeholder consultations that in view of the diversity of aquaculture practices (small-scale, rural, peri-urban, medium and large scale), there is a need for diverse approaches to aquaculture extension. In addition, current aquaculture education in various universities and colleges also has adopted a diversity of course content, standards and delivery mechanisms. Lastly, there are varying degrees of collaboration among academia, the Department of Fisheries and the aquaculture industry, including farms and other service providers.

Human resources development is at the centre of 2030 Agenda on Sustainable Development Goals (SDGs4). Therefore, a coherent a five-year Human Resource Development Plan should be developed to ensure adequate skilled man power is in place to reduce vacancy rate now estimated at 31%. Additionally, a functional review for district councils is on plan to ensure filling the vacancy gap. This will facilitate wide sensitization of face-to face interactions between extension workers and fish farming communities. Of paramount importance are units to deal with extension services, biosecurity issues, veterinary services and aqua-businesses.

However, to further enhance the Human Resource Development Plan, there is a need to scale up collaboration among the Government, academia and the aquaculture industry to ensure that educational programs are closely aligned with the practical needs and challenges faced by practitioners in the field. The established collaboration among the Fisheries and Aquaculture Scientific and Technical Advisory Panel (FASTAP) should be institutionalized. The panel constitutes the Commercial Fishers Association (CFA); National Commission of Science and Technology (NCST); Innovative Fish Farmers Network (IFFNT); and the private sector as well as fisheries and aquaculture experts from the Malawian universities, including LUANAR, MZUNI, MUST and UNIMA. The role of FASTAP is to provide policy recommendations to the Department of Fisheries based on practical experiences and evidence based scientific research.

8.4 Monitoring and Evaluation of NADP

As outlined by Chimatiro (2021), it is recommended to establish a Coordination Unit in DoF. Its task will coordinate implementation of the NASP I and this Plan. The Unit will also establish a Performance Appraisal System to ensure accountability and track progress more effectively. DoF will need to jointly work with National Planning Commission to undertake monitoring and evaluation process and revise targets and indicators as situation demands.

A Performance Appraisal System is to be undertaken annually by the Ministry to ensure that implementation of the NASP II and the Plan can be monitored through the targets of individual officer's Performance Contracts. Both NASP II and NADP will only be able to deliver the most effective impacts by implementing the Strategy and Plan through multi-stakeholder partnerships of those with shared common vision a vibrant, diversified, professional and profitable aquaculture industry can be delivered based on a National Innovation System that promotes sustainable investment on the one hand and a market system that delivers pro-poor outcomes on the other (Chimatiro, 2021).

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ANNEXES

Annex 1: Monitoring and Evaluation Plan of the National Aquaculture Development Plan (2025-2030)

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 1: GOOD GOVERNANCE										
Objective 1.1: To strengthen good governance in aquaculture sector at national and district levels										
Outcome 1.1.1: Strengthened good governance in aquaculture at community, district and national levels achieved by 2030										
1.1.1.1 Jointly develop area management plans based on holistic food system perspective, EAA, and specific biological needs of the aquatic organisms	Number of area management plans	3	3	5	7	9	10	12	Technical Report	DoF, District Councils and NGOs/CSOs
1.1.1.2 Involve local fish farmers and stakeholders in the implementation of NADP	Number of actors	15,000	20,000	25,000	26,500	28,000	29,000	30,000	Technical Report	DoF, District Councils and NGOs/CSOs
1.2.2.3 Create transparent and social networks along aquaculture value chain	Number of platforms	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF, District Councils and NGOs/CSOs
1.1.1.2 Create inclusive platforms and networks along the value chain to transparently make decisions and share needs and respond to issues encountered along the value chains	Number of policy decisions made transparently	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report (with disaggregated data of actors)	DoF, District Councils and NGOs/ CSO/ NSAs
Outcome 1.2.1 Integrated aquaculture policy and legislative frameworks with other sectors achieved by 2030										

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
1.2.1.1 Implement National Fisheries and Aquaculture Development Policy of 2016	% of Policy Priority Area 2 (Aquaculture) implementation	50%	60%	>70%	>80%	>90%	>90%	>90%	NFAP Review Technical Report (2024)	DoF, District Councils and NGOs/ CSO/ NSAs
1.2.1.2 Scale up integration of aquaculture into Malawi's food systems	% inclusiveness of aquaculture into Malawi's Food Systems Report	40%	50%	70%	80	>90%	>95%	100%	Technical Report	DoF, District Councils and NGOs/ CSO/ NSAs
1.2.1.3 Build coherence between NADP and other relevant sectors to provide environment for investment strategies	Public-Private sector model for aquaculture	0	1	1	1	1	1	1	Technical Report	DoF, District Councils and NGOs/ CSO/ NSAs
1.2.1.4 Develop and operationalise strategy on integration of aquaculture products into safe and nutritious aquatic foods in national food diets, guidelines and school feeding programmes	Number of initiatives	0	1	1	2	2	2	2	Technical Report	DoF, District Councils and NGOs/ CSO/ NSAs
1.2.1.5 Align public incentives with National Fisheries and Aquaculture Policy	Number of incentives	1 (duty waiver)	2 (add subsidy)	3 add oth-er financial invest-ment opportuni-ties)	3	3	3	3	Technical Report	DoF, District Councils and NGOs/ CSO/ NSAs

