

Aquaculture Sector Strategy – Malawi

CASA MALAWI COUNTRY TEAM

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Abbreviations

AfDB	African Development Bank
AgCOM	Agricultural Commercialisation
AGM	Annual General Meeting
AgriTT	Agricultural Technology Transfer
AVCP	Aquaculture Value Chains Project for Higher Income and Food Security
BDS	Business Development Services
CABI	Centre for Agriculture and Bioscience International
CAMA	Consumer Association of Malawi
CASA	Commercial Agriculture for Smallholders and Agribusiness
CC	Climate Change
CCE	Climate Change and Environment
CCRFA	Code of Conduct for Responsible Fisheries and Aquaculture
CDC	Commonwealth Development Cooperation
CDI	Clinton Development Initiative
CFTC	Competition and Fair-Trading Commission
COMSIP	Community Savings and Investment Promotion
CPA	Consumer Protection Act
DF	Department of Fisheries
DFID	Department for International Development
DFIs	Development Finance Institutions
DFOs	District Fisheries Officers
EAD	Environmental Affairs Department
FAO	Food and Agriculture Organisation
FARMSE	Financial Access for Rural Markets, Smallholders and Enterprises
FSP	Financial Service Provider
GDP	Gross Domestic Product
GESI	Gender and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)
GoM	Government of Malawi
GTCL	Global and Tradeline Corporation Limited
IFAD	International Fund for Agricultural Development
IFFNT	Innovative Fish Farmers Network Trust
IGS	Inclusive Growth Strategy
IM	Inclusive Markets
ILAF	Intervention Logic Analysis Framework

KFW	Kreditanstalt Fuer Wiederaufbau (German Development Bank)
KSR	Kasinthula Research Station
LUANAR	Lilongwe University of Agriculture and Natural Resources
MALDECO	Malawi Development Cooperation
MARDEF	Malawi Rural Development Fund
MBS	Malawi Bureau of Standards
MFFS	Mzuzu Fish Farming Station
MFI	Micro-Finance Institutions
MICF	Malawi Innovation Challenge Fund
MITC	Malawi Investment and Trade Centre
MSMEs	Micro, Small and Medium Enterprises
MSY	Maximum Sustainable Yields
NAC	National Aquaculture Centre
NASCOMEX	NASFAM Commodity Market Exchange
NASFAM	National Smallholder Farmers Association of Malawi
NFS	Nutrition and Food Security
NGO	Non-Governmental Organisations
PSGC	Phata Sugarcane Growers Cooperative
PSOG	Phata Sugarcane Out-Grower
RBM	Reserve Bank of Malawi
SACCOs	Savings and Credit Cooperatives Organisations
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SHF	Smallholder Farmer
SME	Small and Medium Enterprises
SMEDI	Small and Medium Enterprises Development Institute
SVTP	Shire Valley Transformation Project
SWFA	State of World Fisheries and Aquaculture
TWG	Technical Working Group
UN	United Nations
VAT	Value Added Tax
VSL	Village Savings and Loan

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Executive summary

Aquaculture is an important sector in Malawi, because it is potentially the main driver of sustained fish supply to the nation to match the increasing protein needs of the population to compensate for the dwindling fish catches under capture fisheries.

Sector Description

- Aquaculture is still in its nascent stage in Malawi but there have been signs of growth in the past two decades. Production rose from about 800 tonnes in 2005 to about 4,900 tonnes in 2015 and 7,672 tonnes in 2016. The sector currently employs about 15,465 smallholder farmers (SHFs), of whom 61.5% are male and 38.5% female. They are loosely organised in farmer clubs. There are only two commercially organised actors and a few other promising emerging semi-commercial actors.
- Smallholder farmers practise pond-based production in upland locations. The two commercial operators: MALDECO uses cage farming, while Chambo Fisheries uses a bio-flow water recirculation production system. These systems require significant initial investment, which is out of reach for many SHFs.
- Aquaculture production is significantly inputs-driven, which increases the importance of fingerlings and feed in the value chain. Meanwhile, access to quality inputs for SHFs is very low, which compromises their productivity. There is weak investment in the production of quality inputs, such that all floating feeds are imported from Zambia.
- Combined with capture fisheries, fish supply to the domestic market still falls short of domestic demand. The estimated supply-demand gap is about 20,000 tonnes a year. Because of this gap, the country is importing fish from neighbouring countries, with fish imports from Zambia alone estimated to average 800 tonnes a year.
- Most actors in the value chain face serious challenges to access commercial finance and investment to expand their enterprises because of weak market information signals about the commercial viability of the sector.

Analysis

The key issues constraining commercialisation at the **production end** revolve around the use of low-quality inputs and SHFs' limited technical knowledge and expertise. There is no structured market for fingerling production and supply, largely because potential producers do not have confidence in availability of the market. Similarly, there are challenges with the accessibility of affordable floating feed: It is imported from Zambia, and the price is increased because the Malawi government levies a 16.5% VAT on its landed value. There is also weak extension support for SHFs due to low numbers of qualified government extension workers. At the same time, access to commercial finance is very limited, so producers usually raise finance through their own savings when they need working capital or want to invest in expansion. Productivity for most smallholder farmers is low, averaging about 1 metric tonne per hectare compared to a potential of 6 tonnes per hectare. This ultimately inhibits the profitability of the sector and holds back commercialisation.

On the **post-production side**, there are no existing aggregation arrangements. This leaves all SHFs to individually (or in their farmer groups) sell fish within their production localities, at a lower price than they would get in urban markets¹. At the same time, low production volumes do not inspire investors to invest in downstream opportunities such as offtake marketing, distribution and processing for value-addition. Moreover, the low volumes are scattered across the country, and it is not clear where production is located. However,

¹ The price in these localities is around \$2.70 compared to \$4.0 in urban markets

downstream investment has great potential considering the huge unmet demand, both domestic and in neighbouring countries. Designing and pitching a viable business model for financing at this stage of the value chain requires credible information on current and projected supply chains to strengthen the value proposition.

In **policy and regulation**, there are inherent inconsistencies that stifle prospects for growth. While the National Fisheries and Aquaculture Policy (NFAP) identifies aquaculture as the second policy priority area and aspires to expand the sector to make up for dwindling fish catches, tax policy does not support this aspiration. The current tax regime reduces local fish producers' competitiveness due to the high cost of feed, while fish imports are duty-free.

The following steps are required to **accelerate the commercialisation of the aquaculture sector**: (1) improve accessibility to commercial input and service markets; (2) strengthen and formalise organised production arrangements; (3) strengthen the role of emerging commercial producers; (4) strengthen SME involvement in the sector; and (5) improve the regulatory and policy environment to be responsive to the commercial needs of the sector.

Responsive strategy

CASA's strategy for aquaculture seeks to deepen the commercial participation of key value-chain actors in viable input and output markets. CASA will pursue this strategy by improving the capacity of emerging commercial producer groups to access working capital finance and by leveraging investments in SMEs to provide key business support services. As the sector is thin and SME actors are weak, CASA has identified a few promising emerging SMEs to support. This support will help them to prepare for and access investment for more lucrative downstream value chain functions. CASA will also seek to influence regulatory and policy improvements that are necessary for increasing sector competitiveness and access to markets for SHFs and that make the environment more attractive for increased investment. This strategic focus is designed to address identified weaknesses in the current support service.

Three broad intervention areas have been identified to anchor projects that will drive inclusive commercialisation. Projects defined under the current intervention areas will reach an estimated 6,000 producers. We anticipate it will be possible to scale up to approximately 9,000 beneficiaries by expanding existing projects and identifying new intervention areas in future years.

1 Background

1.1 CASA programme overview

DFID's approach to economic development and agriculture relies on an increasingly commercial approach to agricultural programming by:

- Boosting agri-business investment, financing agricultural infrastructure and supporting smallholder-farmer access to markets;
- Helping farmers and their families to have opportunities and jobs outside their farms, and supporting SMEs in rural areas;
- Supporting subsistence farmers without other economic opportunities, so that they avoid hunger, malnutrition and extreme poverty;
- Encouraging commercial approaches that reduce the cost of nutritious diets.

In support of this approach, DFID has launched the five-year, flagship Commercial Agriculture for Smallholders and Agribusiness (CASA) programme which seeks to change how investors, donors and governments view and invest in agribusinesses that work with smallholder supply chains. In doing so, CASA will increase economic opportunities for smallholders by:

- a) Demonstrating the commercial viability of small and medium-sized (SME) agribusinesses with significant smallholder supply chains and attracting more investment into these businesses;
- b) Deepening the smallholder impact of existing investments made by development finance institutions (DFIs, notably CDC), and impact investors;
- c) Enabling poor smallholder farmers to engage with and trade in commercial markets;
- d) Researching and communicating the case for successful engagement with smallholder-linked agribusiness.

CASA has three components, two of which (Components A and C) are managed out of Nairobi, Kenya by NIRAS-LTS in partnership with Swisscontact and CABI. CASA's component B is separately implemented by Technoserve and focuses on technical assistance and investment promotion for larger agri-enterprises involved in global development. In addition to its three components, the programme has three strategic cross-cutting components:

- Gender and social inclusion (GESI);
- Nutrition and food security;
- Climate change and the environment.

