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Global Program Sustainable Fisheries & Aquaculture

CONCEPT NOTE ON LIGHTHOUSE FISH FARMER GROUPS



Msambaisa Fish Farmer Group in Zomba

June 2023

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Acronyms

ABF	Agribusiness Facility
ABS	Aquaculture Business School
AgFin	Agricultural Finance
ATVET4W	Agricultural Technical Vocational Education and Training for Women
AVCP	Aquaculture Value Chain Project for Increased Income and Food Security
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung German Ministry of Economic Cooperation and Development
CASA	Commercial Agriculture for Smallholders and Agribusiness
CFFF	Climate Friendly Fuel and Foods
DoF	Department of Fisheries
EnDev	Energising Development
FFC	Farmer Financial Cycle
FFG	Fish Farmer Group
GIAE	Green Innovation Centers
GIZ	Deutsche Gesellschaft für internationale Zusammenarbeit
GmBS	Gender makes Business Sense
IFFNT	Innovative Fish Farmers Network Trust
SFAD	Sustainable Fisheries, Aquaculture Development and Watershed Management
TVET	Technical Vocational Education Training

1. Background Information

As a federal enterprise, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH supports the German Government in achieving its objective in the field of international cooperation for sustainable development. GIZ operates in more than 130 countries around the globe. In Malawi, GIZ has been working for more than 30 years. Malawi is a priority for German international cooperation and currently focuses on three priority areas: education, health, and private sector development in rural areas. In addition to our work on these areas, we also work on public financial and economic management and social protection.

The „Globalvorhaben/Global-Programme“ Fish is part of the special initiative "Transformation of agricultural and food systems" of the German Ministry for Economic Cooperation and Development (Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung, BMZ), which aims at reducing extreme hunger and poverty in a selected number of countries. GV Fish contributes to this objective by implementing projects in the field of sustainable fisheries and aquaculture with a focus on artisanal practices.

The overall objective of the program "Aquaculture Value Chains for Increased Income and Food Security" (AVCP) in Malawi is to support the development of Malawi's aquaculture sector in selected regions to increase the availability of fish products and income from sustainably operated small and medium-size aquaculture businesses. While fish farmers are the core focus group of the project, it strives to develop the entire value chain in which these are embedded.

The Programme divides into three action areas or outputs:

"More fish more work": Production from artisanal pond aquaculture has been increased, entailing a concomitant increase of employment in the sector.

"Economic groups" (Fish Farmer Groups): The organization of operators of sustainable pond management has been improved.

"Sustainable fish": The political framework conditions are improved as a prerequisite for the implementation of sustainable and resource-conserving aquaculture.

The AVCP operates in 17 districts, namely Mzimba, Rumphu, Nkhata Bay, Ntchisi, Kasungu, Dowa, Mchinji, Salima, Lilongwe, Dedza, Mwanza, Zomba, Phalombe, Blantyre, Chiradzulu, Mulanje and Thyolo.

2. Rationale

Fish farming has been in Malawi since the 1960s but has failed to generate income for small-scale farmers and has mainly been dependent on donor driven projects. Despite of decades of support towards the sector by projects of the international cooperation the sector has remained at a nascent stage with the majority of fish farmers on a subsistence level. Studies and a limited number of case studies have shown that there is potential for fish farming as a profitable business. The clear advantage of fish farming is that only a small area of land is needed to generate more profit than with crops. Currently fish farmers are organized in a number of informal fish farmer clubs across the country that operate ponds as communal Fish Farmer Group (FFG) ponds or individual FFG ponds (see Table). However, very few fish farmer groups are registered formally and operate their fish farming jointly in a profitable way. One hindering factor is the lack of enabling conditions such as access to inputs and finance. The AVCP project has trained over 140 fish farmer clubs in organization development and group dynamics and aims to transform selected (at least one group per project district) – so called lighthouse fish farmer groups- towards commercialization by capacity building in numerous areas, such as farmer organization development, adoption of good aquaculture practices, business skills, improvement in post-harvest handling, value addition and market linkages. Eventually, this should lead to a higher and more reliable production of the right volumes of the much-demanded high-quality fish which can enter formal markets.