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
1.2.1.6 Enhance coordination and cooperation among various authorities competent on different aspects relevant for aquaculture development	Number of partners	2 (to institutionalize Blue Economy Working Group, FASTAP and district level platforms)	6	6	7	8	8	8	Technical Report	DoF, District Councils and NGOs
Encourage industry players to adopt voluntary codes of conduct that promote ethical practices and environmental stewardship.	Number of adopted voluntary codes	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF, District Councils and private sector
Strengthen access to data and information related to aquaculture practices, market trends, and environmental impacts.	Updated website and newsletters	1	3	3	3	3	3	3	Technical Report	DoF and District Councils
Outcome 1.3.1: Effective coordination among actors along aquaculture value chain achieved by 2026										
1.3.1.1 Mobilise farmers into clusters	Number of clusters	TDB	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF, District Councils and NGOs
1.3.1.2 Establish producer organisations to link farmers to markets, anchor farms and individual off takers	Number of gender sensitive Producer Organisation (PO) linked to off takers, anchor farms and markets	59 (55 cooperatives and 4 (AGCOM)	250	450	750	1,000	1,200	3000	Annual Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
1.3.1.3 Support mobilisation of a national fish farmers organisation aligned to NAFAM/FUM to provide a platform for actors along the value chain	Number of members by gender in the National Fish Farmers Association affiliated to NASFAM	0	113 (28 district and national fish farmers organisations	113	113	113	113	113	Technical Report	DoF
1.3.1.4 Conduct regular joint aquaculture sector review meetings	Number of aquaculture review meetings	4	29/quarter (add district level meetings)	29/quarter	29/ quarter	29/ quarter	29/ quarter	29/ quarter	Minutes of meetings	DoF
1.3.1.5 Conduct annual fisheries and aquaculture meetings with exhibitions	Number of annual fisheries and aquaculture	1	1	1	1	1	1	1	Forum Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 2: SUSTAINABLE AQUACULTURE PRODUCTION										
Objective 2.1: To have an optimally productive and socially equitable small- and large-scale fish farms achieved by 2030										
Outcome 2.1.1: Increased aquaculture production ffrom 10,000 tonnes/year to 100,000 tonnes/ha by 2030										
2.1.1.1 Establish 7 mega aqua farms operational by 2030 through PPP by partial capitalisation through financial resources by Government in the arrangement	Number of mega-farms	0	1	3	5	5	5	8	Monthly field report	DoF
2.1.1.2 Establish 120 anchor farms by 2030 through PPP	Number of anchor farms	0	1	3	5	5	5	8	Monthly field report	DoF
2.1.1.3 Produce fingerlings from 8 hatcheries (publicle and privately owned and individual farmers) by 2030	Number of fingerlings	0.8 million	50 million	70 million	95 million	120 million	150 million	150 million	Technical Report	DoF, Private sector
2.1.1.4 Produce and supply floating feeds through agro-dealers in cluster markets	Quantity (mt)	<18,000 tonnes	18,000	22,000	25,200	34,200	43,200	54,000	Technical Report	DoF, Private sector (e.g. agro-dealers)
2.1.1.5 Harvest fish (mt)	Fish yield (mt)	9,000	10,000	24,000	50,000	70,000	88,000	100,000	Fish Production Report	DoF, District Councils, SMEs
2.1.1.6 Conduct field days in clusters on tilapia and catfish demonstrated best management practices and importance of fish nutrition	Number of field days in clusters	16 (1 National Trade Fair, 2 Agriculture Fair 3 World Food Day and 10 selected district level field days)	25	30	30	40	40	40	Cluster record	DoF, District Councils

