



INLAND MYSAP

Value Chain Report - Shwebo



Value Chain Report - Shwebo Township

The Myanmar Sustainable Aquaculture Programme (MYSAP) which is funded by the European Union (EU) and the German Federal Ministry of Economic Development and Cooperation (BMZ) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has the following objective:

Support the sustainable intensification of the aquaculture sector, thereby realizing its potential for food security, nutrition and sustainable livelihoods

MYSAP is promoting small-scale aquaculture and improved human nutrition in five townships in the Shan State and the Sagaing and Mandalay Regions of Myanmar in its component INLAND MYSAP. WorldFish Myanmar is implementing INLAND MYSAP under a GIZ grant agreement. The INLAND MYSAP townships are:

- i) Kale (ကလေး - MMR005027) Township, Sagaing Region
- ii) Shwebo (ရွှေဘို - MMR005004) Township, Sagaing Region
- iii) Kengtung (ကျိုင်းတုံ - MMR016001) Township, Eastern Shan State
- iv) Pinlaung (ပင်လောင်း - MMR014009) Township, Southern Shan State
- v) Amarapura (အမရပူရ - MMR010006) Township, Mandalay Region

Mekong Economics Limited, a commercial company was contracted under a service agreement with WorldFish Myanmar to conduct the INLAND MYSAP baseline survey after a tendering process.

The findings of the INLAND MYSAP baseline survey were presented by Mekong Economics Limited at a workshop held in Nay Pyi Taw on 26 June 2018 which was attended by 70 key stakeholder participants including government, NGOs, farmers and donors.

Feedback from key stakeholders has been incorporated into this final version of the INLAND MYSAP baseline survey report for release into the public domain.

The findings of the INLAND MYSAP baseline survey report will be used by the Government of Myanmar, the EU and BMZ, MYSAP and collaborating implementing partners to assess progress towards both programme level and project level objectives and results and programme and project level impact.

For further information on MYSAP please contact the Head of Project Mr Peter Buri (peter.buri@giz.de) and for further information on INLAND MYSAP and/or the baseline survey report please contact: inlandmysap@cgiar.org.

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1. Introduction

In this section, we briefly introduce the intervention and its objectives, and the value chain research that was conducted as part of a baseline study of the INLAND MYSAP project.

Project Description

WorldFish Myanmar in collaboration with the Department of Fisheries (DoF) R&D Division, under the Ministry of Agriculture, Livestock and Irrigation (MoALI), will implement the project 'Improving the production, nutrition and market values of small-scale aquaculture in Myanmar's Shan State, and Sagaing Region' (INLAND MYSAP). INLAND MYSAP will run from 06 April 2017 to 05 May 2020.

The development goal of INLAND MYSAP is to increase the availability and access of fresh water aquaculture products sustainably produced by small-scale aquaculture producers, and to provide nutritious, affordable food and incomes for the poor and vulnerable in Shan State and Sagaing Region. Amarapura Township in Mandalay Region was recently added to the project area.

Value Chain Study

As part of the baseline research conducted for this project, a value chain study was commissioned to understand the constraints facing selected aquaculture value chains and the opportunities for value-chain upgrading and increasing fish consumption. Mekong Economics (MKE), a leading socioeconomic development consultancy in the Mekong region, was contracted following a limited tender process to implement the baseline research, including the value chain study.

The following themes are touched upon, to varying degrees, in the value chain study: (1) production; (2) markets; (3) nutrition; (4) climate resilience; (5) gender equality; and (6) governance. Opportunities for the following are highlighted: (1) livelihoods improvement; (2) product development; (3) processing; and (4) service provision. These will serve to inform the specific contents of the intervention and to steer the project's overall direction.

2. Methodology

The methodology adopted for the value chain research combines quantitative and qualitative tools to answer specific research questions. Concurrently with the value chain study, a survey of households was conducted to obtain baseline values of indicators. Some of the value chain research was able to "piggyback" on the household survey, but mostly relied on separate data collection tools. These consist of: (1) a market survey; (2) key informant interviews; and (3) focus group discussions.

Research Questions

The research questions of this study comprise a single lead question in addition to five sub-questions. They were as follows.

Lead Question: Can aquaculture help to replace fish previously supplied from the wild and if so what is the best way of doing this to improve low-income people's fish consumption?

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Sub-question 1: Are we experiencing an increase in the proportional supply of farmed fish? If so, what are the resulting changes in local fish trade and consumption practices?

Sub-question 2: If there has been an increase in fish from aquaculture in the area, has the price of fish at local markets remained stable, lowered or increased?

Sub-question 3: Are local fish farmers and collectors facing important logistical challenges to supply their products to the market? What are they and how do they address these?

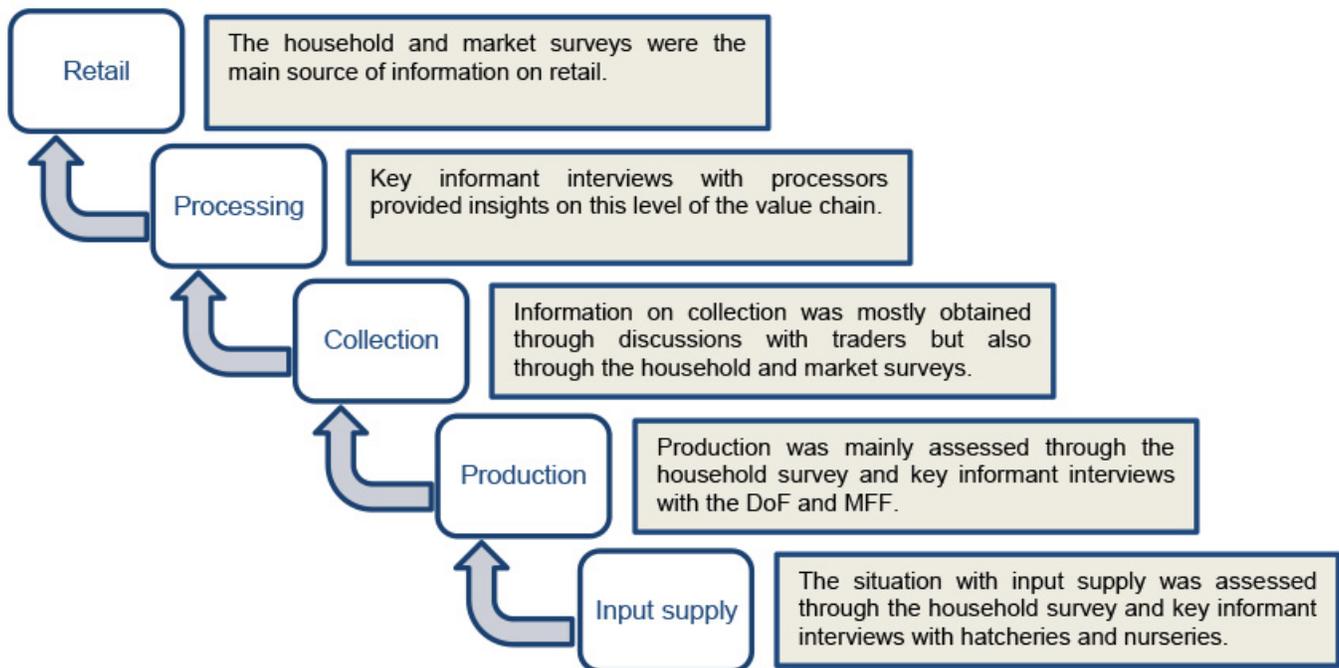
Sub-question 4: How is local fish farming positioned compared to the wild-caught and Yangon-farmed fish supply? What are the main interrelations between these three supply chains?

