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Characteristics of the Small-Scale Aquaculture Sector in Malawi

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Key Messages

- Results from the MwAPATA Aquaculture Survey show that 87% of small-scale fish farms in Malawi are individually owned, and most fish farming households are male headed (86%).
- Most farms (95%) use low-technology earthen ponds, which are susceptible to floods, erosion, and natural predators.
- Nearly all farms (99.8%) are stocked with mixed-sex fingerlings, which are associated with uncontrolled reproduction, low survival rates, overcrowding, and stunted growth.
- It is encouraging that many farms apply organic fertilizers (87%) and inorganic fertilizers (49.4%). However, small-scale fish farming in Malawi is characterized by limited usage of other high-quality inputs, such as commercial feed (floating feed), which constrains the productivity of the sector.
- Nevertheless, small-scale aquaculture has potential to improve farmers' livelihoods and welfare through economic and dietary diversification.
- Survey results point to a need to disseminate modern fish farming practices and technologies; promote the active participation of youths and women; organize fish farmers into groups and strengthen existing farmers' associations; and incentivize private sector investment, particularly in the production of floating fish feed.

Introduction

Worldwide, small-scale aquaculture (fish farming) has gained attention due to its potential contribution to food and nutrition security and economic growth. For this reason, the United Nations has declared 2022 the International Year of Artisanal (Small-Scale) Fisheries and Aquaculture.

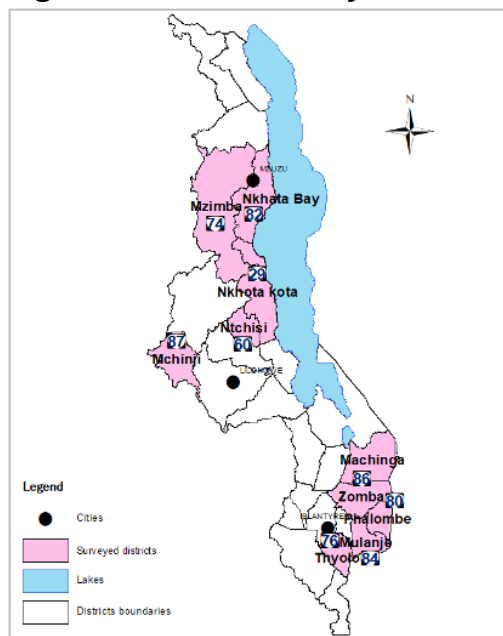
For Malawi, aquaculture presents an opportunity to enhance rural household incomes and nutrition and, further, to contribute towards the national agriculture diversification drive as laid out in the Malawi 2063 agenda. If integrated with crop or livestock production, aquaculture can also enhance land and labor productivity—key indicators of agricultural transformation.¹ Though Malawi has historically relied on capture fisheries to meet domestic demand for fish, wild fish populations are now under stress. Moreover, demand for animal protein, including fish, is expected to double by

2050 due to population growth and rising incomes.² Aquaculture can play a key role in meeting this demand.

There are currently about 9,000 small-scale fish farms in Malawi. Efforts to promote aquaculture have seen the sector grow in production from 813 tons in 2005 to 9,399 tons in 2020.³ However, production remains low relative to total fish consumption in the country (approximately 182,110 tons in 2020). Hence, there is a need to develop policies and strategies to foster aquaculture growth in Malawi. Thus far, the sector has lacked comprehensive data and a solid evidence base to guide policy development.

We address this gap with an up-to-date characterization of the small-scale aquaculture sector in Malawi based on data from a survey of fish farms across the country. This new data set, collected by the MwAPATA Institute, is the most comprehensive data resource available on

Figure 1. Districts surveyed



aquaculture in Malawi. This brief presents an overview of fish farm and farmer characteristics, farm management and input usage, production, and marketing.

Data

This policy brief draws on the MwAPATA Aquaculture Survey (MAS 2021), which was conducted in June–July 2021 and targeted 10 districts across Malawi with relatively high concentrations of fish farms (Figure 1). The data can be considered loosely representative of fish farms in these 10 districts. In total, the survey gathered data reflecting the 2019–2020 reference period from 732 small-scale fish farms, including 126 community owned farms and 606 individually owned farms.