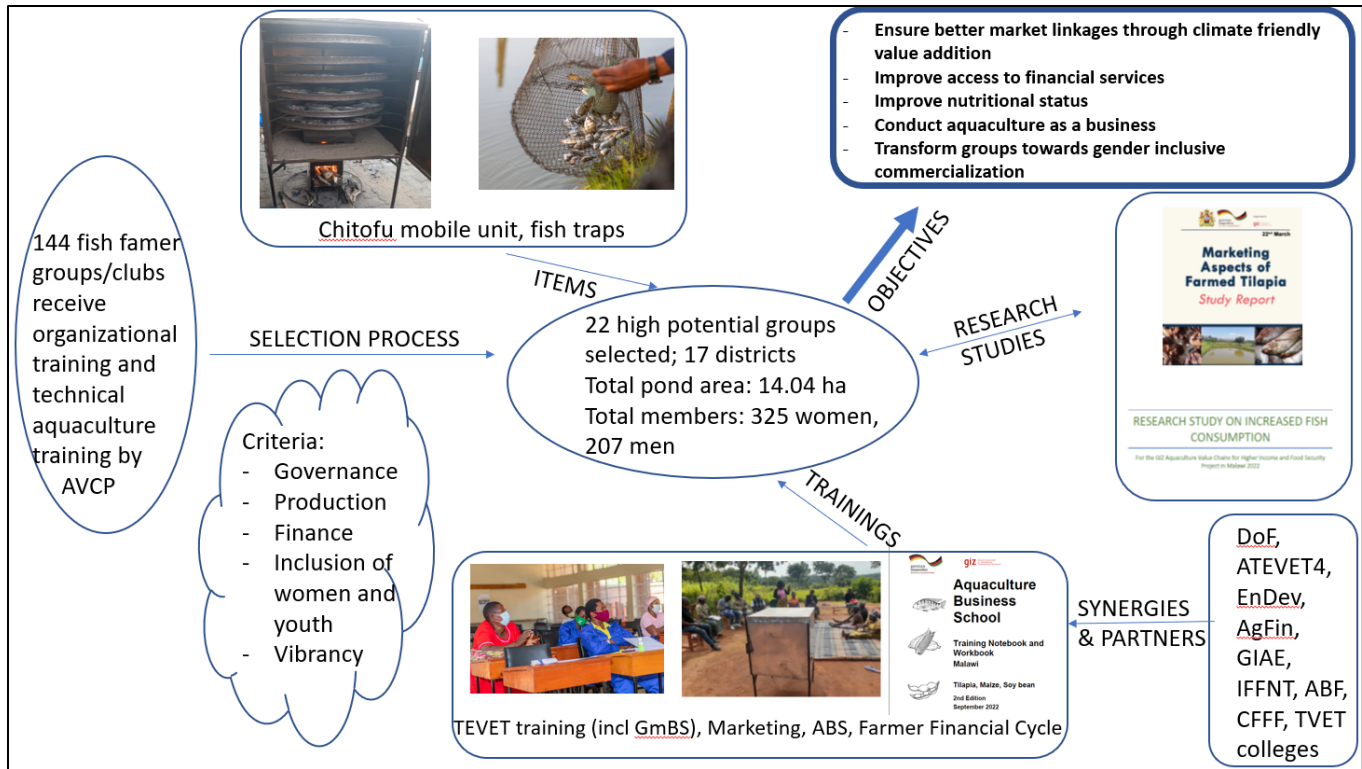
3. Concept

The concept of establishing lighthouse fish farmer groups and availing additional support to them includes several steps and components as displayed in the picture below and described in the following chapters. Out of the 144 fish farmer groups that received organizational training and technical aquaculture training by AVCP, 22 high potential groups were selected based on a defined set of criteria (see Chapter 4. [Selection of FFGs](#)). Those selected groups received training and items to improve their hard and soft skills to improve their aquaculture enterprises in an inclusive manner. The materials handed out to the fish farmers are a so-called Chitofu 2in1 mobile unit stove to enable them to process fish in a climate friendly way (see Chapter 7. [Fish Processing using the Climate Friendly Chitofu 2 in 1](#)) and material to construct fish traps which enable them to regularly harvest small fish for home consumption and sale (see Chapter 8 [Intermittent Harvest using an Innovative Fish Trap](#)). Furthermore, the groups received various trainings, such as Aquaculture Business School (ABS) trainings to professionalize the aquaculture business including an increased productivity and improved incomes and living conditions of aquaculture entrepreneurs and their families. Other trainings received are marketing trainings, fish processing using the Chitofu 2in1 as well as different modules of a Technical Vocational Education Training (TVET) aquaculture curriculum which were attended by individual group members. Five groups were trained in Farmer Financial Cycle which builds up on the ABS training and improves the farmers financial literacy with the aim to link the groups to financial institutions in order to access loans. All components were supported in collaboration with partners (see Chapter 10. [Synergies](#)).