Sub-question 5: What is the prevalence of fish processing practices and related consumption? Are there interesting prospects for the project to support these?

Research Strategy

The research strategy was to employ mixed (quantitative and qualitative) methods to obtain information along the value chain. The various tools deployed were: (1) a household survey; (2) a market survey; and (3) qualitative interviews with the DoF, the Myanmar Fisheries Federation (MFF), hatcheries, nurseries, processors and traders. For the purpose of this value chain study, a 'trader' was defined as someone who purchases fish from a fish farmer or another trader. While a 'vendor' was defined as someone who sells fish to consumers. Note that traders can also be vendors.

Value chains were evaluated at the following five levels:



The value chain analysis drew a distinction between the following three types of fish species: (1) carp species – namely Indian major carps, being rohu, catla, and mrigal, and Chinese carps, being common carp, silver carp, big head carp and grass carp; (2) tilapia; and (3) small indigenous species (SIS). The following three supply chains were considered, although the focus was on the first of these: (1) locally farmed fish; (2) Yangon-farmed fish; and (3) wild-caught fish. The value chain study was conducted in five townships, with separate reports for each: (1) Kalay (Sagaing Region); (2) Amarapura (Mandalay Region); (3) Kyaing Tong (Shan State); (4) Pinlaung (Shan State); and (5) Shwebo (Sagaing Region).

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Where possible, a triangulation approach was used with multiple sources of information to corroborate data.

Quantitative Tools

The quantitative tools consisted of a baseline household survey and a market survey in the five townships.

Household Survey

The household survey employed a quantitative questionnaire to collect data from 847 households, of which 188 were sampled from Shwebo Township. These were split roughly equally between three sets of locations: (1) four wards of the township capital; (2) four production hubs (wards/villages with above-average aquaculture involvement); and (3) four rural villages (those in village tracts).

Market Survey

A market survey was conducted with fish vendors in each township. The sample consisted of randomly-selected vendors in each market, with one major market and two or three minor markets surveyed in each township.

Qualitative Tools

As can be seen in Table 1, the qualitative tools used for the Shwebo value chain study consisted solely of key informant interviews (KIIs). A KII is a conversation with a relevant individual conducted by trained staff that usually collects specific information about one person. Semi-structured questionnaires were developed for all qualitative interviews. These are included in the Annexes.

Table 1

Interview format	Stakeholder(s)	Interview date	Interview location
KII	DoF	03/05/2018	Shwebo
KII	MFF	02/05/2018	Shwebo
KII	DoF hatchery	03/05/2018	Shwebo
KII	Private hatchery	03/05/2018	Shwebo
KII	Private hatchery	03/05/2018	Shwebo
KII	Trader (male)	05/05/2018	Shwebo
KII	Trader (male)	09/05/2018	Shwebo
KII	Trader (male)	09/05/2018	Shwebo
KII	Trader (female)	04/05/2018	Shwebo
KII	Trader (female)	09/05/2018	Shwebo
KII	Trader (female)	09/05/2018	Shwebo
KII	Processor (male)	04/05/2018	Shwebo
KII	Processor (female)	05/05/2018	Shwebo

3. Value Chain Map

See Annex A for a value chain map of the fish sector in Shwebo Township.

4. Market Information

Market information was collected from the following three market locations: Central (major market), Kone Baung (minor market) and Aung Zaya (minor market). The following map marks these locations. Randomly selected vendors accounted for roughly 15%, 30% and 35% of traded volumes at Central, Kone Baung and Aung Zaya Markets, respectively, on the day of visit. 87.5% of vendors randomly selected for interview were female, suggesting that Shwebo vendors were mostly female.



Fish Sales

Figure 1 compares sales volumes for wild-caught fish and different types of farmed fish across the three markets surveyed. The township total was calculated by summing volumes at the three markets.

As can be seen in Figure 1, carp volumes were dominated by rohu that originate from the many (circa 500-800) fish farms in the township. Other prominent aquaculture species in the township included: catla, mrigal, common carp, grass carp and tilapia. Small indigenous species (mainly mola carplet during the wet season, but also some Berdmore's loach after the wet season) were sold in small quantities, some of which were reported to originate from farms, having entered into ponds through the incoming water supply. In addition, the household survey found three fish farmers (12.5%) who deliberately stocked small indigenous species.

Seasonal Variation

Figure 2 depicts the extent of seasonal variability in sales of different kinds of fish in Shwebo using a four-point Likert-type scale (very much, quite a lot, a little bit, not at all). The township average was a simple average of observations from all three markets.

As can be seen in Figure 2, wild-caught fish exhibited greater seasonal variability in sales and, in all likelihood, also availability than farmed fish.