Component A will demonstrate high-impact interventions in the three target countries (Malawi, Uganda and Nepal) leading to: (a) mobilisation of investments for partner agribusinesses (which can include commercially-minded farmer associations and cooperatives) and expanded outreach to smallholders; and (b) improved access to markets for smallholders. The ultimate target group for CASA is the 'missing middle' of 'stepping-up' smallholders² – that is, those that wish to engage in commercial agriculture but have largely not done so to date. Of the total number of CASA's beneficiaries, 40% will be those that live on less than \$2 a day and 50% will be women.

² 'Stepping-up smallholder farmers are described as those that sell or wish to sell at least 50% of their cash crops/produce.

Component C is a learning and knowledge-sharing component. Among other things, it will leverage knowledge gains from Component A interventions and other research to inform donors and investors about the merits of investing in agribusiness SMEs with significant outreach to smallholders.

1.1.1 Analysis approach

Subsequent to the sector analysis exercise, the CASA Malawi Country Team has consulted with key actors in the aquaculture sector with a view to building consensus on the understanding and characterisation of the key elements of the market system. A sector validation workshop was organised to allow the targeted key actors to feed into the draft problem analyses, as well as the initially proposed intervention logic analysis frameworks (ILAFs). These consultations also helped to deepen the Country Team's understanding of the specific roles performed by various market actors, the problems and opportunities in the core market and the corresponding support and business-enabling environment functions.

As such, this document draws from multiple sources, including secondary information from a literature review and primary information obtained through various focus group discussions and key informant interviews. These were carried out during the field investigations exercise, which also obtained feedback from key market actors during the validation working session. This report has systematically aligned the sector analysis with the inclusive-markets (IM) approach that guides the design and implementation of CASA interventions. To ensure that CASA remains flexible and adaptable to emerging evidence, this report provides evidence-based analysis to guide development of the start-up portfolio of interventions.

1.2 CASA aquaculture sector locational focus

The Country Team carried out a rapid analysis of the spatial distribution of aquaculture actors at all levels of the value chain in order to select the programme interventions. This analysis was based on sectoral information from the Department of Fisheries. On the basis of this analysis, the Country Team employed four factors to guide identification of locations for the implementation of programme interventions:

- Presence of SHFs;
- Presence of organised farmer groups for proposed interventions;
- Availability of medium-scale producers and agribusinesses to provide support services to the SHFs;
- Weather differences across the agro-ecological zones. This will affect scalability, because of different weather impacts on applicable production technologies and fish management practices.

Based on those factors, three locations have been earmarked for pilot implementation of the first set of interventions. Each site is in a different one of the country's three regions.

2 Sector description

2.1 Sector profile

2.1.1 Overall context

Aquaculture is one of the key agricultural sub-sectors that are directly linked to the achievement of some of the Sustainable Development Goals (SDGs) under the United Nation's 2030 Agenda for Sustainable Development. Increased aquaculture production will inevitably contribute to the attainment of SDGs 1, 2, 3, and 8 – respectively on ending poverty; ending hunger; increasing good health and wellbeing; and providing decent work and economic growth. In addition, SDG 14, which seeks to ‘conserve and sustainably use the oceans, seas and marine resources for sustainable development’, is particularly relevant to the aquaculture sub-sector. As such, an increase in production volumes and productivity of aquaculture is a major objective on the global stage for both nutrition and food security. It will also improve the livelihoods of communities through commercialisation of the sector and enhanced household incomes.

Global fish production volumes and value peaked in the year 2016, registering about 171 million tonnes, which was valued at about \$362 billion³. Of the total production volume, 47% represented aquaculture production if non-food uses (such as fishmeal and fish oil) are included or 53% if non-food uses are excluded. Of the total sales value, \$232 billion was from aquaculture production. It is noteworthy that production levels from capture fisheries have been relatively static since the late 1980s, and that continued growth in fish supply has largely been possible thanks to growth in aquaculture production. This trend has continued and even accelerated in recent years (See Table 1).

Table 1: World fisheries and aquaculture production and utilisation (million tonnes)

Category	2011	2012	2013	2014	2015	2016
Production						
Capture	92.2	89.5	90.6	91.2	92.7	90.9
Aquaculture	61.8	66.4	70.2	73.7	76.1	80.0
Total (fisheries & aquaculture)	154.0	155.9	160.8	164.9	168.8	170.9
Utilisation						
Human consumption	130.0	136.4	140.1	144.8	148.4	151.2
Non-food uses	24.0	19.6	20.6	20.0	20.3	19.7
Population (billions)	7.0	7.1	7.2	7.3	7.3	7.4
<i>Per capita consumption (kg)</i>	<i>18.5</i>	<i>19.2</i>	<i>19.5</i>	<i>19.9</i>	<i>20.2</i>	<i>20.3</i>

Source: FAO Statistics in the State of World Fisheries and Aquaculture for 2018

Global per capita fish consumption has also been increasing. It rose from about 9 kg in 1961 to 20 kg in 2015. Estimates for 2016 and 2017 are just over 20 kg⁴. This points to the potential contribution of the fisheries and aquaculture sector in attaining the relevant SDGs. For Africa, per capital fish consumption was 9.9 kg in 2015⁵.

Most global production is concentrated in Asia, which has contributed over 89% of world aquaculture production for over two decades. The leading producers in Africa

³ The information in this and two subsequent paragraphs draws from the 2018 edition of the Food and Agriculture Organisation's Report on the State of World Fisheries and Aquaculture: Meeting the Sustainable Development Goals. It can be accessed at: <http://www.fao.org/state-of-fisheries-aquaculture>

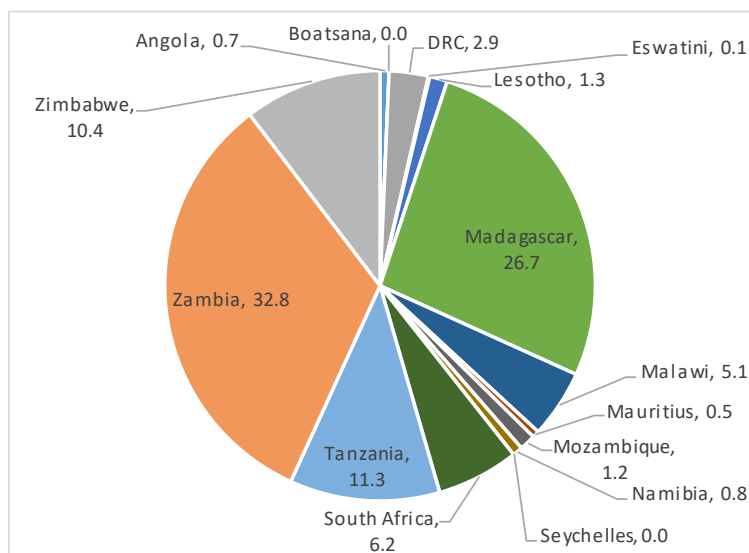
⁴ The State of World Fisheries and Aquaculture: Meeting the Sustainable Development Goals

⁵ *ibid*

have been Egypt, Nigeria and Uganda, and their share of global production has been steadily increasing over the past two decades.

SADC fish production – capture and aquaculture combined – was 2,815,736 tonnes in 2016, of which 97,460 tonnes was aquaculture⁶. That amounted to a 3.5% contribution by the sector to the region's GDP. Of the total production under aquaculture, Zambia was the regional leader, with some 33% of the total, followed by Madagascar with 27%. Tanzania contributed 11%, and Zimbabwe 10% (See Figure 1).

Figure 1: Percentage aquaculture production by SADC countries



Zambia's prominence has considerable implications for Malawi because of its significant investment in inputs and fish production infrastructure. This investment allows Zambia to export excess floating fish feed to neighbouring countries including Malawi. In addition, Malawi imports some fish from Zambia, which competes with local production. Pursuant to the relevant trade protocols under the SADC Agreement on Trade, fish are imported duty-free into Malawi, while fish feed imports into Malawi are subject to VAT. This gives Zambian producers an unfair competitive advantage over their Malawian counterparts.

Aquaculture production systems and technologies have developed rapidly over the past five decades. They vary from simple facilities, such as family ponds for domestic consumption in tropical countries, to high-technology systems, such as intensive closed systems for export production⁷. Almost half of aquaculture production utilises simple systems of freshwater ponds with inbuilt modifications for ensuring improved growth and survival rates of the targeted fish species through enhanced food uptake, oxygen levels and protection from predators. Ultimately, the selection of aquaculture system or approach is determined by several considerations, including socio-economic factors related to the targeted beneficiaries; the availability of technology; the availability of production inputs, support facilities and services; and investment requirements. Environmental considerations also need attention.

2.1.2 Local context

Malawi's aquaculture production levels are insignificant on both a global and a SADC-region level, because the sector remains largely under-developed. In the SADC, Malawi's aquaculture production contributed about 5% of the regional total in 2016 and ranked sixth, after leading producer countries including Zambia, Madagascar, Tanzania, Zimbabwe and South Africa. This was in spite of the country's enormous freshwater

⁶ The Synthesis Report on the State of Food and Nutrition Security and Vulnerability in Southern Africa, 2018

⁷ FAO, accessed at: <http://www.fao.org/fishery/technology/aquaculture/en>

endowment compared to other SADC countries. Meanwhile, the country's fish production still falls short of national demand, attracting supplementary fish imports from Zambia.