Interviews with members of the FFGs informed two research studies, one on marketing aspects of tilapia and the second one on the potential impact of the innovative harvesting system (traps) on household food security and fish consumption.

The overall objective of the additional support for the lighthouse fish farmer groups is to transform the groups towards gender inclusive commercialization with following sub-objectives

(a) to ensure better market linkages through a product with increased shelf life which was produced in a climate friendly way, (b) to improve the access to financial services, (c) to improve the nutritional status of the households by increased income and fish consumption, (d) to conduct aquaculture as a business and challenge gender norms and perceptions.



4. Selection of FFGs

The selection of the lighthouse fish farmer groups was based on a set of criteria. Additionally, the aim was to select at least one group per district. During the exercise 70 groups were assessed and 22 qualified to receive further support.

Verification criterion

The criterion for the FFGs encompassed factors on composition, production levels, network, governance, finance, marketing and vibrancy of the groups. The criterion was subjected to change basing on the location.

1. Composition

80% should be women and 20% should be men. If the FFG has more men than women, men should be less than 35 years old. The FFG should have more than 15 members where everyone

should at least have a fishpond. Those selected to go for a training under TVET at least 90% should be women.

2. Production levels

The selected FFG should be operating on a pond size of not less than 200m² and these ponds should be more than six. The ponds should have fish.

3. Network

The selected FFG should show a strong coordination with members of the group. There also must be strong communication within the group and other fish farmer groups regarding fish farming and marketing. The group members should be well interviewed to see if they coordinate in their operations. Such questions on frequency of their meetings.

4. Governance

The FFG should have elected leaders that governed the group. The FFG should have laws that each member should abide by. Are there forfeit fees attached to any law breaker? Frequency of their meetings to exchange ideas and do all members follow agreed dates.

5. Finance

The group should be probed to see if they have a bank account and find out if they keep records.

6. Marketing

Find out more if there are markets where the farmers can sell fish of different forms. Are there challenges faced during marketing that can be solved by fish processing?

7. Vibrancy

Find out how much money is generated from fish farming and let them mention if profit is attained. If not, what are their plans to make profit. Also check their daily pond management. If the ponds are poorly managed this is a clear indication that the group is not vibrant

The fish farming groups can be differentiated based on the ownership of ponds as communal or individual ponds FFGs (see Table 1).

Table 1: Communal vs. Individual ponds FFGs

Communal Ponds FFGs	Individual ponds FFGs
Operate into one or more ponds as group	Operate on individual pond and may have one for demonstrations
The ponds are managed by the groups on agreed shifting days by members.	Each member manages his/her own pond and share knowledge on problems during their monthly meetings
Decisions are made by the group on how and when to harvest and sell the fish	Individuals make decisions for their own ponds on how and when to harvest and sell the fish
High drop out from the group-likely to collapse	It is not very easy to collapse as each person knows the importance of fish farming as an individual.
Very susceptible to group conflicts due to the sharing of the benefits.	Well organized and strong coordination in managing group sharing.
Project dependency	Non-Project dependency

Further information on group characteristics can be found in [Chapter 12. Group Characteristics](#).

5. Study on Marketing Aspects of Farmed Tilapia in Rural Aquaculture

To gain more insights into current marketing strategies of Tilapia in rural pond aquaculture, the AVCP commissioned a survey in all 17 project districts to evaluate marketing aspects. Among the interviewees, there were members of the lighthouse FFGs to assess their potentials and constraints in marketing of their produce. The results highlight that 96% of the fish farmers sell their fish as fresh produce within their local community (93%). Only 7% of the fish farmers opt to sell their fish at a distance markets, such as towns, where they fetch higher prices (3,000 – 3,5000 MK/kg as compared to 2,000 MK/kg in the rural community). Fish farmers expressed a shortage of appropriate packaging, cooling, transport and storage facilities and perceived it risky to take fresh fish to the market if they can't ensure to have it chilled. There is positive feedback about the plans to provide farmers with equipment which can extend the shelf life of fish produce. Consumers state to prefer fresh Tilapia of a medium size which carter better for their family needs and 59% state to prefer fish from the pond than fish from the lake. 65% of farmers in the study district harvest medium sized Tilapia (70-200g). Price is the most important characteristic for purchasing Tilapia and it is commonly eaten occasionally, once after several weeks.