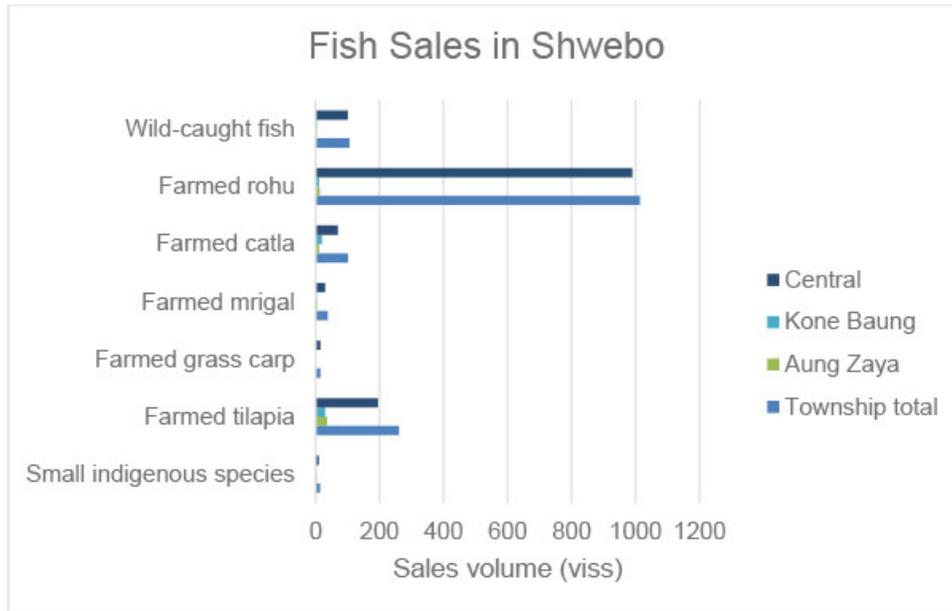


Figure 1

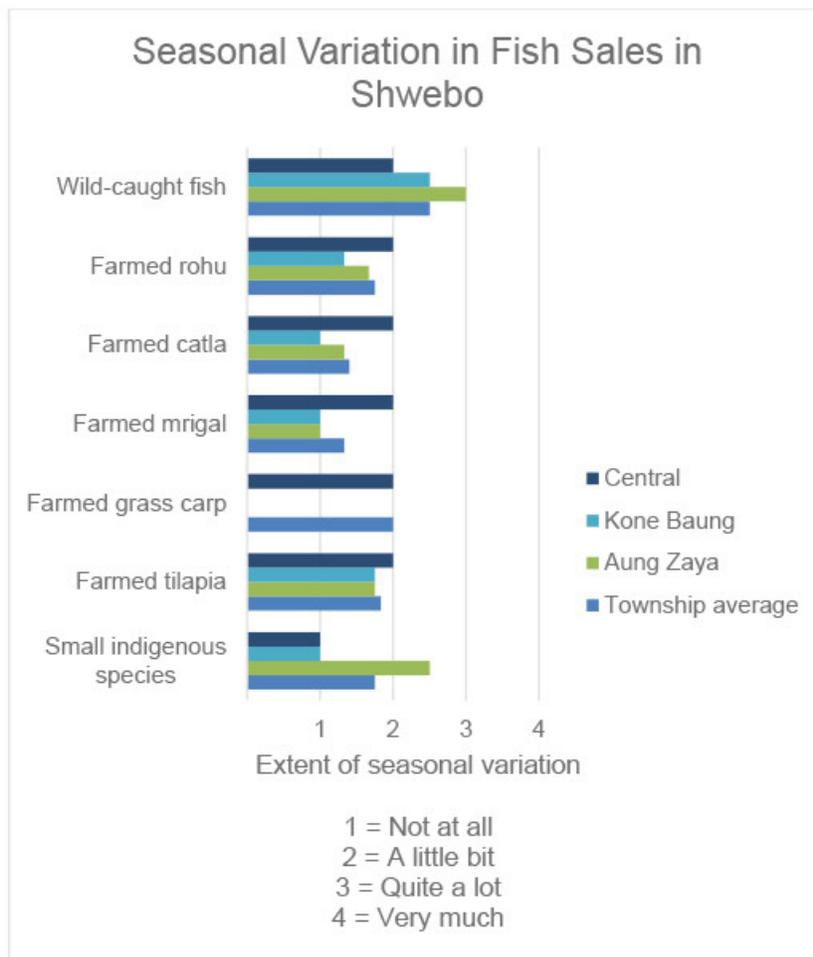


Figure 2



Figure 3

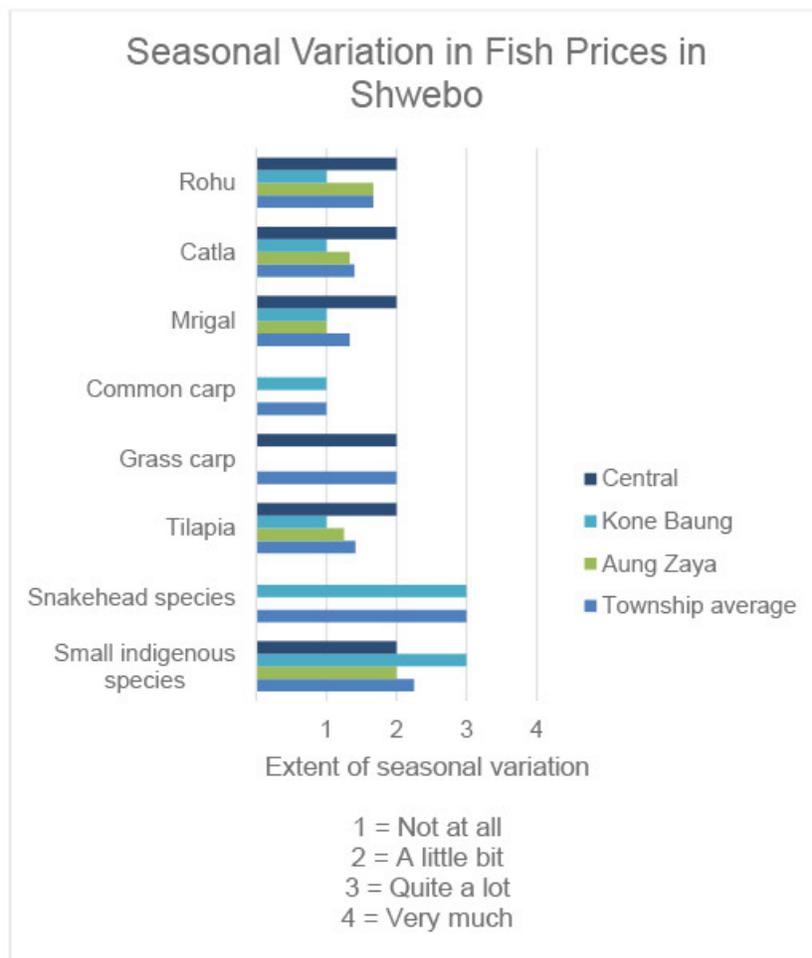


Figure 4

Fish Prices

Figure 3 displays the price of different kinds of fish in each of the three markets surveyed. The price for each market is the simple average across vendors, whereas the township average is the average of observations from all three markets.

Wild-caught species were generally more expensive than farmed varieties per viss, with snakehead species fetching prices of MMK 8,000 at Kone Baung Market. Among farmed fish, catla was found to be the most expensive, outside of Central Market.

Seasonal Variation

Figure 4 depicts the extent of seasonal fish price variation in Shwebo using the same four-point Likert-type scale as Figure 2. Wild-caught fish such as snakehead species and small indigenous species were reported to exhibit the most seasonal variation in price, in line with their seasonal availability.

5. Answers to Research Questions

In this section, we seek to answer the research questions underpinning this study.

Lead Question: Replacing Wild-Caught Fish and Improving Fish Consumption

Farmed fish was found to be more abundantly traded than wild-caught fish in Shwebo, which has experienced decreasing availability of wild-caught fish species over the past few years. Important challenges remain, however. Both the DoF and the MFF pointed out that the current land use policy (La Ya 30) is restrictive for the growth of the sector. Existing fish farmers are frequently unable to construct new ponds because of La Ya 30, resulting in a high incidence of fish disease stemming from the use of old ponds. Many prospective fish farmers were prevented from entering the sector altogether. As illustrated in Figure 5, the household data highlights proximity to water resources as a critical factor that constrains expansion of aquaculture production.

Processors revealed that they have the resources and will to produce fish snacks, which may serve to increase sales and consumption of fish products, but they do not possess the technical knowledge to do so. This is another area where project support may be well placed.

Sub-question 1: Changes in Supply of Farmed Fish

According to traders, there were 500-800 fish farmers in the township, while the DoF and MFF both cited a figure of 700. Some fish farmers may be under the radar as a result of unregistered land use.

Traders, the DoF and the MFF all agreed that the township was currently witnessing an increase in the proportional supply of farmed fish, fuelled by an increase in the supply of farmed fish and a corresponding decrease in the amount of wild-caught fish. This was corroborated by the market data, which revealed that all vendors believed that the supply of farmed fish has increased relative to wild-caught fish over the past three years. This has had implications for the composition of fish trade, with 92.9% of vendors reporting an increase in sales of farmed fish compared with wild-caught fish over the past three years.

The household data, however, suggests that the effects are both more subtle (production and consumption is unchanged for many) and not so clear cut. Table 2 shows that, in line with qualitative findings, more fish farms recorded an increase in aquaculture production than a decrease. This was true in the case of individual fish species, with the exception of rohu and small indigenous species.