However, the sector has shown strong signs of growth over the past couple of years. Total annual production volumes reached an all-time high of 164,940 tonnes in 2016, up from about 81,400 tonnes in 2005 and 100,900 tonnes in 2010. While the bulk of fish caught, sold and consumed has traditionally been produced by capture fishery, capture fishery production has declined in some years. This has been particularly the case for the commercially-oriented, high-value species such as the *Oreochromis karongae* - locally known as 'chambo' – the average annual production of which declined from more than 10,000 tonnes between 1980 and 1990 to around 4,000 tonnes between 2000 and 2015⁸. On the other hand, annual fish production under aquaculture increased from about 800 tonnes in 2005 to about 4,900 tonnes in 2015 and 7,672 tonnes in 2016. The bulk of fish produced by aquaculture are commercially-oriented, high-value species, which are being caught less by capture fishery (See Table 2).

Table 2: Trends in Malawi's annual fish production and growth for capture and aquaculture⁹

Year	Capture (tonnes)	% Growth in capture fisheries	Aquaculture (tonnes)	% Growth in aquaculture	Total (tonnes)	% Growth in capture & aquaculture
2005	80,609		813		81,422	
2006	72,929	(9.5)	907	11.6	73,836	(9.3)
2007	67,818	(7.0)	1,252	38.0	69,070	(6.5)
2008	75,867	11.9	1,318	5.3	77,185	11.7
2009	76,045	0.2	1,600	21.4	77,645	0.6
2010	98,300	29.3	2,632	64.5	100,932	30.0
2011	82,336	(16.2)	2,815	7.0	85,151	(15.6)
2012	120,328	46.1	3,232	14.8	123,560	45.1
2013	109,889	(8.7)	3,705	14.6	113,594	(8.1)
2014	116,289	5.8	4,742	28.0	121,031	6.5
2015	144,315	24.1	4,918	3.7	149,234	23.3
2016	157,268	9.0	7,672	56.0	164,940	10.5

Source: Department of Fisheries

The number of Malawians engaged in fisheries and aquaculture has also increased.

The sector employed 173,328 Malawians in 2016, including 7,139 that engaged in aquaculture¹⁰. By 2018, the number of aquaculture fish farmers had grown to about 15,465, according to a census carried out by the Department of Fisheries¹¹. Most of these are SHFs organised in farmer clubs, and only two players are operating at a commercial level. In terms of gender, 61.5% of the SHFs are male, and 38.5% female.

Fish culture is primarily done for commercial and semi-commercial purposes by almost all producers in Malawi. That includes SHFs, who sell virtually 90% of their production. Even when some aquaculture farmer clubs are initially established by NGOs to support nutritional needs, they become increasingly more inclined to sell their fish harvests¹². Nonetheless, this practice enhances community nutritional needs because SHFs sell fish within their localities. In spite of this commercial inclination, most smallholder farmers do not

⁸ The National Fisheries and Aquaculture Policy of 2016

⁹ Fish production data was obtained from Department of Fisheries

¹⁰ FAO FishStat, SADC Member States, World Bank in the Synthesis Report on the State of Food and Nutrition Security and Vulnerability in Southern Africa, 2018

¹¹ As reported in the Annual Economic Report of 2018 by the GoM

¹² The IFFNT membership emphasised this point and attributed the same to the significant income constraints that smallholder farmers do have to cater for their basic needs

use formulated feed but chicken manure. Others supplement pond fertilisation with locally sourced maize and rice bran. This has implications for productivity levels, which range between 0.9 and 1.2 tonnes/ha for SHFs, compared to about 3.0 tonnes/ha for medium-scale producers and a potential of 6.0 tonnes/ha.

The two commercial companies, MALDECO and Chambo Fisheries, as well as some potential stepping-up smallholder producers¹³, invest in quality inputs in order to enhance productivity and achieve their commercial objectives. Apart from Chambo Fisheries¹⁴, all producers in this category use imported floating feed and fingerlings they have bred themselves. In addition, MALDECO and Chambo Fisheries are making extra efforts to enhance their viability, including investment in genetic improvements in the available fish strains through various techniques such as genetic selection and brood stock selection. While most smallholder producers in this category appear willing to step up their production, almost all have very rudimentary operational arrangements, often with no documented strategic/business plans or financial statements.

The seasonal impact on production depends on the specific weather conditions in agroecological zones. For instance, farmers in high-altitude areas such as the northern region city of Mzuzu are not able to produce fingerlings during the cold months from May to July, which also restricts the production of grow-outs to a single cycle per year. On the other hand, fingerling production and production of grow-out fish can be undertaken throughout the year in low-altitude warm areas such as the Lower Shire and most of the Lake Shore districts of Nkhatabay, Nkhotakota and Salima.

In terms of pricing and marketing, all fish produced under aquaculture are sold and consumed within the country, with most of the SHFs and farmer clubs selling within their locality. MALDECO is the only entity selling fish beyond the vicinity of its production sites, supplying most of the major cities and some district towns through its established franchisees. Fish colour is the major factor that impacts the price of fish produced through aquaculture: both pond and cage-based farmed fish tend to have a dark colour, but most upmarket consumers prefer a silver colour. It is noteworthy that this upmarket urban niche, particularly in the capital city of Lilongwe, is where duty-free imports of competing fish products from Zambia are also sold.

While the involvement of women and youth at the production level is currently limited largely to feeding fish in family ponds, studies have established that the role of women and children is significantly higher than that of men in the downstream nodes of the value chain. This is particularly true for capture fisheries, where women and youth are far more involved in downstream activities, including sale brokerage at landing sites, fish processing such as smoking, local trading and exporting through informal cross-border trade. A 2017 study found that only 1% to 5% of producers in the various nodes of fish production and marketing were women; about 70% of local brokers were women; about 90% of local processors were women; none of the transporters were women; 2% of the wholesale and intermediary traders were women; and about 60% of exporters were women¹⁵. These results were consistent with findings in an earlier study that concluded that over 70% of informal cross-border trade in the SADC region is undertaken by women¹⁶, and that in Southern Africa, cross-border fish traders were also predominantly young, with ages below 40 years (between 60% and 80% of traders between Malawi and Zambia were under 40.)¹⁷

¹³ Andrew Dorward (2009) defines "Stepping-Up" in an agribusiness 'where current activities are engaged in, with investments in assets to expand these activities, in order to increase production and income to improve livelihoods'. Key amongst these in our case include Chonona Fish Farm in Chikwawa, KA-Small Fish Farm in Mchinji and ViphyaChambo Fish Farm in Mzuzu

¹⁴ Chambo Fisheries use own-produced feed, which is slow sinking

¹⁵ Manyungwa-Pasani et al. (2017) 'Women's participation in fish value chains and value chain governance in Malawi: A case of Msaka (Lake Malawi) and Kachulu (Lake Chilwa)', Working Paper 45. PLAAS, UWC

¹⁶ By Afrika, J-G.K. et al. Informal cross border trade in Africa: Implications and policy recommendations. Africa Economic Brief (Volume 3, Issue 10). Africa Development Bank.

¹⁷ By Mussa, H. et al. Assessment of Informal Cross border Fish trade in the Southern Africa Region: A case of Malawi and Zambia (2017). Journal of Agricultural Science and Technology

The government's intention is to promote aquaculture production to contribute to nutrition and food security by compensating for the dwindling volumes under capture fisheries. But most of the fish currently being produced under aquaculture in Malawi are the commercial Chambo species, which have an average weight during harvesting of between 300 and 800 grams. This type of fish is generally too expensive for the nutritionally-constrained segment of the population, who are in the lower-income brackets. As such, most of the aquaculture-produced fish is sold to middle-income urban consumers. To cater for lower-income urban consumers, Chambo Fisheries purposefully harvests some smaller fish sizes, between 150 and 300 grams, and sells them to this segment of consumers. The company makes some profit on sales of these small sized fish thanks to a reduced production cost because of the shortened culture period. It is important to note that studies have confirmed that even small, affordable species such as *Copadichromis inornatus* (utaka) and *Engraulicypris sardella* (usipa) are nutritious enough¹⁸.

The country has already experienced some short-term negative impacts from climate change on aquaculture, and future climate shocks and stressors will become more likely. In March 2019, floods triggered by Cyclone Idai washed away two Chonona Fish Farms fishponds, along with catfish stock that was about to be harvested, resulting in the loss of significant sunk costs. Chonona is located in the Lower Shire, a valley with significant potential in aquaculture production, but which is also prone to extreme climatic events such as floods and droughts. Atmospheric warming could change water temperatures, which might impact production. Droughts could decrease the availability of freshwater to fill ponds or tanks. Lake production using cages would be more resilient to such drought events. Large ponds in farming communities can be used for irrigation water during dry periods or during the off season.

Aquaculture production can have environmental impacts, especially relating to the disposal of wastewater from fishponds. The prevailing production systems of most SHFs are such that they fertilise their fishponds with organic and inorganic fertilisers. Some producers dump this water into local rivers and streams. A more sustainable strategy would be to use this water to irrigate crop lands and make them more fertile ("fertigation").

Caged aquaculture in Lake Malawi is likely to raise environmental concerns. Such concerns would necessitate carrying out a "strict environmental audit and monitoring under the World Wildlife Fund/ Tilapia Aquaculture Dialogue (WWF/TAD) International Standards for Responsible Tilapia Agriculture due to the highly sensitive nature of the Lake Malawi ecosystem and the high risk of multiple kinds of damage from intensive aquaculture activities". Specific concerns include nutrient loading, the introduction of invasive species and toxins and the decline of native fish populations. These concerns are associated with farming in Lake Malawi because it is regarded as an ecologically important and sensitive ecosystem. Even if impacts are not related to CASA activities, aquaculture could be seen as part of the problem. Hence, serious public and political relations would need to be considered.