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
2.1.1.7 Update record of subsistence and small-scale fish famers by cluster and gender	Number of small- and large-scale farmers by cluster and gender	17,000	18,500	19,600	22,400	28,100	30,050	36,800	Annual census Report	DoF, District Councils
2.1.1.8 Provide support to subsistence/ small-scale fish farmers access information on aquaculture business case model	Disaggregated Percentage of supported small-scale farmers by gender accessing aquaculture business case model	20% of farmers accessing information and best practices	>40 %	>60%	>80%	>90%	>950%	>98%	Technical Report	DoF, District Councils
2.1.1.8 Establish clusters of fish farmers in all suitable areas	Number of clusters country-wide	5 (2 chitipa, 2 Dowa, 1 Mchinji)	15	28	50	150	270	350	Cluster record	DoF
2.1.1.9 Design and implement strategies that enhance market-led transformation based on gender	60 farmers adopting business models (60 cooperatives and large-scale fishers along vale chain)	200	800	1,500	1,800	2,500	3,500	4,000	Technical report	DoF
2.1.1.10 Adopt best practices in aquaculture (e.g. deepening ponds and increasing pond sizes)	Number of best practices	2	5	6	8	9	11	12	Technical report	DoF
Outcome 2.1.2: Designated suitable and, cage sites and aqua parks for aquaculture available by 2030										
2.1.2.1 Identify high potential aquaculture sites (zoning)	Number of high potential aquaculture sites zones	1 for pond and 2 for cage farming	3	5	8	10	12	14	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
2.1.2.2 Identify farmer cluster sites (for pond-based farmers) or associations (for cage farmers) for targeted extension messages	Number of designated cluster sites	8 (e.g. Chngale, Polepole, Nyoka,2 in Mchinji, 2 NB)	12	18	20	35	50	80	Technical Report	DoF
2.1.2.3 Carry our environmental, social and impact assessment (ESIA) studies in the aquaculture sites	Number of ESIA studies	0	1	1	1	1	1	1	ESIA reports	DoF
2.1.2.4 Secure, equitable and socio-culturally appropriate tenure rights to aquaculture designated sites (and water) and adjacent land for long-term leases	Number of title deeds / leases	0	4 (Kasinthula, Limpasa, Chisenga, Kalira, Kunene-kude, Kasinthua, Mzuzu	8 (plus mega farms)	11	15	20	25	Record of leases/ deeds	DoF
2.1.2.5 Conduct pre-feasibility/ feasibility studies to promote aquaculture investments in feed, hatcheries, fish production, supply chain (distribution of inputs and outputs)	Prefeasibility/ feasibility studies	0	1	2 (water and land)	2	2	2	2	Technical Report	DoF
Outcome 2.3.1: Scaled up visibility of the aquaculture industry by 2030										
2.3.1.1 Create public awareness on viability of aquaculture investments	Number of medium to large-scale investors in aquaculture industry	0	3 (TV, Newspaper, Newsletter)	5	5	6	6	8	Record of medium to large scale businesses by gender	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
2.3.1.2 Participate in business meetings to attract aquaculture investors	Number of prospective deals	0	5	20	30	60	90	120	Meeting Report	
2.3.1.3 Demonstrate economic and financial viability of aquaculture enterprises at various levels	Number of people expressing interest to venture into businesses at commercial level	As in 2.2.2.1	As in 2.2.2.1	As in 2.2.2.1	As in 2.2.2.1	As in 2.2.2.1	As in 2.2.2.1	As in 2.2.2.1	Record of people expressing interest to start aquaculture	DoF
2.3.1.4 Conduct farming community awareness on demonstrated best management practices and importance of fish nutrition through various platforms and channels	Number of farmers adopting best management practices	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	Survey report	DoF
2.3.1.5 Disseminate aquaculture research, technologies and innovation	Number of tested technologies	2	4	4	6	6	6	8	Technical Report	DoF
2.3.1.6 Conduct civic education on consumption of fish-based diets among children, adolescent girls and boys and pregnant and lactating mothers within 1000 days of life to improve cognitive development	Number of men and women and learners	% of HH	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
2.3.1.7 Develop aqua-business investment portal	Portal with policy, legal and technical information regarding aquaculture investments	0	1	1	1	1	1	1	Aqua-business portal	DoF
2.3.1.8 Conduct Round Table Dialogues (discussion platforms) involving Blue Economy Working Group (BEWG) e.g. NPC, MCCCI, EDF, PPP Commission, MAAIC, MITC), MFIs, banks and large-scale investors to showcase on-farm tested technologies with financial analysis to attract investment and financial access models	Number of Round Table dialogues	7 by AVC)	10	10	10	10	10	10	Minutes of Round Table dialogues	DoF
2.3.1.9 Develop special economic zones where aqua-feeds production can be located for ease access to farmers	Number of industrial parks	1	2	2	2	3	4	6	Record of sites with aquaculture industrial parks	DoF
Outcome 2.4.1: Increased fish production from natural and man-made small water bodies by 2030										
2.4.1.1 Undertake an inventory of natural/ man-made irrigation dams and reservoirs	Number of irrigation dams and reservoirs	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Survey report	DoF
2.4.1.2 Stock small-water bodies including reservoirs and dams.	Number of fingerlings stocked	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Fingerling (seed) stocking reports	DoF
2.4.1.3 Establish tenure arrangement of the stocked water bodies based on by laws and cultural systems	Number of sites with entitlements	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 3: RESEARCH, TECHNOLOGY AND DISSEMINATION										
Objective 3: To develop research, technology and innovations for increased profitability, sustainable environment and socially equitable aquaculture sub-sector growth										
Outcome 3.1: Scientifically proven and demand driven research, technologies and innovations produced in aquaculture done by 2030										
3.1.1.1 Assess community needs on aquaculture best management practices and importance of fish nutrition	Number of farmers by gender adopting aquaculture	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	40-60% gender	Technical Report	DoF
3.1.1.2 Conduct census of fish farmers to update record	Record of fish farmers	1	1	1	1	1	1	1	Technical Report	DoF
3.1.1.3 Design and conduct priority research for appropriate technologies and innovations	Document with number of proposed research projects in a document	1 (3-in-1 chitofu	3	3	6	8	8	10	*Research Report*	DoF
3.1.1.4. Develop aquaculture research that is responsive to gender and industry	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	*Research Report*	DoF
3.1.1.5 Conduct aquaculture research on technologies and innovations that are responsive to climate variability	Number of proposed research areas responsive to climate variability and disaster risks	2 (deepening ponds)	3	3	6	8	8	10	*Research Report*	DoF
3.1.1.6 Conduct genetically improved fish strains	Number of released genetically improved strains	0	1	1	1	1	1	1	*Research Report*	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
3.1.1.7 Conduct aquaculture research that is responsive to gender and industry	Number of research projects along the aquaculture value chain responsive to gender	3	4	4	5	5	6	6	*Research Report*	DoF
3.1.1.8 Disseminate aquaculture research, technologies and innovation	Number of tested technologies	2	4	4	6	6	6	8	Technical Report	DoF
3.1.1.9 Develop climate-smart and gender-based technologies and innovations	Number of climate-smart and gender-based technologies	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	Technical Report	DoF
3.1.1.10 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses	Number of socio-economic studies	1 (by MAC)	2	3	3	4	4	4	Socio-economic Reports	DoF
3.1.1.11 Develop ICT and other innovations in aquaculture	Number of ICT areas and innovations	0	0	1	1	2	2	2	ICT and Innovations Reports	DoF
3.1.1.12 Scale-up and harmonise fish harvest methodologies	Approved and adopted harmonized fish harvest method	1 (APES)	1 (harmo-nized and approved)	1	1	1	1	1	Fish Harvest Manual outlining protocol	DoF
Outcome 3.2.1: Increased institutional capacity for effective implementation of aquaculture research, technology and innovation programmes										
3.2.1.1 Operationalize bio-safety measures at national and regional levels	Number of certified hatcheries	0	4	6	10	20	40	60	Technical Report	DoF
3.2.1.2 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses	Number of socio-economic surveys to characterize fish farming household profiles	0	2	4	4	4	4	6	Fish farming household survey reports	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
3.2.1.3 Equip and rehabilitate aquaculture research centres with necessary laboratory equipment and other infrastructure	Number of procured goods and works	2 (SFAD and FAO (EUS Project)	2	2	4	4	4	4	Asset register List of goods and works (LOGS)	DoF
3.2.1.4 Provide public and private sector support to Genetic Improvement Programmes (GIPs)	Number of GIP programmes	2 (DAC and MAS) on *O.s* and *C.r* respectively	2	2 (add C. rendalli)	3 (Add *O. mossambicas*)	3	3	3	GIP Technical Report	DoF
3.2.1.5 Support local innovation including information and communications technology (ICT) e.g. development of aquaculture equipment and manufacturing and digitalised feeding.	Number of interns carrying our innovations and ICT	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF
3.2.1.6 Train scientific human capital in various specialised disciplines (biology, ecology, genetics economics, fish disease diagnosis, nutrition, gender)	Number of trained staff by discipline, location and gender	7 (nutrition, economics, gender, biology, technology, fish processing, business)	8 (add social, value chain, marketing, processing	8	8	9 (Add ecology and governance)	9	9	Human Resource Report	DoF
3.2.1.7 Review curricular various training institutions including university to respond to the aquaculture industry needs	Number of training institutions with revised curricular certified with National Council for Higher Education (NCHE)	0	2 (MCF and TEVETA)	6 (add NRC and 5 community colleges)	8 add Stefanoand MEDI)	10 add LUANAR and MZUNI)	10	10	Revised Curriculum	DoF (MCF), LUANAR, MZUNI, MUBAS, UNIMA