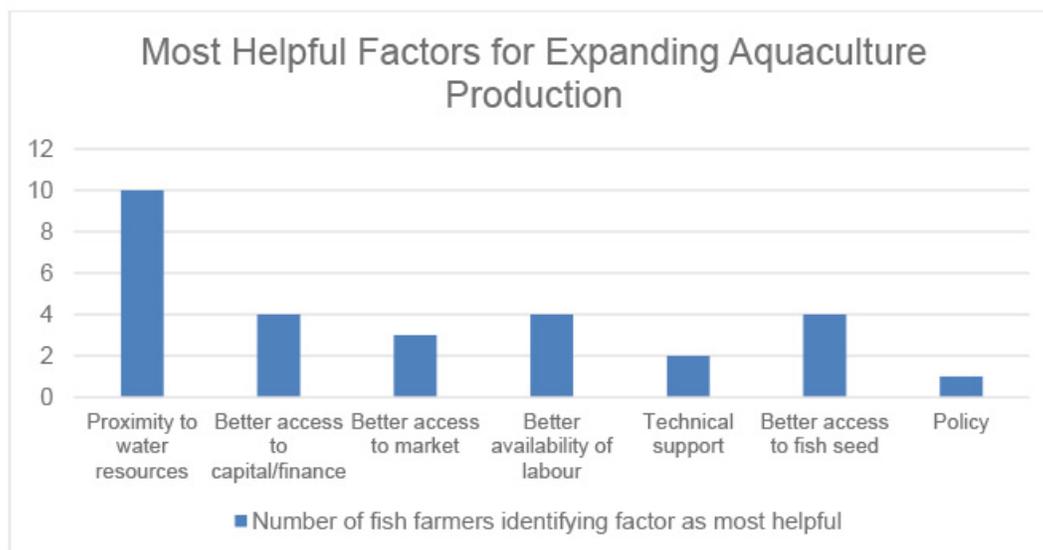


Figure 5

Table 2

Change in production compared to three years ago (% of responses)	Aquaculture	Fish						
		Rohu	Catla	Mrigal	Common carp	Grass carp	Tilapia	Small indigenous species
Increased	33%	0%	0%	45%	40%	50%	40%	13%
Decreased	17%	50%	75%	25%	20%	50%	20%	25%
Remained the same	50%	50%	25%	30%	40%	0%	40%	63%

On the consumption side, as can be seen in Figures 6 and 7, the majority of households believe their consumption of both common aquaculture and common wild-caught species has been unchanged in the past three years. What is surprising is that more households reported decreased consumption of common aquaculture species than wild-caught species. Further investigation is needed to understand why this is the case when there is quite strong agreement that the trend for supply is the reverse.

Sub-question 2: Changes in Market Price of Fish

Both the DoF and MFF indicated that there has been an increase in fish prices at local markets in recent years, concurrently with a decrease in the supply of wild-caught fish and simultaneous increase in the supply of locally farmed fish. This is in line with the findings of the market survey, where 87.2% of responses to questions asking about change in the market price of various fish species over the past three years were “increased”, while the rest were “remained the same”.

Sub-question 3: Logistical Supply Challenges

According to the household survey, Shwebo fish farmers mainly face difficulty with the quality of roads and a lack of suitable vehicles when transporting fish to markets (see Figures 8 and 9). The household survey also offered some insight into the strategies used by fish farmers to deal with challenges faced when transporting fish. One fish farmer from Shwebo explained that he carried his fish through a field so as to avoid the bad-quality roads. Another fish farmer explained how he used a boat instead of a motorbike to ferry his produce to the point of sale. No one reported experiencing difficulties with distance to markets or ice for keeping fish cool before sale.

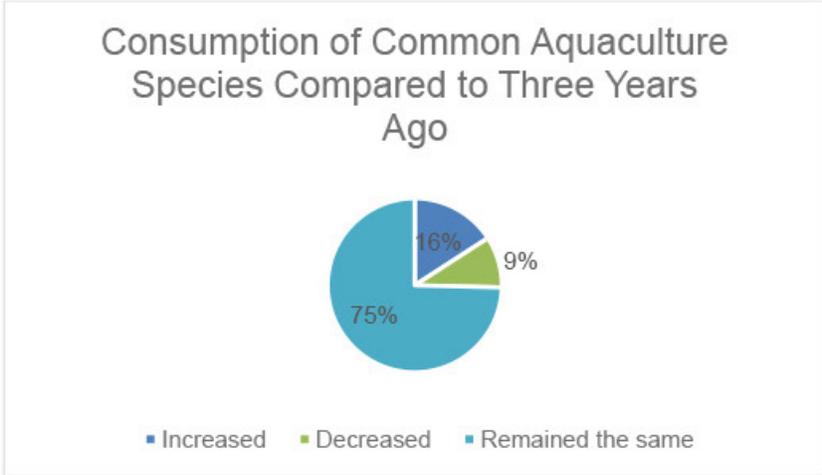


Figure 6

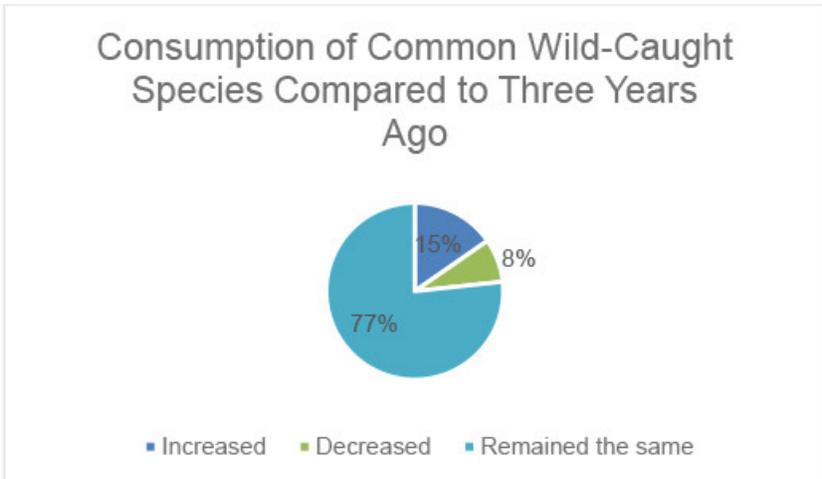


Figure 7



Figure 8

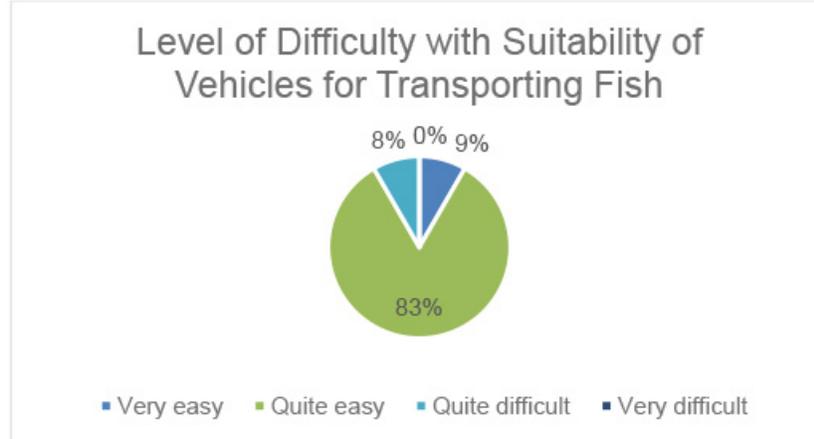


Figure 9

According to the Shwebo DoF, fish farmers who sell their own fish incur lower transportation costs than traders who purchase fish from fish farms, due to smaller distances travelled. Since their fish sells for the same price at markets, traders end up with lower profit. Traders may benefit from being larger, as they would be able to spread the additional transportation costs over a greater quantity of fish being transported.