6. Fish Processing using the Climate Friendly Chitofu 2 in 1

The mobile Chitofu 2in1 is climate-friendly stove to prepare high-quality tasty and safe food by frying, boiling, baking roasting and smoking with very little firewood instead of charcoal. All the lighthouse FFGs received a mobile Chitofu 2in1 unit and training in the use and maintenance of it. The advantages of the stove are that it can be shared between members of a group, it is ideal for smaller quantities of fish when using the intermittent harvesting with the trap, which will enable FFGs to keep their cashflow going. It provides security of storage and can also serve as a drying cupboard where the fish can be left in over-night. The stove has a good potential for scaling, as the cost, construction and delivery time is much faster than a fixed stove. The firewood consumption is very reduced with less than 3kg per smoking cycle of 2 hours. Firewood savings can exceed 80% compared to traditional methods (open fires). The firewood can be totally substituted by other alternative fuels (e.g. elephant grass, bamboo, pigeon pea etc.). The sand on the horizontal parts above the firechamber prevents grease dripping on hot surfaces and burning off, thus preventing the development of harmful smoke (especially polyaromatic hydrocarbons).



Picture 1: Members of a fish farming group are attending a training on the use of the mobile fish processing unit Chitofu 2 in 1

7. Intermittent Harvest using an Innovative Fish Trap

One of the common and complex challenges in rural aquaculture is the use of mixed-sex Tilapia fingerlings in low-input systems. This means that farmers only have a limited selection and quantity of agricultural by-products available with which to feed a rapidly growing fish population in the pond. This leads to increasing competition for oxygen and food, which leads to poor growth rates and often an acceleration of sexual maturity. Accordingly, final harvests often consist of rather small fish, which does not meet the widespread expectations of harvesting edible – “plate filling” – fish from aquaculture.

Lack of low-cost, labour-saving harvesting technologies prevent smallholder fish farmers from regularly eating fish from their ponds. The AVCP and Department of Fisheries (DoF) have developed an inexpensive, easy to use, size selective trap to reduce the offspring in the ponds. Results of a comparative study revealed that fish farmers using the trap eat significantly more fish (3 – 4 times a week) and tend to eat more fish from their own ponds, compared to fish farmers without trap. Additionally, households using the trap are less likely to experience food insecurity and had more diversified diets compared to both control groups.

AVCP has trained all lighthouse FFGs in the use of the innovative trap and provided the materials for the construction. It is expected that fish farmers use it to regularly harvest and sell small fish which can serve as additional income (sold as fingerlings alive or as food fish) or use it for own consumption which improves the household nutrition. Furthermore, they can use the Chitofu 2in1 to process the small fish into new fish products such as fried or smoked fish and fetch higher prices for it.



Picture 2: Female fish farmer is harvesting small fish from her pond using the innovative trap

A comparative study which was conducted in Northern Malawi used the selected fish farmer groups as intervention households to evaluate the effects of the traps in (1) assessing the impact of intermittent harvesting on diet and nutrition of fish farming communities (2) establishing the attitude of fish farmers towards usage of the technology. The results of the study revealed that fish farmers using the technology eat significantly more fish (3 – 4 times a week) and tend to eat more fish from their own ponds, compared to fish farmers not using a trap. Additionally, households using the innovative technology had more diversified diets and were also less likely to experience food insecurity than both control groups (fish farmers without traps and farmers without fishponds).

8. Trainings

All 144 fish farming groups under AVCP underwent capacity building through technical training and group dynamics and organization development. The technical training covered 8 modules and organization development and group dynamics training covered 7 modules.

It was also noted that farmers lacked the business aspect as they did not mainly consider aquaculture as business. Therefore, the lighthouse FFGs also underwent a five days ABS training. The ABS training triggers a mindset change for fish farmers to consider themselves as entrepreneurs and investors in aquaculture.

By doing that, they realize the importance of record keeping and the use of good aquaculture practices. By doing so they eventually manage to increase their production and thus are improving the income and living



Picture 3: Members of a fish farming group are attending the Aquaculture Business School training

conditions of their families. Some of the lighthouse FFGs also received training on Farmer Financial Cycle (FFC) by the GIZ Agriculture Finance project (AgFin) which capacitates the FFGs to apply for loans from financial institutions.

Additionally, in each lighthouse FFG one female member was selected to undergo the module on fish processing of the aquaculture TVET curriculum.