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
3.2.1.8 Develop innovation hubs for young scientists and innovators in aquaculture for internships	Number of innovation hubs	1 (LUANAR)	2	3	3	3	4	4	Technical Report	DoF
3.2.1.9 Develop gender-responsive climate-smart technologies and innovations	Number of gender responsive climate-smart technologies and innovations	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	As in 3.1.2	Technical Report	DoF
3.2.1.10 Conduct joint field days involving researchers and extension agents to demonstrate aquaculture technologies and financial viability as guided by the research agenda (e.g. feeding, hatchery, mono-sex culture, poly-culture, integrated aquaculture agriculture (IAA), integrated irrigation	Number of adopted technologies	2 (deep ponds and chitofu3-in-1	3	4	6	8	8	8	Field Report	DoF
3.2.1.11 Establish and operationalise joint research-extension committee involving experts from various sectors/sub-sectors e.g. fisheries and aquaculture; environment, early warning, climate change and adaptation; agriculture and veterinary and trade	Number of committee meetings	0	4	4	4	4	4	4	Minutes of meetings	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 4: GENDER-RESPONSIVE AQUACULTURE SUPPLY AND VALUE CHAINS AND DECENT WORK										
Objective 4.1: To promote gender-responsive input-output markets, supply chains and product diversification to achieve wealth creation										
Outcome 4.1.1: Building resilience of gender-sensitive aquaculture enterprises along value chain										
4.1.1.1 Scale-up gender-transformation in decision processes regarding production, processing and marketing	% HHs adopting gender transformation	50%	52%	54%	56%	58%	59%	60%	Household profiles	DoF
4.1.1.2 Undertake action to address barriers along the value chain from production from production to consumption	% women fish farmers and processors	50%	52%	54%	56%	58%	59%	60%	Household report	DoF
4.1.1.3 Entrench gender transformative approach in aquaculture planning and policy recommendations at all levels.	Number of plans with gender transformative approach	2 (NFAP and HIV/AIDS Strategy)	2	3 (Add DDP)	3	4	4	4	Plans	DoF
4.1.1.4 Provide support to women and youth in aquaculture cooperatives and enterprises jointly with other partners e.g. TEVETA, universities and NGOs.	% of women youth in certified cooperatives accessing loans either by individual or group	2 (Mzuzu)	4	10	40	60	80	100	Technical Report	DoF
4.1.1.5 Mainstream gender into production, value addition and trade	Number of gender mainstreamed strategies and plans								Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
4.1.1.6 Establish industrial supportive and strategic facilities/infrastructure in designated areas of secondary cities for niche products and value chains like fish (fish landing and processing facilities)	Number of cold chain facilities	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Feasibility study	DoF
4.1.1.7 Ensure one-broader post facilities are operational	Borders with functional facilities	3	3	3	3	3	3	3	Technical Report	DoF
4.1.1.8 Promote BMPs to prevent fish loss and waste along the AVC (e.g. duty waiver, schemes, deepening ponds, training, associations, networking, EUS and TLV control)	Number of BMPs	7	10	15	15	15	15	15	Technical Report	DoF
4.2.1 Decent working conditions in aquaculture ensured	% reduction of reported abuse cases on gender and remuneration	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF
4.2.1.1 Enable fish farmers, workers and business stakeholders to earn a fair return from the labour	Reduced % of cases on remuneration	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF
4.2.1.2 Create adequate working conditions	Reduced number of reported cases	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
4.2.1.3 Create conditions for men and women in aquaculture to work in an environment free from gender abuse	Reduced gender cases	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF
4.2.1.4 Promote apprenticeship or vocational skills for youth engagement in aquaculture	Number of youth in vocational training centres	60 (SFAD and AVCP)	200	1000	2000	4000	4500	5000	Technical Report	DoF
4.2.1.5 Set up targeted investments for youth and women	Number of aquaculture enterprises owned by youth and women	100 (AVCP and SFAD)	400	1000	2000	4000	4500	5000	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 5: CAPACITY STRENGTHENING										
Objective 5.1: To strengthen institutional capacity, and knowledge and skills of actors based on gender at all levels for higher productivity and competitiveness										
Outcome 5.1.1: Functional gender-responsive frameworks and tools for effective knowledge and skills generation, dissemination and uptake by 2030										
5.1.1.1.1 Train DoF and its partners to support development of commercial fish farming	Number of staff trained in specified modules	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Training Report	DoF
5.1.1.1.2 Regularly conduct Joint Aquaculture Sub-Sector meetings involving relevant stakeholders at cluster, district and national levels	Number of Joint Aquaculture Sub-Sector meetings	4/year	4/year	4/year	4/year	4/year	4/year	4/year	Minutes of meetings	DoF
5.1.1.3 Revise modules and curricular various training institutions including MCF, universities and TEVET Authority (TEVETA) responding to the aquaculture industry needs	Number of modules	As in 3.1.1.7	As in 3.1.1.7	As in 3.1.1.7	As in 3.1.1.7	As in 3.1.1.7	As in 3.1.1.7	As in 3.1.1.7	Training Report	DoF
51.1.4 Recruit adequate skilled extension workers in district	Number of recruits	TBD (with Local Govt)	TBD (with Local Govt)	TBD (with Local Govt)	TBD (with Local Govt)	TBD (with Local Govt)	TBD (with Local Govt)	TBD (with Local Govt)	Recruitment Report	DoF
5.1.1.1.5 Review aquaculture extension system for effective delivery systems and outreach services	Number of extension approaches	2 (T+V, Group)	3 (add famer leaders)	4 (add demand driven – commer-cial)	6 (add online and other digital plat-forms)	6	6	6	Study report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
5.1.1.1.6 Operationalise one-stop-shop for all aquaculture business application procedures established.	Number of one stop-shop facility	0	1	1	1	1	1	1	Technical Report	DoF DoF
5.1.1.1.7 Train farmers and actors along value chain and supply in business management and entrepreneurial skills	Number of One-Stop-Shops in all 3 regions	0	1	2	3	3	3	3	Technical Report	
5.1.1.1.8 Conduct internships and famer field schools to over 8,000 farmers by 2030	% of farmers graduating from famer field schools	150 (Kulima/ World Fish)	300	1,000	2,500	5,000	7,000	10,000	Farmer field school report	DoF
5.1.1.1.9 Mobilise fish farmers into cooperatives	Number of cooperatives with membership by gender	60	200	600	850	950	1,200	2,000	Technical Report	DoF