Sub-question 4: Comparisons Between Supply Chains

Shwebo has a relatively developed aquaculture sector, with a number of traders reporting that about 90% of all fish in the township was farmed. Fish produced in Shwebo was also supplied to the following external locations: Kawlin Township (Sagaing Region), Monywa Township (Sagaing Region), Hpakant Township (Kachin State), Myitkyina District (Kachin State) and fish markets in Mandalay (e.g. Thiri Marlar). According to both the DoF and MFF in Shwebo, locally farmed fish was the main supply chain in Shwebo, followed by wild-caught fish and then Yangon-farmed fish. The latter was typically relied on to make up for shortfalls in the supply of locally farmed fish. Despite the relative unimportance of Yangon-farmed fish in the township, prices in Shwebo fish markets were reported to track those in Yangon fish markets quite closely.



Figure 10: Processors in Shwebo

Sub-question 5: Prevalence of Fish Processing

The household data revealed that only three Shwebo fish farmers (12.5%) were doing processing. Of these, two did salting and one did drying. On average, households consumed 3.47 meals containing processed fish products per week. This was slightly above the average for all five townships.

One processor interviewed in Shwebo turned leftover farmed rohu into salted fish and separately produced fish balls and pickled fish. She purchased directly from fish farms in Shwebo and sold to consumers herself. Interestingly, she explained that processed fish was more commonly consumed than fresh fish. This was supported by the household data, but only just – households surveyed reported consuming 3.43 meals containing fish per week. She also mentioned that processed fish was more profitable. A male processor interviewed in Shwebo, who also produced salted fish, fish balls and pickled fish from farmed rohu, said that processed fish was indeed more profitable, but less commonly consumed than unprocessed fish. He sold his fish to traders, vendors and consumers.

The Shwebo MFF pointed out that processed fish is consumed as much as or more than fresh fish only because the latter is more expensive. It was noted that fish processing in Shwebo Township was done mainly by females.

6. Additional Findings

In this section, we report additional findings from the field mission to Shwebo. We include estimates of price mark-ups as well as some profit margins along the value chain.

Mark-ups and Margins

Through assessing price and cost data from fish farmers in the household survey, we can roughly estimate¹ the average profits that producers received for different fish species. Table 3 summarises this data for Shwebo. The most profitable fish species was estimated to be rohu and grass carp, while small indigenous species were calculated to be the least profitable.

Table 3

Fish species	Average selling price (MMK per viss)	Average profit (MMK per viss)
Rohu	2,550	2,310
Mrigal	2,385	1,709
Catla	1,500	1,171
Common carp	2,444	1,700
Grass carp	2,750	2,157
Tilapia	1,575	950
Small indigenous species	1,300	626

As can be seen in Table 4, traders in Shwebo received lower mark-ups for fish species in comparison to vendors, ranging from MMK 100 to MMK 258 per viss. Transport costs ranged from MMK 22,500 to MMK 600,000 per day. The cost of ice also varied considerably, ranging from MMK 12,000 to MMK 1,000,000. The main factors influencing the amount spent on ice were the quantity ordered and the distance the ice was coming from. As might be expected, traders who had higher transport costs also generally had higher ice costs.

¹ Average profit was calculated by dividing average total fish cost by average total fish production, giving average unit cost. Average unit cost was then subtracted from selling price in order to arrive at a crude estimate of average profit.

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Vendor mark-ups and costs are presented in Table 5. Vendors in Shwebo were found to have negligible transport costs. The largest average mark-up for vendors was for catla at MMK 2,900 per viss. Municipality fees were similar across markets surveyed in Shwebo, ranging from MMK 200 to MMK 355 per day.

Table 4

Fish species	Average markup (MMK per viss)	Transport cost (MMK per day)	Ice cost (MMK per day)	Labour cost (MMK per month)
Rohu	258	22,500-600,000	12,000-1,000,000	1,050,000-2,500,000
Mrigal	225			
Catla	200			
Common carp	200			
Grass carp	200			
Big head carp	200			
Tilapia	100			

Table 5

Fish species	Average markup (MMK per viss)	Ice cost (MMK per day)
Rohu	1,320	500-3,000
Mrigal	2,400	
Catla	2,900	
Tilapia	467	
Small indigenous species	2,000	

Processors in Shwebo reported obtaining profit margins of 15-17%. This was for fish balls, salted fish and pickled fish. One fish processor in Shwebo stated that he obtained profits of MMK 200-300 per viss on fish balls and pickled fish.

Hatcheries and Nurseries

It was reported that there were no farms that only nursed fish (i.e. nurseries) in Shwebo; those farms that were nursing fish in Shwebo were all hatcheries. Those interviewed revealed the main species to be rohu, striped river catfish, pacu, catla and common carp. Hatcheries (DoF and private) were found to also be nursing a variety of silver barb called "tarpium", which is imported from Thailand. Hilly hilsa was observed in the case of a private hatchery. The hatcheries also noted that the demand for fish seed had been increasing in the last three years, with the demand for striped river catfish and pacu, as well as silver barb 'tarpium', rising most quickly.

The broodstock of the DoF hatchery and one private hatchery were reported to have been sourced from China and India, while the main sources of technical advice were technicians from the DoF, the MFF and other private hatcheries. Another private hatchery reported hearing about genetically improved farmed tilapia (GIFT) being sold in the township, but this was unverified. All indicated that the demand for fish seed in Shwebo Township was fully met by Shwebo hatcheries.

The main constraints according to hatchery interviews were: (1) unstable fish feed prices; (2) a lack of insurance for the fish production value chain in general; (3) difficulty with obtaining permission for fish farms; and (4) a lack of access to export markets for Shwebo fish farmers.

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Other Observations

- Vendors typically did not bear the cost of transporting fish to local markets.
- There was considerable variation in the amount of ice used by vendors at local markets, ranging from 10 lbs to 1,500 lbs per day.
- No vendors, traders or processors reported using chemical preservatives.
- Both the DoF and MFF reported the existence of livestock feed and medicine shops. The DoF also noted the existence of shops selling rice bran and peanut cake (used for on-farm feeds), as well as specialist shops selling imported fish farming products from China and Thailand, but were not able to specify what these products were.
- No concerns were voiced about gender-specific challenges faced by traders or processors.
- No concerns were voiced about the climate resilience of fish in Shwebo.

7. Recommendations

In this section, we present recommendations coming out of the value chain study in Shwebo. These are aimed at different levels of the fish value chain in Shwebo.

Input Supply

Recommendation: Establish Mono Sex Tilapia Hatchery

The establishment of a mono sex tilapia hatchery in Shwebo that supplies all-male tilapia seed can help farmers achieve better growth. Fish farmers in Shwebo currently purchase mixed-sex male and female tilapia seed. This leads to unintended breeding and, as a result, overcrowded ponds. The mono sex technique involves delivering feed containing sex hormones to tilapia seed before sex is determined.

Recommendation: Promote Fish That Grow Quickly

Fish species that reach a marketable size in a shorter amount of time (e.g. tilapia and silver barb, which take about four to six months) should be promoted among hatcheries in the township.

Production

Recommendation: Promote Backyard Fish Farms

Currently, fish farms smaller than 25 by 50 feet do not need to obtain permission or require a licence to operate and thus are not constrained by the land use policy in Myanmar. Small backyard fish farms could thus be promoted by the project. These fish farmers should receive training from INLAND MYSAP as well as support with access to inputs (seed, feed, etc.).

Recommendation: Promote Farming of Giant Freshwater Prawn

Giant freshwater prawn (*Macrobrachium rosenbergii*) should be promoted among local fish farmers. Giant freshwater prawn has strong commercial potential overseas, which could allow local fish farmers to tap lucrative export markets. To begin with, seed could be sourced from Yangon. Eventually, once a market is established, local hatcheries could begin producing giant freshwater prawn seed as well. There are, however, constraints to be overcome in giant freshwater prawn hatcheries in Myanmar, which have biosecurity issues and high losses due to disease.