Table 2: Description of trainings delivered to FFGs

Trainings received	Training content	Training delivered by
4 days technical training on good aquaculture practices	Pond construction and maintenance, fish feed, fingerling production, grow out, harvesting, record keeping	COFAD, 3 NGOs (GIZ – AVCP)
2 days Organization Development and Group Dynamics	Understanding a group, Effective Leadership, Communication, Conflict Management, Decision Making, Monitoring Performance	COFAD, 3 NGOs
5 days Aquaculture Business School Training	Gross margin analysis, planning and financial management, financial services, management of the farm as enterprise	GIZ-AVCP, GIZ-EYA!, IFFNT
Farmer Financial Cycle	Improve understanding of finance and linking groups to financial institutions to access loans	GIZ-AgFin
½ day training on use and maintenance of Chitofu 2 in 1	Technical use of Chitofu 2 in 1 (fish smoking and processing) and maintenance of device	CFFF, GIZ – AVCP
½ day training on marketing	Marketing strategies	CFFF, GIZ- AVCP
Training on the use of innovative fish trap	How to construct fish trap Materials used	GIZ-AVCP

9. Synergies

To realize the comprehensive training approach for the lighthouse fish farmer groups numerous partners were involved:

- **Involvement of DoF:**
 - District Fisheries Officers played a big role in linking the FFGs to community hatcheries which are supported by SFAD.
 - Coordinating fish farmers for the trainings and making follow ups on the adoption of the introduced technologies

- For the innovative **Aquaculture Business School** following partners are involved:
 - The *GIZ Green Innovation Centers (GIAE)*: cooperation during the development of the Aquaculture Business School (ABS) material and support during the training of trainers
 - The *GIZ Agribusiness Facility* supported AVCP in the development of the Aquaculture Business School
 - The *Innovative Fish Farmers Network Trust* was given a local subsidy to conduct ABS trainings for more than 500 fish farmers (including members of the lighthouse fish farmer groups)
- For the **development and distribution of the innovative Chitofu 2 in 1** following partner are involved:
 - The *GIZ Energizing Development (EnDev) Project* supported the development of the fuel efficient Chitofu stove and set up of some pilot stoves
 - The NGO *Climate Friendly Foods and Fuel (CFFF)* was awarded a local subsidy agreement to distribute the mobile Chitofu units and conduct training sessions in the use of the stove as well as marketing trainings.
- For **the access to finance** following partner is involved:
 - The GIZ project *Access to Finance (AgFin)* conducted Farmer Financial Cycle Trainings for five FFGs and two FFG were linked to banks and were able to receive a loan.

10. Gender Aspects

The GIZ project Agricultural Technical Vocational Education and Training for Women (ATVET4W) promoted the Gender makes Business Sense (GmBS) training. The five master trainers of two TVET institutes (Malawi College of Fisheries, Stephanos College) were trained in GmBS and trained students on the same approach, alongside of different aquaculture related training courses.

For the development and implementation of the gender transformative change in the groups, the project introduced the gender transformative approaches that seeks to change gender norms which restricts women and men in accessing or taking part in various activities. In addressing the related challenges selected women and men from the FFGs underwent the GmBS training at the Malawi College of Fisheries and Stephano's Vocation Education Training. The project also made sure that 80% is a representation of women in the FFG, 95% are women trained as trainers for fish processing.

CASE STUDY

Maswaswa is the fish farming group found in Nkhatabay district, Traditional Authority Timbiri under Mpamba Extension Planning Area. The groups have 28 active fish ponds with an average size of 300 square meter. The annual total harvest is estimated to be around 1 ton per hectare.

Markets and marketing



Melinda Phiri in front of the Chitofu 2 in 1

Maswaswa fish farming group uses posters to advertise fish sales. The group sells fresh fish at \$3.5/kg at Mpamaba main market. Only 60% of the total fish harvested are sold on a single day. 40% of the fish are sold on the following day at a reduced price of \$1.5/kg and most of the fish rots. The FFG experiences huge post-harvest losses for the medium and small sized fish that have low market demand.

Upon realizing that most of the medium and small sized fish found on the market were processed (smoked, fried and sundried), the fish farming group started thinking of the processing to meet the market demand for the small and medium fish harvested from ponds.

The fish farming group selected Melina Phiri to undergo a six weeks training on fish processing at Malawi College Fisheries offered under the GIZ-AVCP TVET trainings. Melina Phiri is the one leading the group during fish processing. GIZ-AVCP through the NGO Climate Friendly Fuel and Foods provided the group with Chitofu 2 in 1, a fish processing technology used for smoking and frying fish. The group agreed to do smoking of the medium and small sized fish by cutting it open like a butterfly shape.