5.1.1.10 Train fish experts in diagnosis, parasitology and treatment of fish diseases	Number of fish heath experts	0	2	3	3	3	3	3	Training Report	DoF
3.1.1.11 Provide training to women cooperatives to women actors along the aquaculture value chain										
5.1.1.12 Provide mentorship to enhance youth aquaculture entrepreneurship through an incubation programme targeting 250 incubates at National Aquaculture Centre (NAC), Mzuzu Aquaculture Centre (MAC) and Kasinthula Aquaculture Centre (KAC)	Number of interns/ mentees / trainees by gender (40-60)	400	600	800	1,200	2,000	4,000	6,000	Internship Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
5.1.1.13 Conduct specialised training for hatchery operators (catfish and tilapia) to increase fingerling production	Number of hatchery operators undergoing hatchery training	0	5	6	6	6	6	6	Training Report	DoF
5.1.1.14 Conduct specialised training for catfish management especially breeding	Number of catfish producers by gender	0	3,000	5,000	7,000	9.,000	11,000	12,000	Training Report	DoF
5.1.1.15 Invest in hatcheries through PPP	Number of hatcheries	As in 2.1.1	As in 2.1.1	As in 2.1.1	As in 2.1.1	As in 2.1.1	As in 2.1.1	As in 2.1.1	Technical Report	DoF
5.1.1.16 Operationalise procured 2 feed mill through PPP for MAC and DAC	Number of functional public feed mills	1	2	2	2	2	2	2	Technical Report	DoF
Outcome 5.2.2: Enhanced capacity of aqua businesses achieved by 2030										
5.2.1.1 Jointly work with agri-business experts in districts to support aquaculture businesses	Number of agri-business	0	10 per district	30 per district	100 per district	200 per district	300 er district	500 per district	Technical Report	DoF
5.2.1.2 Recruit aqua-business officers to support aquaculture investors	Number of Agri-business officers at district level	0	30	30	30	30	30	30	Recruitment Report	DoF, DRMD
5.2.1.3 Strengthen public-private partnerships to enhance knowledge sharing and technology dissemination	Number of dissemination channels	0	3	4	4	4	4	4	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 6: CLIMATE-SMART AQUACULTURE										
Objective 6.1: To enhance climate-resilience and environmentally sound aquaculture investments										
Outcome 6.1.1 Increased aquaculture resilience achieved by 2030										
6..1.1.1 Assess vulnerability of fish farming.	Number of vulnerabilities	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Vulnerability Assessment Report	DoF
6.1.1.2 Implement disaster risk management and mitigation measures for aquaculture.	% aquaculture sites with high risks	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Risk Maps	DoF
6.1.1.3 Increase access to information (potential impacts of climate change, early warning, climate variability and disaster risks)	Number of farmers accessing information on early warning, climate variability and disaster risks	5,000	8,000	10,000	12,000	14,000	15,000	20,000	Technical Report	DoF
6.1.1.4 Establish early warning systems for use by farmers	Number of early warning messages	1	2	2	2	3	3	3	Technical Report	DoF
6.1.1.5 Provide diversified value chains and equal access to fish markets	Number of diversified value chains	1	2	4 (Add *O. mossambicas, C. renalli* and *C. gariepinus*)	4	4	4	4	Study Report	DoF
6.1.1.6 Reduce post-harvest losses by adopting climate-smart fish processing technologies	Number of farmers adopting climate-smart fish processing technologies	500	1,200	2,400	3,000	6,000	8,000	10,000	Technical Report	DoF
6.1.1.7 Increased fish quality and hygiene in fish processing, transportation and marketing	Number of farmers applying fish standards	20	500	1,200	2,200	3,500	4,000	6,000	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
Outcome 6.2.1: Best management practices for aquaculture responsive to climate variability and disaster risks developed and adopted by farmers by 2030										
6.1.2.1 Adopt best aquaculture management practices that are responsive to climate variability and disaster risk.	Number of farmers adopting BMPs	2 (deepening ponds and pond liners)	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF
6.1.2.2 Ensure access to microfinance and insurance schemes for diversified livelihoods, increased enterprises	% of farmers with insurance policies	0	200	550	800	1000	1500	2000	Technical Report	DoF
6.1.2.3 Develop and share best adaptation practices to increase resilience among fish farmers	Number of farmers	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Survey Report	DoF
6.1.2.4 Apply integrated management approaches e.g. Ecosystem Approach to Aquaculture (EAA)	Number of farmers adopting integrated management approaches	120	500	1,000	2,500	5,000	8,000	10,000	Study Report	DoF
6.1.2.5 Share lessons on adaptation capacity and risk factors in aquaculture development	Number of resilient farmers	As in 6.1.2.3	As in 6.1.2.3	As in 6.1.2.3	As in 6.1.2.3	As in 6.1.2.3	As in 6.1.2.3	As in 6.1.2.3	Technical Report	DoF
6.1.2.6 Mainstream Climate Change Adaptation (CCA) and Disaster Risk Management (DRM) planning frameworks at national level	Aquaculture strategies and plans inclusive of CCA and DRM at district and national levels	2	3	4	4	4	4	4	Strategies and Plans	DoF
6.1.2.7 Implement aquaculture interventions outlined in NDCs and NAP	Number of interventions	2 (deep ponds and processing)	4	4	4	4	4	4	Technical Report	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
PRIORITY AREA 7: MONITORING EVALUATION AND LEARNING										
Objective 7.1: To ensure that an effective MEAL framework is developed with clear targets, indicators and budget at national and district levels										
Outcome 7.1.1 Establishment and operationalisation of monitoring evaluation and learning framework (MEAL) for aquaculture at community, district and national levels										
7.1.1.1 Establish Specific, Measurable, Achievable, Relevant and Time-bound (SMART) indicators for effective implementation of policy, strategies and plans	Number of annual plans	337 central and districts)	337	337	337	337	337	337	Plans	DoF, District Councils
7.1.1.2 Develop a participatory and gender-sensitive monitoring, evaluation and learning system at community, district and national level to track progress on aquaculture development.	Number of participatory monitoring, evaluation and learning system	As in 7.1.1.1 above	As in 7.1.1.1 above	As in 7.1.1.1 above	As in 7.1.1.1 above	As in 7.1.1.1 above	As in 7.1.1.1 above	As in 7.1.1.1 above	Plans	DoF, District Councils
7.1.1.3 Prepare participatory climate variability and disaster risk practices monitoring tools for documentation and effectiveness	Number of tools	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Report	DoF, District Councils
1.1.1.4 Develop mechanisms and plans to monitor the impacts of the operations on the environmental, social and economic sustainability	Number of ESIA plan	0	50	100	150	200	250	300		