Collection

Recommendation: Build Common Cold Storage Facility for Traders

Traders can purchase shares in a common cold storage facility that would enable them to freeze their fish until they are ready for sale. This could enable traders to reduce their individual expenditure on ice, as the storage facility would be able to purchase ice in bulk.

Processing

Recommendation: Encourage Production of Fish Snacks Using Locally Farmed Fish

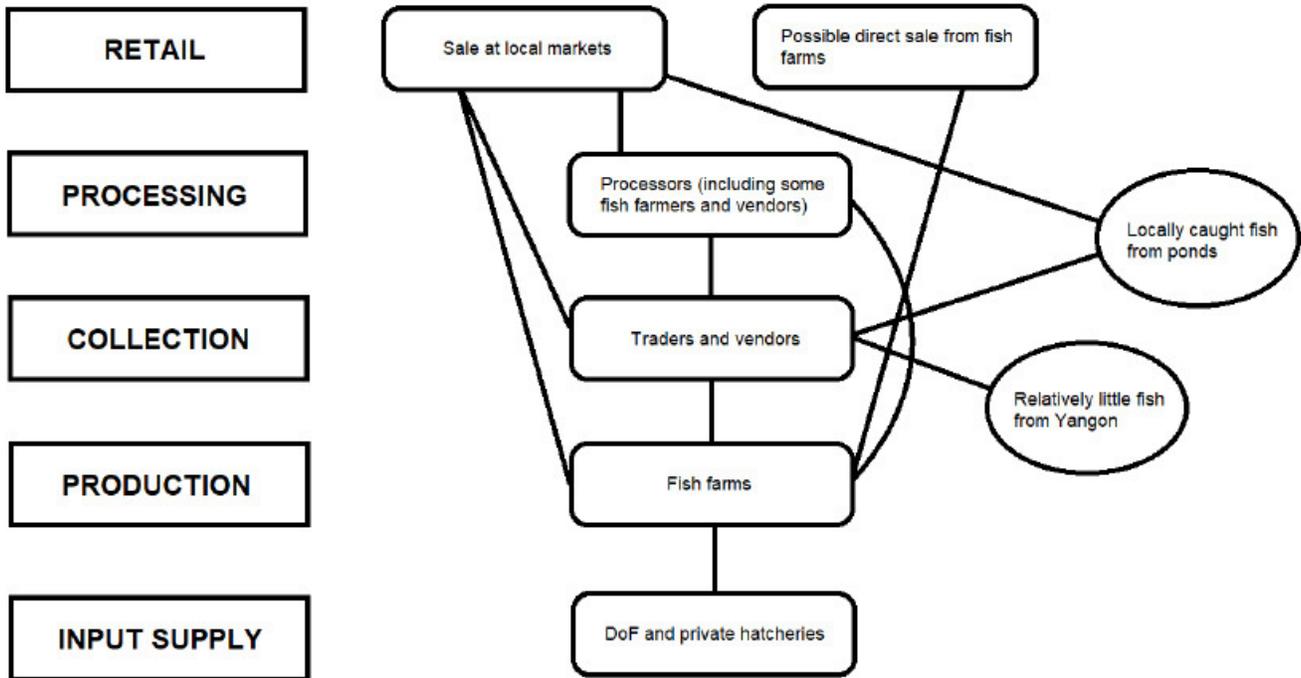
The production of processed snacks made with locally farmed fish could boost both fish consumption as well as create demand for local fish farmers to expand their business. Local processors would need to be trained in the methods of production.

8. Conclusions

Fish farming in Shwebo was relatively developed in comparison with the other townships studied, with 500-800 aquaculture producers. Prominent aquaculture species in the township included: catla, mrigal, common carp, grass carp and tilapia. Small indigenous species were sold in small quantities, with some reportedly originating in fish farms. According to traders, 90% of all fish in the township was farmed and the percentage was increasing. Locally farmed fish was also supplied to other townships, but export opportunities have not as yet been explored.

Important challenges include bad-quality roads, which affect the collection level of the value chain, and the land use policy in Myanmar. Hatcheries in the township noted unstable fish feed prices and a lack of insurance as particular challenges. Recommendations relate to the type of fish seed that is available in the township, backyard fish farming, cold storage and promotion of processed fish. Notably, processors revealed that they have the resources and will to produce fish snacks, but they do not possess the technical knowledge to do so.

Annex A: Fish Value Chain Map for Shwebo



Annex B: Photos from Field Mission



Figure 11: A Hatchery in Shwebo



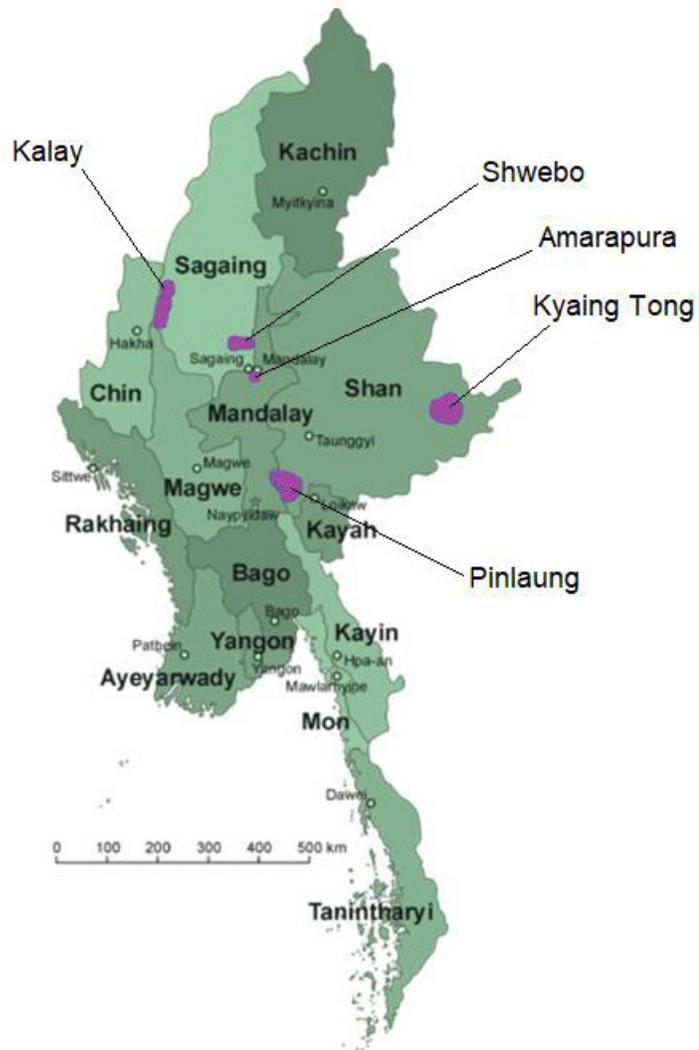
Figure 12: Operations of a Trader in Shwebo



Figure 13: Fish Belonging to a Trader in Shwebo

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Annex C: Map of Project Areas



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Annex D: Value Chain Questionnaires

MARKET QUESTIONNAIRE

Section A: Basic Information

Date of interview: __/__/__

Name of interviewer: _____

Name of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

Respondent identification number: __-__

Location of market: _____

Township of market (select one): Kalay / Amarapura / Kyaing Tong / Pin Laung / Shwebo

Frequency of market (select one): daily / weekly / every two weeks / monthly / other (specify: _____)