The group found that 15 medium sizes of fish make a kilogram of fish. When sold as fresh fish, medium sizes are sold at \$2.5/kg when demand for fish is high and when the demand for fish is low such sizes can be sold at \$1.5/kg. The group did an assessment to find out how the price of processed fish is affected by the market demand of the fish. The group found out that when demand is low the price for processed fish does not change much and fish farmers have the option to sell the fish when the demand for fish is high. Because processed fish can be stored and sold when the demand for fish is high. The medium smoked fish are currently sold at \$0.5 per piece. This translates to \$7.3/kg of the weighed fresh fish. The FFG also found that 25 small fish make 1kg of fresh fish which is sold at \$1.5/kg. When processed as smoked fish is sold at \$0.24 per piece. This translates to \$6.2/kg of the weighed fresh fish. More profit is realized when selling medium and small smoked fish.

11. Way forward

Linkages to input suppliers like fingerling and fish feed producers have to be further strengthened. More support for the groups is needed to ensure sustainability for instance coaching loops. Furthermore, an impact monitoring system has to be developed to evaluate the success of the trainings and if the groups can realize more productivity, better market access and higher income from fish farming. Additionally, a business model around the Chitofu 2 in 1 has to be developed with the AgFin project to prove its viability and include it as one of the business models which were introduced to financial institutions to provide financing for the technology.

12. Group characteristics

All selected groups have a bank account and rear the fish species *O. shiranus* and *C. rendalli*. Find more details about the group characteristics in Table 3.

Table 3: Characteristics of the 22 selected FFGs

Groups	1	2	3	4	5	6	7	8	9	10
District	Chiladzulu	Ntchisi	Phalombe	Salima	Blantyre	Lilongwe	Dedza	Mchinji	Mwanza	Mulanje
No. of members (male/female)	10F;10M	10F	10F;10M	28F;2M	9F;6M	23F	10F;3M	17F;15M	12F;8M	21F;9M
Registered										yes
Type of FFG (communal/individual)	Communal	Communal	Communal, few members have individual ponds	Communal	Communal, few members have individual ponds	Communal	Individual	Communal	Individual ponds	Individual ponds
Infrastructure	None									
Location (road access?)	They are close to the main road (M3) and can easily be accessed	Not close to the main road, difficult to reach during rainy season	Easy to reach and close to the tarmac road	The FFG is easily accessible	The group is accessible, but the place is hilly to get to the pond site.	The group is accessible, but but 20km from the main	The group is accessible, but over 30km from the main road	The group is accessible with a distance of less than 2km from the main road	The group is accessible but travel over a distance of 30km to get the FFG	The FFG is easily accessible
Assets	Mobile Chitofu 2 in 1, Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale,	Mobile Chitofu 2 in 1 Weighing scale
Current Markets	Mbulumbudzi Market is available and along the M3 road	Nthondo main market	Phalombe main market is the the FFG sell the fish.	The nearest market is Maganga. The market is easily accessed but they also sell their fish to Salima if the harvest is above 200kgs	They sell fish to the local market surrounding the community.	They sell the fish at Mitundu main market. Most of the times the sell direct at the pond site to the middlemen who take the fish to the main market and sell at a higher price	They sell fresh fish to the local market around Mayani EPA.	The sell fish in their local markets and the district main market; and to some institutions	The sell fish in the local market and to the community members	The sell fish in the local market and to the community members
Distance to Market	Less than 2km	12km	1.5km	Less than 2km	Less than 2km	5 km to the main market	Less than 2 km	Less than 2km	Main market is 18km	Less than 2km
Current Marketing Practice (including transport)	They sell mainly fresh fish. They use local transport (bicycles/or on foot to access the main market. Sometimes they sell the	The group intends to start selling processed fish. Currently they sell fresh fish	Sells fresh fish to the market and at the pond site during harvesting time. They also intend to sell	Selling as fresh fish but planning to sell processed as observed to have profit.	They sell mainly fresh fish. They use local transport (bicycles/or on foot to access the local market. Sometimes they sell the	Most of the times the sell direct at the pond site to the middlemen who take the fish to the main market and sell at a higher price.	Mainly sells fresh fish and transportation is on foot and bicycles	Mainly sell fresh to community members and middlemen who buys the at lower price and	Mainly sell fresh to community members and middlemen who buys the at lower price and	Selling as fresh fish but planning to sell processed as their production increases