Land-based aquaculture systems in either ponds or tanks in which water can be re-circulated or used to fertilise crop production are likely to be much more environmentally sound and face significantly less review. Land-based aquaculture systems may provide significant co-benefits through the provision of water for irrigation and the use of crop waste and livestock manure as inputs into the aquaculture system. The challenge with land-based systems has been their small size, poor construction, and lack of water availability. All these constraints have limited economic growth.

¹⁸ Mumba, P. et al. (2005). Nutrient composition of selected fresh and processed fish species from Lake Malawi: *A nutritional possibility for people living with HIV/AIDS*. International Journal of Consumer Studies

2.2 Sector dynamics

2.2.1 Market overview and dynamics

Fish farming in Malawi started as early as 1906 with the introduction of rainbow trout for angling and the subsequent culture of indigenous species such as *Oreochromis shiranus* and *Tilapia rendalli* in 1956/7. But commercial aquaculture was only established in 2005, with just two operators. Most of the functions remain underdeveloped, both in the core market and in support and regulatory services.

2.2.2 Core value chain

The core value chain depicts all the transactions and linkages through which the primary product is produced and reaches the final consumers. For aquaculture in Malawi, this broadly includes the input suppliers, producers, processors, distributors, intermediary traders and final consumers. Since the sector is still in its infancy, some of these roles are currently being provided by a single actor. For instance, MALDECO which is a major commercial producer, also does some fish processing, as well as distributing to outlet markets in cities and doing some wholesale selling.

a. Input supply

The major inputs for aquaculture production are fingerlings and feed. Others used occasionally include organic and inorganic fertilisers, as well as the optional use of nets and cages, depending on what production technology and system is employed.

Currently, the major players in fingerling production are three public hatcheries, two private commercial producers and six small-scale producer hatcheries. The three public hatcheries are located in government fish research stations or farms: the National Aquaculture Centre (NAC), Mzuzu Fish Farming Station and Kasinthula Research Station. The major private fingerling producers are MALDECO and Chambo Fisheries (See Table 3).

Table 3: Trends in production by public and private hatcheries (by number of fingerlings)

Year	Public hatcheries (NAC, Mzuzu)	% of total	Private hatcheries (MALDECO)	% of total	Total (public and private)
2013	785,906	13.6	5,006,011	86.4	5,791,917
2014	731,756	11.5	5,613,964	88.5	6,345,720
2015	965,811	13.1	6,423,307	86.9	7,389,118
2016	1,670,526	20.1	6,625,000	79.9	8,295,526
2017	1,891,835	19.9	7,619,920	80.1	9,511,755

Source: Annual Economic Report of 2018, GoM

The private hatcheries operated by MALDECO and Chambo Fisheries are primarily serving those companies' internal needs, while public hatcheries serve SHFs and produce fingerlings for ongoing internal research needs. On a small scale, these two commercial companies have been supplying some SHFs with fingerlings on demand.

The small-scale fingerling producers comprise hatcheries operated by emerging SME producers as well as other small-scale individual producers. Most of these are members of the Innovative Fish Farmers Network Trust (IFFNT), a grouping of upcoming micro, small and medium aquaculture players (See Table 4).

Table 4: Capacity of small-scale private hatcheries (by number of fingerlings produced)

#	Name of the private hatchery	Total capacity (Number of fingerlings)	Current production level (Number of fingerlings)
1	Chonona Fish Farm	120,000	Not yet started
2	ViphyaChambo	100,000	40,000
3	KA-Small Fish Farm	100,000	50,000
4	Aglupenu Investments	2,000,000	Based on demand
5	African Novel Resources Ltd	400,000	Based on demand
6	Fulamuchenga (individual Producer)	100,000	32,000

Since most SHFs are unwilling to pay for quality fingerlings, the private hatcheries do not have adequate demand for their fingerlings, which depresses fingerling production levels. Those SHFs that use quality fingerlings mostly purchase with the help of NGOs and the government, reducing the incentive for investment¹⁹ in fingerling production.

The country does not have commercial producers of floating fish feed. Its high protein-conversion ratio makes it the appropriate feed type for aquaculture-based production, whether this uses ponds or cages. Sinking feed, on the other hand, has low uptake because most of the feed ends up accumulating at the base of the pond or wasted in the water reservoir in the case of cage-based production.

NAC has just installed a feed mill that can produce floating fish feed. However, the capacity is too small to support any commercial production needs of SHFs. Secondly, NAC is still testing this equipment, which was procured under the now phased-out AgriTT Project. So, the equipment has not been fully commissioned. The Lilongwe University of Agriculture and Natural Resources (LUANAR) also procured a similar equipment with financial support from the AgriTT Project, but this has not yet been installed because construction of its housing facility has not yet been completed.

Chambo Fisheries produces slow sinking feed but uses this for its own internal production needs and does not supply it to other players. While MALDECO invested in a feed mill, it has stopped using it, because it was only producing sinking fish feed, which was observed to have significant performance deficiencies compared with floating fish feed imported from Zambia. Meanwhile, MALDECO is only using imported feed from Zambia.

Other potential producers of floating feed include Chonona Fish Farms and Lenziemill Milling Company. Chonona Fish Farm has procured a medium-sized feed mill capable of producing floating fish feed. However, installation of this equipment is awaiting completion of the construction works for the anchorage and housing facility. With capacity of about 100 kg per hour – compared with a monthly internal feed demand of about 250 kg – Chonona’s feed mill could potentially service other SHFs. Lenziemill, a local SME currently involved in production of poultry feed and aggregating agri-produce for export, is also planning to procure a floating fish feed mill with capacity of between 300 and 800 kg an hour, depending on demand.

¹⁹ Sector Analysis Studies for CASA: Malawi Country Value Chain and Market Analysis Report, CARDNO, November 2017.

Table 5: Summary of available and potential feed-making investments

#	Producer/ potential producer	Type of Feed	Operational (Yes/No)	Capacity (kg/hr)	Remarks
1	Chambo Fisheries	Partial floating	Yes	Not yet provided	Internal use only
2	Chonona Fish Farm	Floating	Not yet	100	Equipment just procured. Installation awaiting completion of housing facility
3	NAC	Floating	Partly	100	Finalising testing – primarily for research purposes but can supply a few SHFs
4	LUANAR	Floating	Not yet	100	Equipment not yet installed. Awaiting construction of housing facilities. Primarily for research purposes but can supply some SHFs
5	Lenzie Mills	Floating	Not yet	300 -800	Equipment not yet acquired. Procurement process still underway

Due to weak access to formulated feed, some SHFs use organic and inorganic fertilisers, mostly with the support of projects and NGOs. On the other hand, most of the SHFs without project or NGO support tend to use locally sourced chicken manure, rice and maize bran with significant depressing effects on productivity.

The most pertinent cross-cutting issue at the input supply node is the environmental implications of releasing wastewater from fingerling production ponds. This results from prevailing weaknesses in enforcing proper environmental mitigation measures, and most of the small-scale producers tend to release wastewater back into source water bodies, such as rivers.

b. Production and post-harvest handling

As already stated, the main actors at this node include the two major commercial producers, MALDECO and Chambo Fisheries, plus 15,465 registered SHFs spread across the country²⁰, of which only about five show some signs of capability to step-up their production. Among those with the ability to step up, only Viphya Chambo has a woman as a registered owner – she is working closely with her husband on the enterprise. The rest are owned and operated by men. Similarly, youth involvement in the potential stepping-up of aquaculture production is not evident, due to high initial investment costs. As such, the production function in aquaculture is currently skewed towards men, with women largely involved through small-scale producer farmer groups.

There is currently very little interaction among actors in this node of the value chain, perhaps only among the SHFs. That is, some of the SHFs noted as potential stepping-up producers provide some extension support to fellow SHFs in their catchment areas.

In terms of production technologies, MALDECO is the only company engaged in cage farming, after initially trying to use pond-based production technologies. The company has over the past couple of years been working on testing the viability of cage culture and is now confident of pursuing this as its main production technology. MALDECO produced 712 tonnes of fish in 2018 but has the capacity to produce much more.