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
7.1.1.5 Inventorise all existing programmes and projects funded by the Government, NGOs and other agencies with their funding portfolios in aquaculture for promotion of good governance, accountability and transparency	Inventory with number of programmes and projects in aquaculture sub-sector	0	1	1	1	1	1	1	Technical Reports	DoF, District Councils
7.1.1.6 Conduct census of all actors along value chain	Census	0	1	1	1	1	1	1	Technical Reports	DoF, District Councils
7.1.1.7 Prepare and circulate State of the State of the Environment Outlook (SEO) Reports e.g. Socio-economic Profiles (SEPs) with aquaculture development to all stakeholders with adequate aquaculture inclusion done by 2026.	Number of SEO and SEPs	0	1	1	1	1	1	1	SEP Reports	DoF, District Councils
7.1.1.8 Prepare annual District Development Plans (DDPs) with set targets, indicators and responsible institutions on aquaculture	% of DDPs with aquaculture sub-sector	0	28	28	28	28	28	28	DDPs	DoF, District Councils
7.1.1.9 Collect and analyse gender-disaggregated data on aquaculture along the value chain.	Number of gender-disaggregated reports	0	29	29	29	29	29	29	Technical Reports	DoF

OUTCOMES / ACTIVITIES	INDICATOR	Baseline	ANNUAL TARGETS						MEANS OF VERIFICATION	RESPONSIBLE INSTITUTION
			2025	2026	2027	2028	2029	2030		
7.1.1.10 Apply adaptive MEAL	Number of lessons	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Reports	DoF
Outcome 7.1.2: Sustainability in aquaculture programmes and projects achieved										
7.1.2.1 Develop resource mobilisation strategy	Strategy	0	1	1	1	1	1	1	Technical Reports	DoF
7.1.2.2 Prepare human capacity development plan	Number of funding sources	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Reports	DoF
7.1.2.3 Procure necessary infrastructure based on instructional needs	Assets	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Inventory	DoF
7.1.2.4Conduct regular joint assessments of the impacts of policies and regulations on aquaculture development to identify best practices while allowing for data-driven adjustments and improvements	Best practices	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Technical Reports	DoF
Outcome 7.1.3: Harmonised management information system within the aquaculture sector achieved										
7.1.3.1 Harmonise IMS within the fisheries/ aquaculture sector and others	MIS	0	1	1	1	1	1	1	Technical Report	DoF, EP&D and Ministry of Agriculture
7.1.3.2 Train planners at central and district levels on IMS application	Number of planners using MIS	0	28	28	28	28	28	28	Training Manual	DoF, EP&D and Ministry of Agriculture

Annex 2: Schedule of Key Activities and Estimated Budget (K'000)

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 1: GOOD GOVERNANCE							
Objective 1.1: **To strengthen good governance in aquaculture sector at national and district levels**							
Outcome 1.1.1: Strengthened good governance in aquaculture at community, district and national levels achieved by 2030							
1.1.1.1 Jointly develop area management plans based on holistic food system perspective, EAA, and specific biological needs of the aquatic organisms							1,000,000
1.1.1.2 Involve local fish farmers and stakeholders in the implementation of NADP							900,000
1.2.2.3 Create transparent and social networks along aquaculture value chain							
1.1.1.2 Create inclusive platforms and networks along the value chain to transparently make decisions and share needs and respond to issues encountered along the value chains							800,000
Outcome 1.2.1 Integrated aquaculture policy and legislative frameworks with other sectors achieved by 2030							
1.2.1.1 Implement National Fisheries and Aquaculture Development Policy, NAS and NASP							
1.2.1.2 Scale up integration of aquaculture into Malawi's food systems							50,000
1.2.1.3 Build coherence between NADP and other relevant sectors to provide environment for investment strategies							20,000
1.2.1.4 Develop and operationalise strategy on integration of aquaculture products into safe and nutritious aquatic foods in national food diets, guidelines and school feeding programmes							900,000
1.2.1.5 Align public incentives with National Fisheries and Aquaculture Policy							25,000

3 As on 1 October 2024, the xchange rate was MK1.734.0118 to 1 USD (Reserve bank of Malawi //www.rbm.mw/Statistics/MajorRates/)