Section B: Sales

Product	1. On a typical day in the last month, how much [product] did you sell?	2. What was the unit used for the previous question?	3. Has this amount increased, decreased or remained the same compared to three years ago?	4. To what extent does this amount vary depending on the season?
Wild-caught fish		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Aquaculture products CHECK AMOUNT AGAINST SUM OF AMOUNTS BELOW		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed rohu		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed catla		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

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Product	1. On a typical day in the last month, how much [product] did you sell?	2. What was the unit used for the previous question?	3. Has this amount increased, decreased or remained the same compared to three years ago?	4. To what extent does this amount vary depending on the season?
Farmed mrigal		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed common carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed silver carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed big head carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Product	1. On a typical day in the last month, how much [product] did you sell?	2. What was the unit used for the previous question?	3. Has this amount increased, decreased or remained the same compared to three years ago?	4. To what extent does this amount vary depending on the season?
Farmed grass carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed tilapia		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Farmed small indigenous species		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Value Chain Report - Shwebo Township

5. Has the amount of farmed fish that you sell increased, decreased or remained the same compared with wild-caught fish in the past three years? Select one.

- a) Increased
- b) Decreased
- c) Remained the same

6. What do you do with the fish that you are unable to sell at the end of the day? Select all that apply.

- a) Try to sell it another day
- b) Consume it
- c) Throw it away
- d) Other (specify: _____)

Section C: Price

Product	7. On a typical day in the last month, what was the average price, in MMK, at which you sold your [product] (per preferred unit)?	8. What was your "preferred unit" in the previous question?	9. Has this amount increased, decreased or remained the same compared to three years ago?	10. To what extent does this amount vary depending on the season?
Rohu		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Catla		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Mrigal		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Value Chain Report - Shwebo Township

Product	7. On a typical day in the last month, what was the average price, in MMK, at which you sold your [product] (per preferred unit)?	8. What was your "preferred unit" in the previous question?	9. Has this amount increased, decreased or remained the same compared to three years ago?	10. To what extent does this amount vary depending on the season?
Common carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Silver carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Big head carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Grass carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Product	7. On a typical day in the last month, what was the average price, in MMK, at which you sold your [product] (per preferred unit)?	8. What was your "preferred unit" in the previous question?	9. Has this amount increased, decreased or remained the same compared to three years ago?	10. To what extent does this amount vary depending on the season?
Tilapia		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Snakeheads		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Small indigenous species		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

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Section D: Supply

11. In the past month, from where did you obtain your fish? Select all that apply.

- a) Self-farmed
- b) Self-caught
- c) Trader
- d) Fish farmer
- e) Fisher
- f) Other (specify: _____)

12. Has the supply of farmed fish in your area increased, decreased or remained the same compared with wild-caught fish in the past three years? Select one.

- a) Increased
- b) Decreased
- c) Remained the same

Section E: Costs

Product	13. If you purchase fish to sell, what was the average price, in MMK, that you paid on a typical day in the last month for [product] (per preferred unit) that you intended to sell?	14. What was your "preferred unit" in the previous question?	15. Has this amount increased, decreased or remained the same compared to three years ago?	16. To what extent does this amount vary depending on the season?
Rohu		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Catla		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Mrigal		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Value Chain Report - Shwebo Township

Product	13. If you purchase fish to sell, what was the average price, in MMK, that you paid on a typical day in the last month for [product] (per preferred unit) that you intended to sell?	14. What was your "preferred unit" in the previous question?	15. Has this amount increased, decreased or remained the same compared to three years ago?	16. To what extent does this amount vary depending on the season?
Common carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Silver carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Big head carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Product	13. If you purchase fish to sell, what was the average price, in MMK, that you paid on a typical day in the last month for [product] (per preferred unit) that you intended to sell?	14. What was your "preferred unit" in the previous question?	15. Has this amount increased, decreased or remained the same compared to three years ago?	16. To what extent does this amount vary depending on the season?
Grass carp		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Tilapia		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all
Small indigenous species		a) Kg b) Viss c) Single piece d) Bunch e) Can f) Other (specify: _____)		a) Very much b) Quite a lot c) A little bit d) Not at all

Value Chain Report - Shwebo Township

17. Do you transport your fish to the market? Select one.

- a) Yes
- b) No

18. If you answered 'Yes' to the previous question, how much do you spend, in MMK, on transporting your fish to the market (per preferred timeframe)?

Answer: _____

19. What was your "preferred timeframe" in the previous question? Select one.

- a) Day
- b) Week
- c) Month
- d) Other (specify: _____)

20. How much ice (in preferred units) do you use to keep your fish cold at the market (per preferred timeframe)?

Answer: _____

21. What was your "preferred unit" in the previous question?

Answer: _____

22. What was your "preferred timeframe" in **20**? Select one.

- a) Day
- b) Week
- c) Month

23. How much do you spend, in MMK, on ice supplies to keep your fish cold at the market (per preferred timeframe)?

Answer: _____

24. What was your "preferred timeframe" in the previous question? Select one.

- a) Day
- b) Week
- c) Month
- d) Other (specify: _____)

25. How much do you spend, in MMK, on chemical preservatives to use on the fish that you sell (per preferred timeframe)?

Answer: _____

26. What was your "preferred timeframe" in the previous question? Select one.

- a) Day
- b) Week
- c) Month
- d) Other (specify: _____)

27. How much do you spend, in MMK, on labour in order to sell fish (per preferred timeframe)?

Answer: _____

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28. What was your "preferred timeframe" in the previous question? Select one.

- a) Day
- b) Week
- c) Month
- d) Other (specify: _____)

29. Can you estimate, in MMK, any other short or long-term costs (e.g. market fees) that you incur in order to sell your fish at the market (per preferred timeframe)?

Answer: _____

30. What was your "preferred timeframe" in the previous question? Select one.

- a) Day
- b) Week
- c) Month
- d) Year
- e) Other (specify: _____)

QUESTIONNAIRE FOR KII WITH PROCESSOR (MALE)

Date of interview: __/__/__

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

1. How prevalent is processing of fish in the area?

2.

- i) What kind of processing do you do (e.g. fish balls, dried fish)?
- ii) What species of fish does this use?
- iii) What is most common in the area?

3.

- i) From where do you source your fish for processing (e.g. self-caught, purchased from fish farmer)?
- ii) What is usually the case in the area?

4.

- i) To whom do you sell your processed fish products – to traders, vendors or consumers?
- ii) What is usually the case in the area?

5.

- i) How prevalent is consumption of processed fish products compared with unprocessed (fresh) fish in the area?
- ii) Has it increased, decreased or stayed the same compared with three years ago?

6.

- i) How profitable are processed fish products compared with unprocessed (fresh) fish?
- ii) Can you give us a sense of your typical profit margin on different types of processed fish products?

7. How much do you spend on chemicals to preserve fish during processing?

8.

- i) How can MYSAP Inland support processors in your area in increasing the sale of processed fish products?
- ii) How about in terms of increasing the consumption of processed fish products?

9. Are there particular challenges faced by male processors that female processors do not face?

QUESTIONNAIRE FOR KII WITH PROCESSOR (FEMALE)

Date of interview: __/__/__

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

1. How prevalent is processing of fish in the area?

2.

iv) What kind of processing do you do (e.g. fish balls, dried fish)?

v) What species of fish does this use?

vi) What is most common in the area?

3.

iii) From where do you source your fish for processing (e.g. self-caught, purchased from fish farmer)?

iv) What is usually the case in the area?