Results

Characteristics of fish farms and farming households

Small-scale fish farms in Malawi fall into two categories: (1) individually owned farms, and (2) community managed farms. Most fish farms (86.8%) are individually owned (Figure 2), and

Table 1. Characteristics of households and community farm leadership

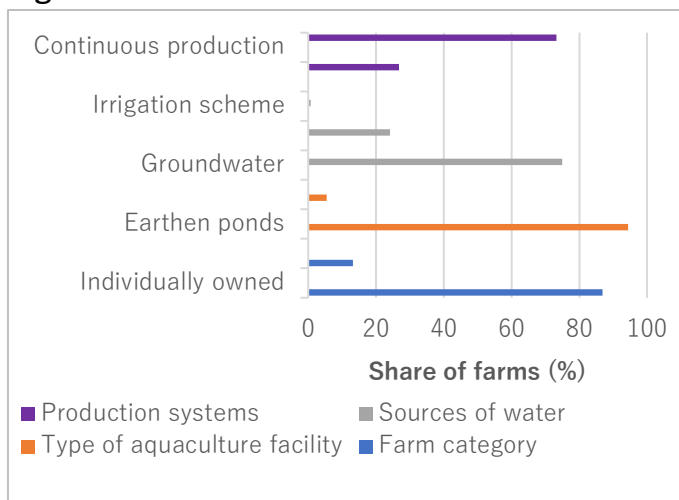
	Mean or %
<i>Individually owned farms/household head:</i>	
Age of household head	52.2 years
Male-headed household	85.5%
Literacy of household head	89.1%
Fish farming experience	11.9 years
Observations	606
<i>Community farms/leaders:</i>	
Share of women in the community farm	61.3%
Share of youths in the community farm	31.2%
Fish farming experience	8.0 years
Age of leaders*	44.8 years
Literacy of leaders*	90.4%
Observations	126

*Observations = 378; Source: MAS 2021

most of these farming households are male headed (85.5%), a rate that is higher than the national value of 64.8% (Table 1). It is worth noting that most fish farmers in Malawi are literate. Farmers that are literate are likely better able to implement improved aquaculture management practices. Most small-scale fish farms in Malawi utilize earthen ponds (94.5%) and rely on groundwater (Figure 2). Earthen ponds, while less costly to construct, are susceptible to floods and erosion if not properly constructed, and they are also vulnerable to natural predators. Moreover, successful pond culture requires adequate water for fish breeding. However, in some districts (namely Dowa, Ntchisi, and Nkhotakota), farmers that depended entirely on groundwater had abandoned fish farming due to drought.

On average, small-scale fish farms in Malawi have 1.4 ponds, and the average pond size is 299.5 m². This is small relative to pond sizes documented elsewhere.⁴ Community farms tend to be almost twice as large as individually owned farms. Over 95% of the ponds on Malawi’s fish farms are used primarily for fish production, while 4.1% are used for fingerling production/hatchery operations.

Figure 2. Characteristics of fish farms



Source: MAS 2021

Farm management and production

The most commonly stocked fish species in Malawi are chilunguni (*Tilapia rendai*), makumba (*Oreochromis shiranus*), and chambo (*Oreochromis karongae*) (Table 2). Fingerlings, which are used to stock fish farms, can either be mixed-sex or sex-reversed. The former, although less expensive, are associated with uncontrolled reproduction, low survival rates, overcrowding, and stunted growth. Nevertheless, nearly all ponds (99.8%) are stocked with mixed-sex fingerlings. They are procured from fellow farmers (54.0%), recycled (19.9%), received or procured from government (13.9%), or received from NGOs/development projects (9.0%).

Fish farms in Malawi may follow production cycles of about 6 months, with one or two cycles per year. Each cycle is followed by pond drainage and cleaning. Alternatively, farmers may choose to produce continuously by allowing the initial fish to reproduce. Over 70% of the fish farms in Malawi practice continuous production (Figure 2). Although continuous production has limited labor and input requirements, the farming system is also associated with low returns.

In the reference period, harvesting was done on more than 95% of the fish farms. Especially in Mchinji, some farms did not harvest due to the

Table 2. Fish species produced and quantities harvested (mean value or percentage)

Fish species	% of farms	Quantity (kg/farm)	Yield (kg/m ²)
Chilunguni	53.3	145.1	0.8
Makumba	57.2	147.2	0.6
Chambo	18.8	90.8	0.7
Mlamba	1.8	341.1	1.4

Source: MAS 2021

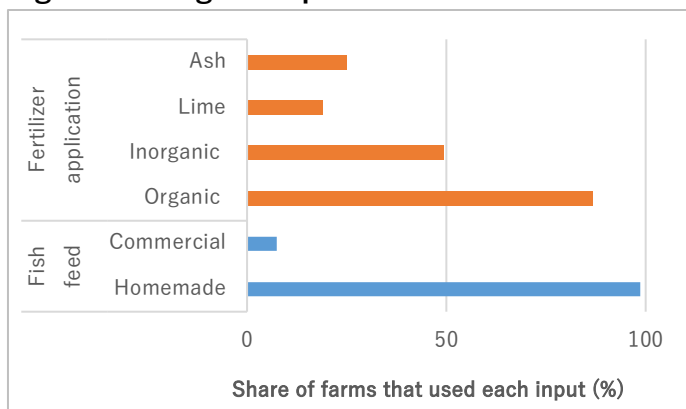
Epizootic Ulcerative Syndrome (EUS) outbreak. On average, farms harvested 184.5 kg of fish. However, approximately three-quarters (75.9%) of the farms harvested less than 100 kg of fish. Moreover, farms of greater than 1,000 m² (comprising just 7.8% of the farms) were responsible for 40.1% of the value of fish harvest. Among these non-industrial fish farms, a significant role is played by the relatively large and intensive farms.