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
1.2.1.6 Enhance coordination and cooperation among various authorities competent on different aspects relevant for aquaculture development							900,000
Encourage industry players to adopt voluntary codes of conduct that promote ethical practices and environmental stewardship.							800,000
Strengthen access to data and information related to aquaculture practices, market trends, and environmental impacts.							700,000
Outcome 1.3.1: Effective coordination among actors along aquaculture value chain achieved by 2026							
1.3.1.1 Mobilise farmers into clusters							3,000,000
1.3.1.2 Establish producer organisations to link farmers to markets, anchor farms and individual off takers with matching grants							900,000
1.3.1.3 Support mobilisation of a national fish farmers organisation aligned to NAFAM/FUM to provide a platform for actors along the value chain							400,000
1.3.1.4 Conduct regular joint aquaculture sector review meetings							1,500,000
1.3.1.5 Conduct annual fisheries and aquaculture meetings with exhibitions							1,200,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 2: SUSTAINABLE AQUACULTURE PRODUCTION							
Objective 2.1: To have an optimally productive and socially equitable small- and large-scale fish farms achieved by 2030							
Outcome 2.1.1: Increased aquaculture production by 67% from 10,000 tonnes/year achieved by 2030							
2.1.1.1 Establish 7 mega aqua farms operational by 2030 through PPP by partial capitalisation through financial resources by Government in the arrangement							15,000,000
2.1.1.2 Establish 120 anchor farms by 2030 through PPP							15,000,000
2.1.1.3 Produce fingerlings from 8 hatcheries (publicly and privately owned and individual farmers) by 2030							12,000,000
2.1.1.4 Produce and supply floating feeds through agro-dealers in cluster markets through PPP							10,000,000
2.1.1.5 Collect and analyse harvest fish (mt)							2,000,000
2.1.1.6 Conduct field days in clusters on tilapia and catfish demonstrated best management practices and importance of fish nutrition							5,000,000
2.1.1.7 Update record of subsistence and small-scale fish famers by cluster and gender							900,000
2.1.1.8 Provide support to subsistence/ small-scale fish farmers access information on aquaculture business case model							1,000,000
2.1.1.8 Establish clusters of fish farmers in all suitable areas							1,500,000
2.1.1.9 Design and implement strategies that enhance market-led transformation based on gender							70,000
2.1.1.10 Adopt best practices in aquaculture (e.g. deepening ponds and increasing pond sizes)							2,000,000
Outcome 2.1.2: Designated suitable and, cage sites and aqua parks for aquaculture available by 2030							
2.1.2.1 Identify high potential aquaculture sites (zoning)							12,000,000
2.1.2.2 Identify farmer cluster sites (for pond-based farmers) or associations (for cage farmers) for targeted extension messages							6,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
2.1.2.3 Carry our environmental, social and impact assessment (ESIA) studies in the aquaculture sites							12,000,000
2.1.2.4 Secure, equitable and socio-culturally appropriate tenure rights to aquaculture designated sites (and water) and adjacent land for long-term leases							3,000,000
2.1.2.5 Conduct pre-feasibility/feasibility studies to promote aquaculture investments in feed, hatcheries, fish production, supply chain (distribution of inputs and outputs)							9,000,000
Outcome 2.3.1: Scaled up visibility of the aquaculture industry by 2030							
2.3.1.1 Create public awareness on viability of aquaculture investments							1,250,000
2.3.1.2 Participate in business meetings to attract aquaculture investors							2,000,000
2.3.1.3 Demonstrate economic and financial viability of aquaculture enterprises at various levels							800,000
2.3.1.4 Conduct farming community awareness on demonstrated best management practices and importance of fish nutrition through various platform and channels							1.500,000
2.3.1.5 Disseminate aquaculture research, technologies and innovation							800,000
2.3.1.6 Conduct civic education on consumption of fish-based diets among children, adolescent girls and boys and pregnant and lactating mothers within 1000 days of life to improve cognitive development							800,000
2.3.1.7 Update aqua-business investment portal with other partners							50,000
2.3.1.8 Conduct Round Table Dialogues and FASTAP (discussion platforms) involving Blue Economy Working Group (BEWG) e.g. NPC, MCCCI, EDF, PPP Commission, MAAIC, MITC), MFIs, banks and large-scale investors to showcase on-farm tested technologies with financial analysis to attract investment and financial access models							800,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
2.3.1.9 Develop special economic zones where aqua-feeds production can be located for ease access to farmers							12,000,000
Outcome 2.4.1: Increased fish production from natural and man-made small water bodies by 2030							
2.4.1.1 Undertake an inventory of natural/man-made irrigation dams and reservoirs							120,000
2.4.1.2 Stock small-water bodies including reservoirs and dams.							5,000,000
2.4.1.3 Establish tenure arrangement of the stocked water bodies based on by laws and cultural systems							3,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 3: RESEARCH, TECHNOLOGY AND DISSEMINATION							
Objective 3: To develop research, technology and innovations for increased profitability, sustainable environment and socially equitable aquaculture sub-sector growth							
3.1.1.1 Assess community needs on aquaculture best management practices and importance of fish nutrition							50,000
3.1.1.2 Conduct census of fish farmers to update record							3,500,000
3.1.1.3 Design and conduct priority research for appropriate technologies and innovations							3,500,000
3.1.1.4. Develop aquaculture research that is responsive to gender and industry							5,500,000
3.1.1.5 Conduct aquaculture research on technologies and innovations that are responsive to climate variability							5,000,000
3.1.1.6 Conduct genetically improved fish strains							8,000,000
3.1.1.7 Conduct aquaculture research that is responsive to gender and industry							1,500,500
3.1.1.8 Disseminate aquaculture research, technologies and innovation							1,500,500
3.1.1.9 Develop climate-smart and gender-based technologies and innovations							3,500,000
3.1.1.10 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses							3.000,000
3.1.1.11 Develop ICT and other innovations in aquaculture							2,000,000
3.1.1.12 Scale-up and harmonise fish harvest methodologies							1,200
Outcome 3.2.1: Increased institutional capacity for effective implementation of aquaculture research, technology and innovation programmes							
3.2.1.1 Operationalise bio-safety measures at national and regional levels							3,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
3.2.1.2 Conduct socio-economic aquaculture research for improved viability and profitability of aqua-businesses							1,000,000
3.2.1.3 Equip and rehabilitate aquaculture research centres with necessary laboratory equipment and other infrastructure							7,000,000
3.2.1.4 Provide public and private sector support to Genetic Improvement Programmes (GIPs) – as in 3.1.1.6 above							
3.2.1.5 Support local innovation including information and communications technology (ICT) e.g. development of aquaculture equipment and manufacturing and digitalised feeding.							800,000
3.2.1.6 Train scientific human capital in various specialised disciplines (biology, ecology, genetics economics, fish disease diagnosis, nutrition, gender)							6,000,000
3.2.1.7 Review curricular various training institutions including university to respond to the aquaculture industry needs							2,000,000
3.2.1.8 Develop innovation hubs for young scientists and innovators in aquaculture for internships							6,000,000
3.2.1.9 Develop gender-responsive climate-smart technologies and innovations							900,000
3.2.1.10 Conduct joint field days involving researchers and extension agents to demonstrate aquaculture technologies and financial viability as guided by the research agenda (e.g. feeding, hatchery, mono-sex culture, poly-culture, integrated aquaculture agriculture (IAA), integrated irrigation							2,500,000
3.2.1.11 Establish and operationalise joint research-extension committee involving experts from various sectors/sub-sectors e.g. fisheries and aquaculture; environment, early warning, climate change and adaptation; agriculture and veterinary and trade							3,500,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 4: GENDER-RESPONSIVE AQUACULTURE SUPPLY AND VALUE CHAINS AND DECENT WORK							
Objective 4.1: To promote gender-responsive input-output markets, supply chains and product diversification to achieve wealth creation							
Outcome 4.1.1: Building resilience of gender-sensitive aquaculture enterprises along value chain							
4.1.1.1 Scale-up gender-transformation in decision processes regarding production, processing and marketing							1,200,000