	at the pond site during the harvesting time	which is transported by bicycles	smoked fish as they are assessed to have increased profit.		fish at the pond site during the harvesting	The fish is normally transport on bicycles		sell at higher price to district markets. Transportation is through motor bicycles and bicycles	sell at higher price to district markets. Transportation is through motor bicycles and bicycles	
Production Capacity	132kg/ha/year based on productivity	464kg/ha/year	106kg/ha/year based on productivity	132kg/ha/year based on pond productivity	140kg/ha/yr	331kg/ha/yr	497kg/ha/yr	563kg/ha/yr	1159kg/ha/yr	597kg/ha/yr
Total Pond Area	0.12ha	0.42ha	0.06ha	0.12ha	0.09ha	0.3ha	0.45ha	1.5ha	1.05	0.54ha
Networks	Linked to climate smart activities Some members	Linked to climate smart activities, Clinton Foundation, World Vision	Linked to CASA project underfish processing and received a FRismo Smoking kiln	Linked to Clinton Foundation supported the group with feeds and fish fingerlings	Linked to climate smart activities - few members	Linked to CASA project and few members are linked to climate smart activities	Linked to government intervention such winter cropping through irrigation	Linked to government intervention such winter cropping through irrigation	Linked to climate smart activities	Linked to climate smart activities Some members

Groups	11	12	13	14	15	16	17	18	19	20	21	22
District	Zomba	Dowa	Mchinji	Rumphi	Kasungu	Mulanje	Nkhatabay	Rumphi	Thyolo	Mzimba	Mwanza	Rumphi
No. of members (male/female)	10F;3M	7F;19M	11F;29M	15F;17M	15F;10M	11F;8M	17F,8M	8F;12M	34F;20M	32F;4M	10F	33F,35M
Registered	Registered as msamabayisa cooperatives	Not registered	Not registered	Yes, under the Rumphi fish farming association	Not registered	Not registered	Not registered	Yes, under the Rumphi fish farming association	Registered as an association	Yes, under the Lusangazi dairy farming, which integrate with fish farming	Not registered	Under the Rumphi fish farming association
Type of FFG (communal/individual)	Communal ponds	Individual ponds	Communal ponds and individual ponds	Individual ponds	Communal ponds	Communal ponds	Individual ponds	Individual ponds	Individual ponds	Individual ponds	Communal ponds	Individual ponds
Infrastructure	Bakery	none	none	none	none	None	None	None	None	Yes, Milk selling point	None	None
Location (road access?)	Very accessible and close to the main road	Not very close to the main road but the group is accessible and easy to reach	Not very close to the main road but the group is accessible and easy to reach	Not very close to the main road but the group is accessible and easy to reach	Very accessible and close to the main road	Very accessible and close to the main road	Accessible and 2km to the main road	Very accessible and close to the main road	Not very close to the main road but the group is accessible	Very accessible and just close to M1	The FFG is accessible during dry season	Not very close to the main road but the group is accessible
Assets	Weighing scale, hapa net, fish harvesting net, Chitofu 2 in 1	Weighing scale, fish harvesting net, Chitofu 2 in 1	Weighing scale, Chitofu 2 in 1	Weighing scale, hapa net, fish harvesting net, Chitofu 2 in 1, fingerling graders	Weighing scale, fish harvesting net, Chitofu 2 in 1,	Weighing scale, fish harvesting net, Chitofu 2 in 1,	Weighing scale, fish harvesting net, hapa nets Chitofu 2 in 1,	Weighing scale, fish harvesting nets Chitofu 2 in 1,	Weighing scale, fish harvesting nets Chitofu 2 in 1,	Milk storage machine, Weighing scale, Chitofu 2 in 1	Weighing scale, Chitofu 2 in 1	Weighing scale, hapa net, fish harvesting net, Chitofu 2 in 1, Frismo smocking kiln
Current Markets	Just less kilometer (Namwera and Malosa markets)	Local markets, Dowa main market, but also sell within the community	They sell the fresh fish on their local markets and demand	They sell fish at rural markets set on special days. Demand for fresh fish is high	They sell fresh fish at Lisasazi market and to the institutions	The market is available and sell fresh fish at the	Local markets, mupamba main market, but also sell within the	Local markets, Lula main market, but also sell within the	They sell the fresh fish on their local markets and demand for fish	Main supermarkets in Mzuzu City and other institutions around the city	Local markets, sell within the community	Local markets, Lula main market, but also sell within the community