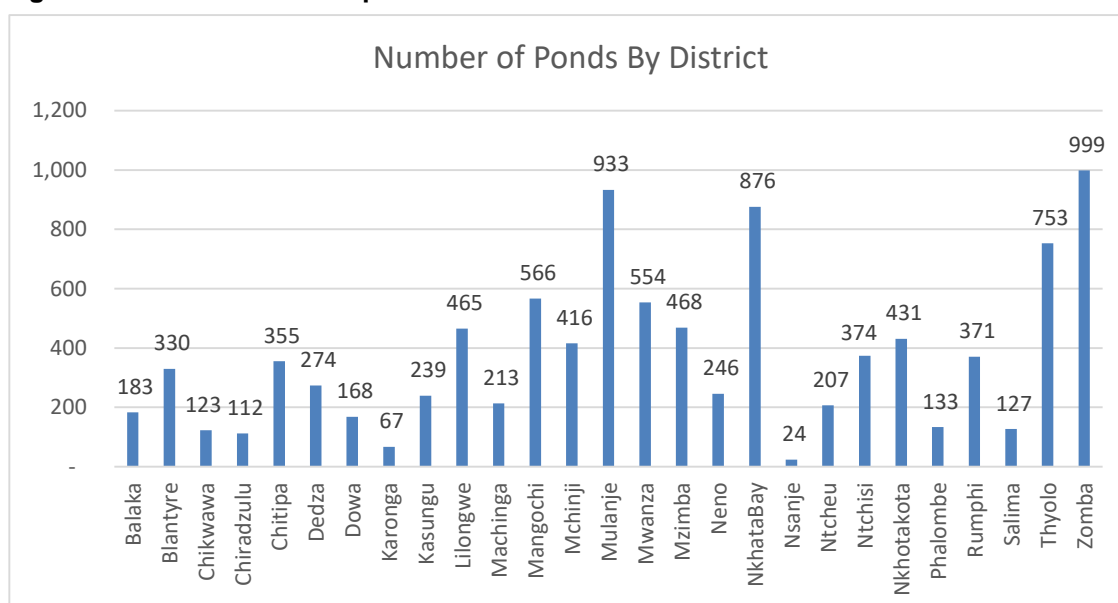
On the other hand, Chambo Fisheries uses a bio-flow system with a combination of an artificially controlled water recirculation system and specialised machinery to filter dirt from the water that serves the breeding and production tanks. Meanwhile, Chambo

²⁰ Source: The Department of Fisheries, based on a census carried out by the Department in 2018. It must be pointed out that some of these fishers may not be active because they tend to be lured into joining producer clubs when there is a new project and go into hibernation soon after the project is phased out.

Fisheries produces about 800 tonnes of fish annually but has the capacity to produce 20,000 tonnes. The company is not able to exploit its installed capacity because of significant cash flow challenges emanating from high operational costs associated with its recirculation production system.

In contrast, all SHFs produce fish through upland pond-based farming technologies. These ponds are mostly communal and owned by farmer groups. Only a few ponds are owned by individual farmers due to the high costs of pond construction, which put them out of reach of most individual SHFs. Individual women are seldom engaged in aquaculture, but most farmer groups include women members. This reflects a traditional mentality that fishery enterprises are largely male activities, as well as limited awareness that they can be structured as household enterprises with collective input (land and labour) and benefits for men, women and children. In addition, the entry of women and youth is hampered by high initial investment costs related to the construction of ponds, even if most women in Malawi do have access to land. As expected, the sizes of ponds vary between farmers and farmer groups. The Department of Fisheries recorded 10,007 active fishponds in 2018 covering a combined area of 251.6 hectares²¹ (See Figure 2).

Figure 2: Distribution of fishponds across Malawi



Source: Annual Economic Report of 2018, GoM

The production technologies described above have considerations for climate change and the environment. Cage farming technology involving the installation of cages – probably in Lake Malawi – would ordinarily require thorough prior assessments to identify the potential environmental impacts of possible changes in water quality parameters. These would have to be followed by appropriate mitigation measures. The possible consequences of cage culture include reduced dissolved oxygen and increased ammonia concentration in and around the cage, resulting from the high fish densities and feeding rates²². Research and testing may show that this negatively impacts the environment by causing anoxic conditions in sediments (due to organic enrichments) underlying the cages, thus changing the abundances and compositions of the invertebrates²³. Water hyacinth is yet another massive problem. It is supported by nutrient runoff, principally from land-based farming but also from cage culture. Research and testing would also inform proper site selection.

²¹ The GoM's Annual Economic Report of 2018

²² Masser, M; What is Cage Culture? SRAC Publication No 160, July 2008

²³ Ngupula, GW & R Kayanda (2010) Benthic macrofauna community composition, abundance and distribution in the Tanzanian and Ugandan inshore and offshore waters of Lake Victoria, African Journal of Aquatic Science.

There are also considerations related to climate change for pond-based production technologies. For instance, climate change has increased the incidences of events linked to extreme weather such as floods and droughts. This is the case in the Lower Shire, which is a key potential aquaculture production site and is faced with more-frequent floods.

Post-harvest handling entails preserving fresh fish to ensure it does not deteriorate before reaching the consumer. MALDECO and Chambo Fisheries have cold rooms at their factories and refrigerated vans for distribution outlets. ViphyaChambo and Chonona, too, have acquired their own refrigerated vans. However, SHFs simply sell their fresh fish at the farm gate to local consumers soon after harvesting.

c. Trading (collection, wholesaling, retailing)

MALDECO sells all the fish it produces directly to consumers, through intermediaries at its factory or through franchises it has established in urban centres. It delivers to franchises with its own refrigerated vans.

Chambo Fisheries sells most of its fish to local vendors, who act as intermediaries, taking the fish to local markets in the city of Blantyre, close to the production site. It sells the fish wholesale to these intermediary vendors and in a few cases to individual consumers who walk into the factory sales booth. All the smallholder fish producers sell by themselves to the local population, restaurants and – on a much smaller scale – to chain stores.

d. Processing

There is very limited processing of fish produced through aquaculture in Malawi. MALDECO is the only company that processes fish by smoking, sun-drying, filleting and cutting, according to customer requests. These value-added functions are done at a very low scale because of low production capacity and the aging factory. The current state of the company's factory technology does not allow production of good fillet products. For SHFs, evidence of smoking was only found with one farmer, who intended to preserve fish for better markets in the nearby city. Otherwise, decisions on homestead smoking and salting for SHFs in producer groups are left to each member.

e. End markets

Currently, the only structured fish marketing outlets are those for commercially-produced fish under MALDECO, because the company has established outlet agents in key cities and district centres. As such, consumers, intermediary retailers and institutional and wholesale buyers have the opportunity to buy fish either from MALDECO's factory or from its agents. Since the factory is located far from urban consumers, most of them buy the product from agents or franchises.

Even though all currently produced fish is sold locally, there is an opportunity to expand into the export market, both within SADC and to other African countries, because the growing demand is outpacing supply. The informal cross-border fish trade between Malawi and its neighbours reflects the potential of the export market.

Proportional value of fish along the value chain

Studies demonstrate that over 50% of the value of fish produced through aquaculture rests at the input node, followed by the production level node, which has an estimated value of about 22%²⁴. These proportions tend to vary with production intensity in terms of level of inputs use and/or extension support. The other relevant value-determining factor is the initial investment, which accounts for about 20% of the total cost of production, including

²⁴ Francis Phiri and Xinhua Yuan (2018) established that feed constituted 42.7% of the cost, fingerlings 9.96%, manure 2.27% and drugs accounted 2.9%. Similarly, Henry Mussa, et al. (2016) concluded that the costs of fingerlings, labour, feed, manure and fertiliser significantly impacted the ultimate gross margin for SHFs in the Bunda area in Malawi.

pond construction and equipment acquisition calculated as the annual depreciation of the infrastructure. In addition, the transport of fish to urban areas generally increases the price per unit. This accounts for between 15% and 25% of the value of the fish, because fish unit prices rise from MK2,500-3,000 at production sites to MK3,000-3,600 in urban areas, depending on the size of the fish and the specific market.

2.2.3 Supporting functions and services

For the core market to operate efficiently and effectively, there is a need for relevant support functions and services. These allow market actors to produce, sell or buy their product and they let the value chain grow in a competitive manner. These range from services needed to support the supply of inputs to extension and business-development services (See Table 6).

Table 6: Summary of key supporting functions and corresponding actors

Value chain node	Specific support function/service	Key actors in provision of the service or potential providers	Core market actors that need services
Input supply	Provision of necessary technical knowledge and backstopping services in production and supply of quality fingerlings	Government research institutions (NAC); LUANAR; Mzuzu University, private companies such as MALDECO and Chambo Fisheries, other SME private hatcheries such as Chonona, KA-Small Fish Farm, Aglupenu Investments, ViphyaChambo	Mostly required by the 15,465 SHFs spread across the country, who face acute shortages
	Provision of appropriate technology for transporting fingerlings, such as oxygen cylinders	Private suppliers on the market	SME fingerling producers, individual small-scale farmers involved in fingerling production (e.g. Fulamuchenga of Nkhatabay)
	Accessibility of affordable and appropriate floating feed when such feed is not produced locally	Potentially Lenziemill, Chonona Fish Farm, NAC and imports from Zambia	15,465 SHFs as well as SME producers (ViphyaChambo, KA-Small Fish Farm, Chonona)
Extension services	Provision of technical and extension Services	Department of Fisheries; NAC; LUANAR	15,465 SHFs and producer SMEs
Research and technology development	Provision of research and technology development on need-based topics	NAC; LUANAR; Mzuzu University	Commercial producers such as MALDECO, Chambo Fisheries, SME producers and SHFs
Distribution and transportation services	Access to and use of appropriate transportation and appropriate distribution facilities and outlets	MALDECO, regional SMEs, private transporters	SHFs and SMEs producers

Business development	Provision of business development and advisory services	Small and Medium Enterprise Development Institute (SMEDI); Clinton Development Initiative (CDI); private/consultant service providers such as AGM Global and Tradeline Corporation Limited, IMANI, accountants, etc	SHFs and SME producers
Investment financing services	Provision of investment financing for smallholder and SME producers	MITC, commercial banks, MIF, private and public micro-finance institutions such as Community Savings and Investment Promotion (COMSIP) and Malawi Rural Development Fund (MARDEF)	SHFs with demonstrated capacity to step up their enterprises; SMEs producers; and commercial producers
Financial services	Provision of tailor-made financial services for SHFs	GoM, Commercial Banks; Reserve Bank of Malawi; donor financing agencies; foreign impact investors	Potential input suppliers, producers; transporters; distributors/ franchises

While technical capacity in production of quality fingerlings is limited to the three government hatcheries, the two commercial producers and a few SME and individual hatcheries, the current volumes are adequate to satisfy commercially available demand. Most of the SHFs do not buy these quality fingerlings, largely because they do not appreciate the importance of using them. In addition, most of the SME hatcheries use ordinary buckets to transport fingerlings to their buyers instead of proper oxygen cylinders. The SME hatcheries also tend to use recycled brood stock because of limited financial and technical capacity to catch new brood stock from the lake.