Across species, the average fish harvest and yield was highest for Mlamba (at 341.1 kg/farm and 1.4 kg/m², respectively). Nevertheless, mlamba (*Clarias gariepinus*, also known as catfish) is cultured by less than 2% of the farms. This can perhaps be attributed to a scarcity of fingerlings, as no hatchery operators in our sample produced mlamba fingerlings.

Usage of inputs

Efficient use of aquaculture inputs is crucial for productivity and farm profitability. In particular, the application of quality feed is essential for optimal and vigorous fish growth. While commercial feed (also known as floating feed) is of high quality, home-formulated feed does not contain all the necessary nutrients for fish.⁵ However, 98.6% of fish farms in Malawi use homemade feed, while just 7.4% use any commercial feed. Most commercial feed is imported from Zambia, contributing to its higher cost (Figure 3). A small share (13.2%) of the farms that use commercial feed seemed to receive it for free from NGOs, projects, or government.

Figure 3. Usage of inputs



Source: MAS 2021

Other inputs used in fish farming include fertilizers, lime, and ash. Lime and ash serve to neutralize the acidity of water and disinfect the ponds, while fertilizers increase the growth of natural food (including plankton, worms, insects, snails, aquatic plants, and small fish) and protect the farms from being invaded by invasive wild species. It is encouraging that many small-scale farms in Malawi apply organic fertilizers (86.6%) and inorganic fertilizers (49.4%). In addition, 19.0% of the fish farms apply lime, and 25.0% utilize ashes from kitchen fires as an alternative liming agent (Figure 3).

Marketing

Across farms, an average of 27.3% of the value of fish produced is consumed, 60.1% is sold, 11.8% is gifted, and the remaining 0.7% succumb to post-harvest loss. Farmers exploit various marketing channels to sell their fish (Table 3). The fish were most often sold to customers at the farm-gate (by 65.6% of the fish farms) or in village or rural markets (40.7%), while it was less common to sell to traders that came to the village (20.9%), or to sell through other market channels. This suggests that the value chain for fish raised by small-scale farmers tends to be short (limited in geographic extent and limited in the number of hands through which the product passes).

Table 3. Marketing channels used in fish sales

Marketing channels	% of farms
Direct to consumers (pondside)	65.6
Direct to customers in a rural market	40.7
Traders that come to the village	20.9
Traders outside the village	12.4
Direct to customers in another setting	6.4
Direct to customers in urban market	5.1
Direct to customers by the road	4.1
Processors/wholesalers	2.4
Contract market	0.4

Source: MAS 2021

Role of fish farming in rural livelihoods

Fish is a particularly inexpensive source of animal protein, and for this reason, aquaculture has potential to reduce malnutrition in low-income populations. A majority (95.6%) of fish farmers consume some fish from their own production, and fish was found to be the second most preferred source of animal protein among farm households. Survey results show that fish farming contributes an average of 21.0% towards household incomes, and most farmers expressed an interest in expanding their farms. This indicates that small-scale fish farming in Malawi serves as a form of self-employment, a source of household income, and a contributor to food and nutrition security.

Conclusion and policy implications

Results from the MwAPATA Aquaculture Survey point to the following recommendations for the development of small-scale aquaculture in Malawi.

Disseminate modern fish farming practices and technologies. Extension programs can be harnessed to encourage farmers to use modern post-harvesting techniques and high-quality inputs, such as sex-reversed fingerlings and commercial feed, and to follow production cycles rather than practice continuous production.

Incentivize private sector investment in production of floating fish feed. There is need to attract the private sector (both domestic and international) to invest in aquaculture, particularly in the domestic production of floating feed. Short-term strategies may include reducing or removing taxes on imported feed milling machinery and other aquaculture equipment. Further, there is need to invest in research to develop quality homemade and floating feed that is suitable for Malawi's farmed fish species.

Promote the active participation of youths and women in small-scale fish farming. There is need to empower and engage women and youths in fish farming enterprises through targeted interventions and strategies. Malawi's high unemployment rate can be at least partially mitigated if youths are provided with the necessary knowledge, skills, and inputs for fish farming.

Organize small-scale fish farmers into groups/organizations/cooperatives and strengthen existing farmers' associations. There is need to establish or strengthen fish farmers' associations to facilitate the provision of training and extension services, ease access to farm inputs and loans, and enable the marketing of fish. In particular, it will be easier to link farmers to formal, reliable, and more distant markets if they are organized into cooperatives or associations.

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