			nd for fish is high in the area		such as secondary schools	main marketc all Msikwanjara	commu nity	commu nity	is high in the area			
Distance to Market	Less than a kilometer	20km to the main market	The distance is less than 2km	The distance is less than 2km	The distance is less than 2km	They travel 2km to the market	They travel 2km to the market	They travel 4km to the market	They travel 10km to the market	They travel 10km to the market	They travel less than 2km to the market	They travel 10km to the market
Current Marketing Practice (including transport)	They usually sell fresh fish and demand is high, use bicycles to transport the fish	They sell fresh fish and demand is high, use bicycles to transport the fish	Sells fresh fish and transport the fish to the market using bicycles	Sells fresh fish and transport the fish to the market using bicycles	Sells fresh fish and transport the fish to the market using bicycle	fresh fish and demand is high, use bicycles and motor bicycles to transport the fish	They sell fresh fish and processed depending on farmer interest, and demand is high, use bicycles to transport the fish	They usually sell fresh fish and demand is high, use bicycles to transport the fish	Sells fresh fish and transport the fish to the market using motor bicycles and public transport	Sells fresh fish and transport the fish to the market using motor bicycles and public transport	They usually sell fresh fish and demand is high, use bicycles and foot to the the fish to the market the fish	They usually sell fresh fish and demand is high, use bicycles to transport the fish
Production Capacity based on productivity	240kg/ha/yr	861kg/ha/yr	563kg/ha/yr	1358kg/ha/yr	828kg/ha/yr	600kg/ha/yr	927kg/ha/yr	1391kg/ha/yr	1855kg/ha/yr	5200kg/ha/yr	99kg/ha/yr	3176kg/ha/yr
Total Pond Area	0.18ha	0.78ha	0.51ha	1.23ha	0.75ha	0.09ha	0.84ha	1.26ha	1.68ha	1.83ha	0.09ha	2.56ha
Networks	COMSIP, Namwera irrigation scheme	Connected to climate smart activities	Connected to climate smart activities	Connected to climate smart activities	WorldFish-Kulima project	CASA project and connected to climate smart activities	CASA project and connected to climate smart activities, VSL	CASA project and connected to climate smart activities, VSL	Connected to climate smart activities	Dairy farming, SFAD project, CASA project	Connected to climate smart activities	CASA project and connected to climate smart activities

Appendix

Overview of fish farmer groups:

No.	Name of Fish Farmer Group	District	EPA	T/A	Village	# of Ponds
1	Tiyanjane	Chiradzulu	Mulumbuzi	Ntchema	Ntchema	4
2	Tiyesenawo	Ntchisi	Chikwatula	Nthondo	Mbuluma	14
3	Domazi	Phalombe	Waluma	Nkhumba	Nachamba	2
4	Tikondane	Salima	Lembwe	Maganga	Kunkhongo	4
5	Mandimu B	Blantyre	Ntonda	Kuntaja	Lesiten	3
6	Tikondane	Lilongwe	Mitundu	Chadza	Chisamba	10
7	Mtawanga	Dedza	Mayani	Tambala	Mtawanga	15
8	Nyoka	Mchinji	Mikundi	Nyoka	Nyoka	17
9	Magwero	Mwanza	Mwanza	Kandoko	Samu	35
10	Chindora	Mulanje	Thuchira	Nkanda	Kambenje/ Chindola	18
11	Sambaisa	Zomba	Malemia	Malosa	Kwenje	6
12	Khumbilani	Dowa	Nachisaka	Chiwere	Jemusi	26
13	Chamalombe	Mchinji	Mikundi	Nyoka	Felesiyano	17
14	Bangwa	Rumphi	Ntchenachena	Kachulu	Jungu-Bawa	41
15	Tiyetse	Kasungu	Lisadzi	Kaomba	Galika	25
16	Namisasi	Mulanje	Msikawanjara	Chikumbu	Kwichi	3
17	Maswaswa	Nkhatabay	Mpamba	Timbiri	Kampharo/ timbiri	28
18	Mphachi	Rumphi	Ntchenachena	Kachulu	Mphachi	42
19	Morere	Thyolo	Masambanjati	Changata	Kweuza/ Chikumba	56
20	Lusangadzi Intergrated	Mzimba	Emusizini	Kampingo	Chawulama Kaunda	61
21	Tikondane	Mwanza	Mwanza	Kandoko	Nkwichi	3
22	Mdimwa	Rumphi	Ntchenachena	Mwalweni	Kayamba	65