Technical and extension services on feed formulation and usage are primarily the responsibility of the Department of Fisheries. LUANAR and NAC tend occasionally to help with this role, especially for farmers that are close to their research activities. This facilitates the feed testing process. These services are vital for SHFs, as their limited understanding of the productivity benefits of quality feed to stimulate optimal fish growth remains a major constraint on increasing net incomes.

Some members of the IFFNT have been used in various projects to act as lead farmers after receiving technical training from experts financed by these initiatives. They have subsequently supported other farmers in their catchment areas with extension services. For instance, Fraser of KA-Small Enterprise Fish Farm, Odoi Mwangonde of ViphyaChambo and Fulamuchange, have all learned various skills through training and are imparting them to SHFs around their production sites.

The leading providers of aquaculture research include NAC, LUANAR, Mzuzu University and WorldFish Centre. These institutions have been carrying out research work relating to all aspects of aquaculture production, including feed formulation and genetic improvement of the traditional strains of the local Chambo species. They aim to enhance aquaculture-based production technologies and husbandry practices.

Financial constraints mean these research programmes are often carried out at institutional centres without location-specific trials of feed formulations and management practices such as pond depth and size to take into account agroecological differences.

Only MALDECO has established designated outlets and transports fish to these sites using its own cold-chain facilities. Intermediary vendors who buy fish from most producers use rudimentary means of transport and cooler boxes.

Business development services (BDS) for aquaculture SMEs and individual farmers are largely non-existent in Malawi. Most SHFs and SME producers do not have the capacity to develop nor the ability to outsource business strategic documentation such as business plans and sales and distribution strategies to exploit better prices. The Government of Malawi has established a quasi-public institution called the Small and Medium Enterprise Development Institute (SMEDI) to be the leading provider of business development services to SMEs in all sectors of the economy. There is currently very weak linkage for SMEDI to assist these fish farmers to develop and grow into sustainable enterprises.

Other agencies have in one way or another provided some BDS to SHFs in other value chains such as the National Smallholder Farmers Association of Malawi (NASFAM) under its commercial company NASCOMEX. NASFAM has pioneered the role of aggregating SHF produce, adding some value by grading and processing and branded packaging for sale at much higher prices. NASFAM has already shown interest in working in any agro-industry that demonstrates viability. Similarly, the Clinton Development Initiative (CDI) has helped soybean and maize farmers access better prices through various BDS. CDI has also shown interest in partnering with CASA on other value chains including aquaculture.

Investment financing in the aquaculture sector is shallow and concentrated in two local private investors: Press Corporations invests in MALDECO, and Pacific Limited invests in Chambo Fisheries Limited. Beyond these, only small-scale individual investors have established producer SMEs using their own financing.

Apart from the two commercial players, integration of the aquaculture players into the formal financial market is very low. This is largely because the SHFs and SME producers do not have proper organisational and corporate documentation to support their financial inclusion and access formal financial markets. Member-based and informal financial formations, such as the savings and credit cooperatives (SACCOs) and village savings and loan (VSL) groups, provide savings and loan options to their own members – but at high interest rates repayable within very short periods. A few producer SHF groups run their VSL groups ancillary to their aquaculture enterprises. However, these schemes are too small to provide meaningful investment financing.

Investment and finance landscape mapping

Progress in agricultural transformation is slow, and productivity remains stubbornly low. Nascent industrialisation that could create new export opportunities and value addition is constrained by low levels of investment, inadequate skills and supply-side constraints. The country's aim of becoming a middle-income country requires a new development model that is focused on development financing and private investment rather than consumption. Malawi has a strong need for impact capital across a wide range of industries including agriculture, where most of the population are employed. However, there has been little commercialisation or value addition.

While many basic services are lacking or underdeveloped in Malawi, this presents an opportunity for entrepreneurs and their investors. Impact capital is relatively limited in Malawi: few actors are available to service smaller enterprises, and most of these actors operate from neighbouring countries. Larger-impact investors such as AgDevCo and CDC Group have made investments but only in larger enterprises. Impact capital represents a small portion of the total capital available in Malawi. Donor organisations are a key source of capital but, according to some development organisations, they often target larger companies with higher turnover, which are perceived as less risky.

The agribusiness investment landscape in Malawi is heterogeneous, and there are limited impact investors and private equity funds. The three biggest, most-consistent investors in Malawi are CDC Group, AgDevCo and Pearl Capital Partners. CDC Group has invested directly in companies at the higher end, with investment outlays of about \$5 million and upwards.

A key lesson is the need for start-up and early-stage capital with stronger linkages to business incubators and accelerators in order to bridge the funding gap and to lower risk perception. A greater focus on climate mitigation and climate adaptation techniques for SHFs would go a long way to enhance agribusiness investments in Malawi following cyclical climate impacts such as droughts and cyclones. Other findings are:

- As in any nascent market, Malawian entrepreneurs do not understand equity instruments. Even when they do, they are reluctant to relinquish company control to an external investor. (Only two, relatively large, equity transactions have been identified.)
- Malawi is a very small market with a very limited number of investment-ready opportunities. When they do arise, they are snatched up very quickly with terms tilted in favour of investors, who tend to have the upper hand.
- There are very few impact investors with a physical presence in Malawi. Most rely on deep local knowledge and government connections to navigate the ecosystem;
- Investment tickets mostly range from \$5,000 to \$1 million.
- Investors prefer debt at the SME level. There are few large equity transactions.
- A few large companies attract the largest investments from private equity firms. Venture capital is almost non-existent.
- Investors have acknowledged that their capital will be more “patient” than in other, more-mature emerging markets. So, investors could benefit from cheap – ideally free – technical assistance and BDS services to enhance their portfolio pipelines.

Evidence gaps identified include a limited number of case studies and examples of profitable and impactful business models. Limited actors are involved in providing agriculture with access to finance. Crop- and country-specific data on productivity and markets are scarce. There has been a limited number of exits to stir the appeal of investors.

The major constraint for potential investors is the perceived level of risk due to: high transportation costs impacting the primary sector; climate change; access to markets; business and personal security; unreliable and low access to energy and water; and limited bankable deal flow. Additional factors include the extremely low productivity of smallholder farmers, fragmented value chains, huge gaps in infrastructure and an import culture limiting the growth of local value chains. Being landlocked is often perceived as a big risk for Malawi, though its strategic position and potential integration into the SADC and EAC regions are viewed as an opportunity.

The main opportunities for increased investment in agribusiness include: horticulture for exports to the SADC and EAC; cassava; sweet potatoes; Irish potatoes; livestock and dairy (livestock are currently used as “moving bank accounts”); poultry (including security for stock theft); the development of insurance and security products; and non-traditional exports. Other development opportunities include: financial and technical support for establishing low-cost processing facilities in the intermediate regions to develop local supply chains; increased use of productive solar and productive renewable energy; development of contract farming frameworks and ecosystems; and development of integrated value chains (farm to plate) using examples from neighbours such as Zambia, Tanzania and Mozambique.

CASA’s finance landscape mapping exercise is being finalised, and interim findings on constraints highlighted by commercial banks in lending to SMEs include:

- Banks’ preference for government borrowing instruments;
- Limited bankable agri-business deals;
- Limited acceptable collateral;
- Fragmented agricultural value chains;

- Price instability and weather-related risks;
- Lack of market information on agri-sectors.

2.2.4 Supporting rules and regulations (enabling environment)

The rules and functions needed for a conducive business environment and to facilitate smooth transactions of the core product are summarised in Table 7.