4.1.1.2 Undertake action to address barriers along the value chain from production from production to consumption							1,000,000
4.1.1.3 Entrench gender transformative approach in aquaculture planning and policy recommendations at all levels.							1,500,000
4.1.1.4 Provide support to women and youth in aquaculture cooperatives and enterprises jointly with other partners e.g. TEVETA, universities and NGOs.							3,000,000
4.1.1.5 Mainstream gender into production, value addition and trade							3,000,000
4.1.1.6 Establish industrial supportive and strategic facilities/infrastructure in designated areas of secondary cities for niche products and value chains like fish (fish landing and processing facilities)							5,000,000
4.1.1.7 Promote BMPs to prevent fish loss and waste along the AVC (e.g. duty waiver, schemes, deepening ponds, training, associations, networking, EUS/TLV control)							4,500,000
4.2.1 Decent working conditions in aquaculture ensured							1,300,000
4.2.1.1 Enable fish farmers, workers and business stakeholders to earn a fair return from the labour							500,000
4.2.1.2 Create conditions for men and women in aquaculture to work in an environment free from gender abuse							2,000,000
4.2.1.3 Promote apprenticeship or vocational skills for youth engagement in aquaculture							3,000,000
4.2.1.4 Set up targeted investments for youth and women							5,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 5: CAPACITY STRENGTHENING							
Objective 5.1: To strengthen institutional capacity, and knowledge and skills of actors based on gender at all levels for higher productivity and competitiveness							
Outcome 5.1.1: Functional gender-responsive frameworks and tools for effective knowledge and skills generation, dissemination and uptake by 2030							
5.1.1.1.1 Train DoF and its partners to support development of commercial fish farming							5,000,000
5.1.1.1.2 Regularly conduct Joint Aquaculture Sub-Sector meetings involving relevant stakeholders at cluster, district and national levels							4,400,000
5.1.1.3 Revise modules and curricular various training institutions including MCF, universities and TEVET Authority (TEVETA) responding to the aquaculture industry needs							50,000
51.1.4 Recruit adequate skilled extension workers in district							800,000
5.1.1.1.5 Review aquaculture extension system for effective delivery systems and outreach services							50,000
5.1.1.1.6 Operationalise one-stop-shop for aquaculture business application procedures established.							800,000
5.1.1.1.7 Train farmers and actors along value chain and supply in business management and entrepreneurial skills							3,000,000
5.1.1.1.8 Conduct internships and famer field schools to over 8,000 farmers by 2030							3,000,000
5.1.1.1.9 Mobilise fish farmers into cooperatives							3,000,000
5.1.1.10 Train fish experts in diagnosis, parasitology and treatment of fish diseases							6,000,000
3.1.1.11 Provide training to women cooperatives to women actors along the aquaculture value chain							5,000,000
5.1.1.12 Provide mentorship to enhance youth aquaculture entrepreneurship through an incubation programme targeting 250 incubates at National Aquaculture Centre (NAC), Mzuzu Aquaculture Centre (MAC) and Kasinthula Aquaculture Centre (KAC)							5,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
5.1.1.13 Conduct specialised training for hatchery operators (catfish and tilapia) to increase fingerling production							2,500,000
5.1.1.14 Conduct specialised training for catfish management especially breeding							2,500,000
5.1.1.15 Invest in hatcheries through PPP							2,000,000
5.1.1.16 Operationalise procured 2 feed mill through PPP for MAC and DAC through PPP							1,500,000
Outcome 5.2.2: Enhanced capacity of aqua-businesses achieved by 2030							
5.2.1.1 Jointly work with agri-business experts in districts to support aquaculture businesses							80,000
5.2.1.2 Recruit aqua-business officers to support aquaculture investors							80,000
5.2.1.3 Strengthen public-private partnerships to enhance knowledge sharing and technology dissemination							60,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 6: CLIMATE-SMART AQUACULTURE							
Objective 6.1: To enhance climate-resilience and environmentally sound aquaculture investments							
Outcome 6.1.1 Increased aquaculture resilience achieved by 2030							
6..1.1.1 Assess vulnerability of fish farming.							50,000
6.1.1.2 Implement disaster risk management and mitigation measures for aquaculture.							800,000
6.1.1.3 Increase access to information (potential impacts of climate change, early warning, climate variability and disaster risks)							2,500,000
6.1.1.4 Establish early warning systems for use by farmers							1,700,000
6.1.1.5 Provide diversified value chains and equal access to fish markets							2,500,000
6.1.1.6 Reduce post-harvest losses by adopting climate-smart fish processing technologies							3,000,000
6.1.1.7 Increase fish quality and hygiene in fish processing, transportation and marketing							2,500,000
Outcome 6.2.1: Best management practices for aquaculture responsive to climate variability and disaster risks developed and adopted by farmers by 2030							
6.1.2.1 Adopt best aquaculture management practices that are responsive to climate variability and disaster risk.							1,500,000
6.1.2.2 Ensure access to microfinance and insurance schemes for diversified livelihoods, increased enterprises							2,500,000
6.1.2.3 Develop and share best adaptation practices to increase resilience among fish farmers							800,000
6.1.2.4 Apply integrated management approaches e.g. Ecosystem Approach to Aquaculture (EAA)							700,000
6.1.2.5 Share lessons on adaptation capacity and risk factors in aquaculture development							120,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
6.1.2.6 Mainstream Climate Change Adaptation (CCA) and Disaster Risk Management (DRM) planning frameworks at national level							70,000
6.1.2.7 Implement aquaculture interventions outlined in NDCs and NAP							3,000,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
PRIORITY AREA 7: MONITORING EVALUATION AND LEARNING							
Objective 7.1: To ensure that an effective MEAL framework is developed with clear targets, indicators and budget at national and district levels							
Outcome 7.1.1 Establishment and operationalization of monitoring evaluation and learning framework (MEAL) for aquaculture at community, district and national levels							
7.1.1.1 Establish Specific, Measurable, Achievable, Relevant and Time-bound (SMART) indicators for effective implementation of policy, strategies and plans							1,500,000
7.1.1.2 Develop a participatory and gender-sensitive monitoring, evaluation and learning system at community, district and national level to track progress on aquaculture development.							550,000
7.1.1.3 Prepare participatory climate variability and disaster risk practices monitoring tools for documentation and effectiveness							
Develop mechanisms and plans to monitor the impacts of the operations on the environmental, social and economic sustainability							550,000
7.1.1.5 Inventorise all existing programmes and projects funded by the Government, NGOs and other agencies with their funding portfolios in aquaculture for promotion of good governance, accountability and transparency							200,000
7.1.1.6 Conduct census of all actors along value chain							3,000,000
7.1.1.7 Prepare and circulate State of the State of the Environment Outlook (SEO) Reports e.g. Socio-economic Profiles (SEPs) with aquaculture development to all stakeholders with adequate aquaculture inclusion done by 2026.							0
7.1.1.8 Prepare annual District Development Plans (DDPs) with set targets, indicators and responsible institutions on aquaculture							3,000,000
7.1.1.9 Collect and analyse gender-disaggregated data on aquaculture along the value chain.							1,500,000

OUTCOMES / ACTIVITIES	Implementation Timeframe						ESTIMATED BUDGET COST (K'000)[3]
	2025	2026	2027	2028	2029	2030	
7.1.1.10 Apply adaptive MEAL in all aquaculture programmes							1,500,000
Outcome 7.1.2: Sustainability in aquaculture programmes and projects achieved							
7.1.2.1 Develop resource mobilisation strategy							800,000
7.1.2.2 Prepare human capacity development plan							800,000
7.1.2.3 Procure necessary infrastructure based on institutional needs							5,000,000
7.1.2.4 Conduct regular joint assessments of the impacts of policies and regulations on aquaculture development to identify best practices while allowing for data-driven adjustments and improvements							1,800,000
Outcome 7.1.3: Harmonised management information system within the aquaculture sector achieved							
7.1.3.1 Harmonise IMS within the fisheries/aquaculture sector and others							20,000
7.1.3.2 Train planners at central and district levels on IMS application							1,300,000
7.1.3.3 Revise and implement Fisheries and Aquaculture Communication Strategy							50,000
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