Table 7: Summary of key regulatory rules, functions and corresponding actors

Value chain node/regulatory need	Specific regulatory role/function	Key actors in provision of the function or potential providers	Core market actors that need services
Input quality	Fingerling quality certification standards and mechanism	NAC; research institutions such as LUANAR, Mzuzu University and World Fish; Department of Fisheries	SHFs, SME producers and commercial producers
	Feed quality certification standards and mechanism	NAC; research institutions such as LUANAR, Mzuzu University and World Fish; Department of Fisheries; (DoF); Malawi Bureau of Standards (MBS)	SHFs, SME producers and commercial producers
Farmer organisation, cooperative formation and regulation	Regulation of farmer cooperatives and organisations	Registrar of cooperatives under the Ministry of Industry and Trade	SHFs
Policy environment	Government policy on introduction of exotic fish species for aquaculture production	DoF; research institutions including LUANAR, Mzuzu University and WorldFish and NAC	Commercial producers and emerging SME producers
Investment formal rules and regulations	Public awareness of available investment opportunities and tax incentives based on new legislation	Ministry of Industry and Trade; Malawi Investment and Trade Centre (MITC); Sectoral Department of Fisheries	Local private investors as well as foreign investors
Informal norms and practices affecting inclusive involvement across various nodes along the horizontal value chain	Streamlining legal provisions for investor access to land and supporting services such as extraction of water (from a source used by communities)	Ministry of Lands, MITC	Local and foreign investors into aquaculture production
	Women's engagement in production is not restricted, but fishing is traditionally for men. Women assume roles downstream in the value chain.	Ministry of Gender, Children and Women Affairs, DoF, and IFFNT	SHFs (existing and potential); farmer associations
Food safety	Development and enforcement of food safety standards, including preservation techniques	DoF; Ministry of Health; MBS; Consumer Association of Malawi (CAMA)	Intermediary traders and retailers; supermarkets; consumers; exporters

Climate change and environment	Enforcing environment mitigation measures in disposal of pond wastewater	Environmental Affairs Department; DoF	Commercial and SME producers; SHFs
Export facilitation	Export certification and export licensing procedures	Ministry of Industry and Trade; Research Institutions; MBS	Existing & potential exporters

No actors currently provide fingerlings and feed quality assurance certification services, because the Malawi Bureau of Standards (MBS) needs to have the relevant standards to guide their enforcement role. The standards would need to be developed by technical agencies such as the Department of Fisheries, supported by government research agencies such as NAC and LUANAR. These standards would provide the regulator with a clear definition of the minimum standards for each applicable parameter to be used as a benchmark for quality certification²⁵.

The Registrar of Cooperatives under the Ministry of Industry, Trade and Tourism (MoITT) is mandated to regulate the formation and registration of farmer cooperatives with the goal of enhancing the economic and social well-being of members. Presently, the Registrar's office has very few officials to provide training to potential cooperative members before they can be registered. Still, most of aquaculture SHFs are already organised in farmer groups and farmer associations which provides a valuable starting point.

The MoITT regulates imports and exports, including conducive trade agreements. But there is also a need for the technical line ministry or department to provide clear information justifying any proposed changes to the prevailing tax regime. As such, any changes to the 16.5% VAT on fish feed and the lack of VAT on fish imports requires the collaboration of the MoITT and the Department of Fisheries.

Existing rules and legislation do not permit the introduction to the country of exotic species. Some commercial players have been lobbying the government to change these regulations to allow the introduction of fast-growing exotic species to enhance the industry's productivity and viability. However, the government understandably fears for the attendant environmental impacts from disturbing the natural habitat and biodiversity of local water bodies. This regulatory function remains the mandate of the Department of Fisheries, with technical support from research institutions such as NAC, LUANAR, Mzuzu University and WorldFish Centre. There is consensus between the Department and research institutions that the introduction of exotic species may not be environmentally benign.

The regulation and enforcement of environmental mitigation measures is the mandate of the Environmental Affairs Department (EAD). This role is vital in the aquaculture sector because almost all aquaculture-based production technologies entail the introduction of inorganic chemicals into the environment. This requires a robust environmental regulatory and enforcement framework. Without such a framework, most SHFs do not have clear guidelines on issues such as how to dispose of wastewater.

The country's prevailing investment climate and formal investment rules and regulations are primarily governed by the Investment and Export Promotion Act of 2012, which also established the Malawi Investment and Trade Centre (MITC). The legislation provides incentives for investment in any sector of the economy, including tax incentives for foreign and local investors. MITC has further developed simplified guidelines for potential investors, as well as priority sectors for investment. However, there is still an opportunity to deepen sensitisation efforts for potential investors by focusing more on sector-specific incentives to attract increased investment into aquaculture.

²⁵ This information was provided to the CASA Country Team by Professor Emmanuel Kaunda, one of the leading aquaculture researchers and centre coordinator of the Aquaculture Centre of Excellence at LUANAR

Malawi's investment legislation allows easy access to land through leasehold tenure. But access to water bodies – such as rivers, dams and irrigation schemes for upland aquaculture production – may give rise to informal impediments. In many cases, these water reservoirs are under the stewardship of local leadership or water users' associations. These have vested interests in the same water bodies, and they may not easily allow investors to tap the water if that limits their own access.

The sale of fish and fish products to the public consumer raises an inherent need for enforcement of food safety standards. Malawi has a Consumer Protection Act (CPA), which is designed to protect consumers from various inappropriate trading practices, including ensuring the safety of food products sold on the market. The Competition and Fair-Trading Commission (CFTC) is mandated to enforce the CPA. However, effective enforcement requires technical collaboration with the Department of Fisheries, as well as the Consumer Association of Malawi. At present, there are some active complaints on the safety of fish, especially those sold in city markets, due to claims that some sellers are using preservation techniques and products – such as formalin solution – which would potentially endanger public health.

3 Analysis

The identified problems are symptomatic of wider issues in the market. To deliver a result that will strengthen the market system sustainably, rather than simply temporarily alleviating symptoms, this analysis first seeks to understand the underlying causes of these issues.

3.1 Problems and underlying causes

There are numerous problems, at all stages of the value chain, that impede the participation of actors in the market system, particularly small-scale players. The CASA Country Team has prioritised some of these, including production, aggregation, processing and distribution as follows.

- Low production volumes to meet market demand
- Use of low-quality inputs by small-scale producers
- Lack of product aggregation arrangements to support viable investment in value addition through processing, distribution and marketing
- Lack of knowledge and skills in fish processing for value addition
- Limited access to finance for investment in downstream functions of the value chains
- Lack of incentives to invest in processing and distribution due to low fish supply by SHFs

At the production level, two core problems have been identified:

Low production levels by smallholder farmers to meet market demand because of various factors including the low number of farmers engaged in viable production, a lack of innovative technical production skills and low productivity levels due to low-quality inputs. The country is importing fish and fish products to satisfy demand.

Use of low-quality inputs by small-scale producers, which significantly compromises their productivity. Most smallholder farmers use recycled fingerlings or fingerling brood stock because they are not able to access affordable quality fingerlings. At the same time, most of the SHFs have a weak understanding of the importance of using quality inputs. Similarly, most of these SHFs have no access to affordable formulated feed and resort to use of locally sourced manure, rice or maize bran. In addition, there is no operational mechanism for certifying the quality of inputs, both fingerlings and feed.

Problems identified in post-production stages include the following:

Lack of product aggregation arrangements to support viable investment in downstream functions. There are very weak market signals to provide incentives to agribusinesses to invest in downstream functions of the value chain because of low production volumes that are sparsely located. There is need for some pull effect from an organised commercial player – an off-taker of some sort – to offer better prices for fish.

Lack of knowledge and skills in basic processing of fish for value addition by SHFs. With no specialised investment in downstream functions by commercial players, it is worthwhile for SHFs to invest in their own capacity to carry out value addition at a small scale so that they can take advantage of higher prices in lucrative urban markets. However, there are very few successful entrepreneurial oriented SHFs.

Limited access to finance for investment downstream in the value chain. The few commercially oriented actors face a high cost of financing from traditional financial service providers; average lending rates hover around 25%. In most cases, traditional financial service providers require collateral that small-scale players cannot provide. At the same time, most players do not have any linkages with impact investors, which provide less-costly long-term financing that is appropriate for business expansion.

Low fish supply to support downstream investment. Production levels at the post-production stage of the value chain are too low to stimulate investment in downstream functions, because an enterprise would struggle to recoup the capital.

3.2 Services, enabling environment and weaknesses

To strengthen the market system, interventions are crucial to target identified weaknesses in these services. The following have been prioritised:

Limited investment in production of quality inputs, compromising their accessibility and affordability. The country does not have commercial investment in production of quality floating feed, apart from two small-scale feed mills that were purchased by the DFID-funded AgriTT project for the LUANAR and NAC for research purposes. All commercially oriented producers – apart from Chambo Fisheries – use imported feed from Zambia, which is subject to VAT. Investment in fingerling production is reduced by weak demand signals.

Lack of input quality certification services, leading producers to use any available inputs. Quality inputs are a prerequisite for enhancing productivity, but the country does not yet have standards for the quality inspection and certification of fingerlings and feed.

SHFs are weakly organised, resulting in weaknesses in advocacy for both policy and regulatory services. There is currently one farmer association, called the Innovative Fish Farmers Network Trust (IFFNT), which is somewhat active in the industry. However, the IFNNT covers only 10 of the country's 28 districts and therefore does not include all the active SHFs. It is imperative for the IFFNT to expand its coverage in terms of membership as well as service packages for producer groups by taking advantage of the fact that most of its members possess deeper skills in hatchery operation and grow-out production.

Limited availability of extension services, both from the government and private service providers. Technical production knowledge and skills are the basis for improved productivity and enterprise viability. But there are few government extension workers, and most of those available do not have technical knowledge or expertise in aquaculture production.

Limited R&D investment, reducing the scope to develop innovative, cost-effective production technologies. Low-cost production technologies would improve the viability of the sector. There are commercial farmers in Zambia that do not use formulated feed but employ intensive management practices. These practices ought to have been subjected to trials by local researchers and adapted to the various agro-ecological zones. However, funding for such targeted research and trials has not been forthcoming, and the sector is highly dependent on input intensification via quality fingerlings and formulated feed.

Limited BDS for producers and downstream SMEs. Though a few small-scale producers are willing to step-up, they do not have the expertise to expand their production and reach out to better markets. For instance, most do not have expertise in business development and planning, bookkeeping, accountancy or taxation, which constrains their ability to obtain financing and invest. Virtually no BDS providers actively service the aquaculture industry.

Lack of appropriate, affordable investment financing, largely due to information asymmetry between the sector players and financial service providers. Most investors do not have accurate information about the potential of the sector: They have not invested in production of good-quality fingerlings, floating feed manufacturing and equipment such as cage making, because SMEs cannot provide information on demand for these products.

Policy inconsistencies tend to stifle prospects for growth of the sector. The National Fisheries and Aquaculture Policy (NFAP) identifies aquaculture as a priority area, but taxation policy does not support these aspirations.

4 Strategy for change

CASA's strategy for aquaculture seeks to deepen the commercial participation of key value chain actors in viable input and output markets. CASA will pursue this strategy by improving the capacity of emerging commercial producer groups to access working capital finance and by leveraging investments into SMEs to provide key business support services. CASA has identified a few promising SMEs, and it will seek to influence regulation and policy to boost sector competitiveness and SHFs' access to markets. This strategic focus is designed to address identified weaknesses in the current support services and enabling environment.

4.1 Process leading to strategy and project outlines

During the inception phase, CASA employed the Inclusive Markets approach to arrive at the inception deliverables of this Inclusive Growth Strategy document and the Project Outlines within. Supported by the project's technical advisors, the CASA country teams completed the following steps of the IM approach:

- i) Development of the sector dynamics and institutional landscape (combination of desk research and key informant interview);
- ii) Analysis of systemic constraints and underlying causes of rather slow investment uptake for commercialisation of the poultry sector including validation with market actors;
- iii) Development of the inclusive growth strategy for stimulating greater investment in poultry sector along with theory of change and vision of change;
- iv) Mainstreaming of CASA crosscutting areas in (i) and (ii) above;
- v) Identification of intervention areas and design of outline projects, including initial interactions with potential SME and other partners and service providers, and completing pre-due-diligence assessments of SMEs;
- vi) Developing an initial list of potential sources of finance and investment for SME matchmaking, including accelerators and incubators for potential BDS and support to SMEs for investment readiness preparation.

The next steps in the IM process are: (a) scoping of at least five project concept notes²⁶ (first three months of implementation), including mainstreaming of CASA crosscutting areas; (b) design of project plans, including mainstreaming of CASA crosscutting areas and monitoring and results measurement activities, as well as partner due-diligence exercises, negotiations and contracting; (c) implementation, monitoring, results measurement and evaluation (most projects expected to commence from 1 April 2020 but possibly some quick wins beforehand); and (d) collaborating with Component C on preparing aquaculture SME success stories and engaging with investment actors.

Subject to DFID agreement, CASA will proceed to design another set of projects outlines during the time of scoping project concept notes for the first set of five prioritised projects. These will form part of the aquaculture sector project portfolio along the three Interventions Areas identified herein.

CASA employs the following criteria to select relevant projects for producers, SMEs and the enabling environment:

- Does the project directly or indirectly target smallholders, especially women, with the capacity to step up – that is, increase production, productivity and quality to meet market requirements?
- Are there suitable actors available to partner with?
- Does the project avoid distortion of the market and create a sustainable market?
- Does the project create access to commercial markets for target smallholders?

²⁶ Initial samples of project concept notes were provided to DFID during the Inception Phase for feedback.

- Does the project demonstrate a business case or new business model that will attract investment to commercialise smallholder supply chains?
- Is the project feasible, sustainable, scalable and relevant (in terms of factors such as resources and timelines)?
- Are the cross-cutting issues incorporated where relevant?

CASA employs the following criteria to select SME partners:

- Annual turnover under \$2.0 million, or less than 50 employees;
- Must want finance in the range of \$100,000 to \$1,000,000 either immediately or in the foreseeable future. (Exceptions could be possible to the lower limit, where there is expected to be a second round of finance meetings or the limit is expected to be exceeded before CASA phases out;
- Ideally has not received finance in the past. (An exception may be an SME seeking finance within the above range for a new stage of expansion);
- Engages or will potentially engage large numbers of smallholders in the supply chain; and passes CASA's due-diligence assessment.

Work on identifying a roster of potential BDS providers for engagement, including assessment of service and delivery capacity building needs, will commence early in implementation. CASA expects to focus on a small number of the most relevant providers. Capacity building may centre on services development, testing and service evaluations and consumer and other research. Provider selection criteria are expected to include:

- Capacity to deliver services;
- Close to SHFs and SMEs in culture, operating environment and geography;
- Low cost structure;
- Commercial focus, business culture and accounting and management systems;
- Organisational independence, especially from donor funds;
- Focus on services for SHFs and agri-business SMEs.

CASA has completed an initial mapping of the investment landscape in Malawi. (See separate report for a list of active investors in Malawi.) A similar exercise for finance landscape mapping is being finalised. The lists of actors from these exercises will be updated periodically.

4.2 Market potential and opportunities for growth

There are five drivers of commercialisation for the Malawi aquaculture sector:

1. Strengthen accessibility to commercial input/service supply markets

At the production level, commercialisation is being held back because of very weak access to quality inputs. This is consequential for a sector that is significantly inputs-driven and results in low profitability. CASA is ordinarily concerned with output markets, but it is necessary for the aquaculture sector to integrate support for potential feed manufacturers to prepare for and access investment in local feed production. CASA will need to provide technical support to aid understanding of the potential market available.

2. Formalise production arrangements through horizontal linkages

Disjointed production arrangements reduce producers' ability to access better input and output markets. CASA seeks to seize the commercial opportunities of horizontally

organised production to facilitate bulk purchasing of inputs, promote collective learning through inclusive support services, and engage in fish aggregation for better prices.

3. Strengthen the role of emerging commercial producers

The aquaculture sector is currently too thin to engage in commercial deals. CASA seeks to elevate the role of emerging commercial producers by supporting them with business operational skills and expertise and linking them to commercial financial providers.

4. Strengthen SME involvement

The role of SMEs in the sector is currently very weak. CASA has identified promising emerging SMEs to support so they can prepare for and access investment. This strategy is designed to unlock investment into functions downstream the value chain, which are underdeveloped and fail to benefit the sector through value-added services.

5. Make the regulatory and policy environment to be responsive to the sector

The prevailing taxation policy allows import of fish duty-free, while fish feed imports are subject to VAT, putting local producers at a competitive disadvantage. There are also stringent restrictions on the introduction of exotic, fast-growing species of fish. CASA seeks to support the business organisations in advocating for policy and regulatory changes.

4.3 Vision of change

Our **vision of change for aquaculture** is as follows:

The aquaculture sector will experience growth from high levels of production, investments and commercialised smallholder supply chains, thereby contributing to improved food and nutrition security.

4.3.1 Vision of processors and distributors

Aquaculture processors and distributors meet market demand through formalised smallholder supply chains, as well as SME capacity growth from investments in facilities, equipment and technical support.

4.3.2 Vision of change for SMEs

SMEs increase their capacity and invest in local feed production and supply, as well as the aggregation of fish. This involves organised smallholder supply chains to meet demand.

4.3.3 Vision of change for SHF producers

SHFs increase incomes from environmentally friendly aquaculture through improved access to competitive input and output offtake markets, as well as enhanced techniques. More women and youth are involved in production and engaged as productive labour.

4.4 Intervention areas and project outlines

CASA employed an Intervention Logic Analysis Framework (ILAF) to identify potential interventions and activities that address systemic weaknesses in the market system. The activities were further streamlined and grouped into three broad intervention areas. The three areas have been designed to respond to the current and evolving needs of the sector, while addressing CASA's objectives (See Table 8).

Table 8: Intervention areas and their links to growth and investment

Intervention area	Link with drivers for growth	Prioritised projects	Link to investment readiness	Possible investors in future
Strengthening SHF access to commercial markets	<p>Access to commercial input markets</p> <p>Organise production arrangements</p> <p>Strengthen emerging commercial producers</p>	<p>Strengthening the technical and management capacity of SHF organisations for bulk input purchasing and aggregation</p> <p>Facilitating access to finance for SHFs to improve productivity</p>	<p>Support SHFs to register as cooperatives; BDS support; matchmaking and linkages between producers & FSPs/SMEs</p>	<p>NBS Bank, NB Development Bank, AgCOM, KULIMA, FARMSE</p>
Support SMEs to attract investment through strengthened vertical and horizontal business linkages	<p>Strengthening SME involvement in the sector</p> <p>Strengthening access to commercial input markets</p>	<p>Preparing SME input suppliers to receive investment</p> <p>Strengthen operational capacity of upcoming SMEs to become investment-ready so they can expand</p>	<p>BDS support to develop and strengthen business models</p> <p>Facilitating linkages for acceleration and incubation support</p> <p>Matchmaking with investors</p>	<p>NB Development BANK; Impact investors (to be identified)</p>
Improved Business Enabling Environment	<p>Improving regulatory and policy environment</p>	<p>Strengthening capacity of business organisations (IFFNT) to lobby for reforms</p>	<p>Introduction of fast-growing species</p>	<p>N/A</p>



Commercial Agriculture for Smallholders and Agribusiness

The CASA programme makes the commercial and development case for investing in agribusinesses that source produce from smallholders. It does this by demonstrating how this can be done effectively, by bridging evidence gaps and by ensuring investors and policymakers have access to the right information and people to make inclusive agribusiness models succeed.

By showcasing successful models for businesses that source produce from smallholders and pulling together the evidence base supporting the commercial and development impact of their business models, CASA will attract more investment into the sector, boosting economic growth and raising demand for smallholder produce.

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