4.

iii) To whom do you sell your processed fish products – to traders, vendors or consumers?

iv) What is usually the case in the area?

5.

iii) How prevalent is consumption of processed fish products compared with unprocessed (fresh) fish in the area?

iv) Has it increased, decreased or stayed the same compared with three years ago?

6.

iii) How profitable are processed fish products compared with unprocessed (fresh) fish?

iv) Can you give us a sense of your typical profit margin on different types of processed fish products?

7. How much do you spend on chemicals to preserve fish during processing?

8.

iii) How can MYSAP Inland support processors in your area in increasing the sale of processed fish products?

iv) How about in terms of increasing the consumption of processed fish products?

9. Are there particular challenges faced by female processors that male processors do not face?

QUESTIONNAIRE FOR KII WITH TRADER (MALE)

Date of interview: __/__/____

Name of interviewer: _____

If not already identified, ask to identify [minor market 1] and [minor market 2].

1.
 - i) Are traders common in your area, or do most fish farmers and fishers sell their fish at the markets themselves?
 - ii) How common is it in your area for traders to also be vendors?
2.
 - i) How common is farmed fish compared with wild-caught fish in your area?
 - ii) Can you give us an estimate of the total number of aquaculture producers in the township?
3.
 - i) Are there any wholesalers in your area that trade in Yangon-farmed fish and fish products? What species of fish and kinds of fish products (e.g. fish balls) are these?
 - ii) How common are these compared with locally farmed versions of the same?
4.
 - i) Has there been an increase in the supply of fish in your area in the past three years?
 - ii) Has there been an increase in the supply of farmed fish compared with wild-caught fish?
 - iii) How have these trends influenced trade and consumption patterns in your area?
5.
 - i) To what extent does the supply of farmed fish in your area vary depending on the season?
 - ii) To what extent does the supply of wild-caught fish in your area vary depending on the season?
6.
 - i) What is the general price at which you buy (1) rohu, (2) mrigal, (3) catla, (4) common carp, (5) big head carp, (6) silver carp, (7) grass carp, (8) tilapia and (9) small indigenous species from fish farmers/fishers?
 - ii) Have these prices increased, decreased or remained stable over the past three years?
 - iii) Do these prices vary depending on the season?
7.
 - i) What is the general price at which you sell (1) rohu, (2) mrigal, (3) catla, (4) common carp, (5) big head carp, (6) silver carp, (7) grass carp, (8) tilapia and (9) small indigenous species to vendors (if you sell to vendors)?
 - ii) Have these prices increased, decreased or remained stable over the past three years?
 - iii) Do these prices vary depending on the season?
8.
 - i) How prevalent is the supply of processed fish products in your area? What kind of products (e.g. fish balls, dried fish) are these?
 - ii) Can you give us a sense of the typical profit margin on different types of processed fish products?
9.
 - i) How much fish do you transport on a "good" day? How much on a "bad" day?

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- ii) How much does this cost? Does the cost vary depending on the season?
- iii) What are the individual costs involved in transporting aquatic products?

10.

- i) Do you use ice to cool your fish? If so, how much do you use on a typical day?
- ii) How much does this cost?

11. How much do you spend on chemical preservatives to use on fish?

12. Can you give us an indication of your total labour cost per month?

13. Can you estimate the main investment costs in establishing yourself as a fish trader? What are they?

14.

- i) Do traders in your area face important logistical challenges?
- ii) What are they and how do you address these?
- iii) Are there particular challenges faced by male traders that female traders do not face?

QUESTIONNAIRE FOR KII WITH TRADER (FEMALE)

Date of interview: __/__/____

Name of interviewer: _____

If not already identified, ask to identify [minor market 1] and [minor market 2].

1.
 - iii) Are traders common in your area, or do most fish farmers and fishers sell their fish at the markets themselves?
 - iv) How common is it in your area for traders to also be vendors?
2.
 - iii) How common is farmed fish compared with wild-caught fish in your area?
 - iv) Can you give us an estimate of the total number of aquaculture producers in the township?
3.
 - iii) Are there any wholesalers in your area that trade in Yangon-farmed fish and fish products? What species of fish and kinds of fish products (e.g. fish balls) are these?
 - iv) How common are these compared with locally farmed versions of the same?
4.
 - iv) Has there been an increase in the supply of fish in your area in the past three years?
 - v) Has there been an increase in the supply of farmed fish compared with wild-caught fish?
 - vi) How have these trends influenced trade and consumption patterns in your area?
5.
 - iii) To what extent does the supply of farmed fish in your area vary depending on the season?
 - iv) To what extent does the supply of wild-caught fish in your area vary depending on the season?
6.
 - iv) What is the general price at which you buy (1) rohu, (2) mrigal, (3) catla, (4) common carp, (5) big head carp, (6) silver carp, (7) grass carp, (8) tilapia and (9) small indigenous species from fish farmers/fishers?
 - v) Have these prices increased, decreased or remained stable over the past three years?
 - vi) Do these prices vary depending on the season?
7.
 - iv) What is the general price at which you sell (1) rohu, (2) mrigal, (3) catla, (4) common carp, (5) big head carp, (6) silver carp, (7) grass carp, (8) tilapia and (9) small indigenous species to vendors (if you sell to vendors)?
 - v) Have these prices increased, decreased or remained stable over the past three years?
 - vi) Do these prices vary depending on the season?
8.
 - iii) How prevalent is the supply of processed fish products in your area? What kind of products (e.g. fish balls, dried fish) are these?
 - iv) Can you give us a sense of the typical profit margin on different types of processed fish products?
9.
 - iv) How much fish do you transport on a "good" day? How much on a "bad" day?

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- v) How much does this cost? Does the cost vary depending on the season?
 - vi) What are the individual costs involved in transporting aquatic products?
- 10.
- iii) Do you use ice to cool your fish? If so, how much do you use on a typical day?
 - iv) How much does this cost?
11. How much do you spend on chemical preservatives to use on fish?
12. Can you give us an indication of your total labour cost per month?
13. Can you estimate the main investment costs in establishing yourself as a fish trader? What are they?
- 14.
- iv) Do traders in your area face important logistical challenges?
 - v) What are they and how do you address these?
 - vi) Are there particular challenges faced by female traders that male traders do not face?

QUESTIONNAIRE FOR KII WITH HATCHERY

Date of interview: __/__/____

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

Ask to share data on main costs of breeding/seed production (including different kinds of costs, e.g. feed, water, energy) as well as data on sales price and volume. Ask for separate price and volume data for carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and small indigenous species.

1.
 - i) What are the top three fish species that you breed? (Number 1, 2, 3.)
 - ii) Do you breed/sell seed of carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and/or any small indigenous (local) fish species?
 - iii) What kind of fish seed do you sell (swim-up fry, fry, fingerlings)?
2.
 - i) To how many people did you sell fish seed in this township in the last year?
 - ii) Do you supply farmers outside the township? If yes, where?
3.
 - i) Approximately how many fry did you sell in the last year?
 - ii) What are your top three species in terms of fry sales? (Number 1, 2, 3.)
4.
 - i) Approximately how many fingerlings did you sell in the last year?
 - ii) What are your top three species in terms of fingerling sales? (Number 1, 2, 3.)
5.
 - i) Are there many other hatcheries in the township supplying fish seed?
 - ii) What percentage of the township demand for seed do you think is supplied from hatcheries within the township? What percentage do you think is supplied from outside?
6.
 - i) In the last three years, have you noticed any increase in the demand for fish seed by farmers for stocking?
 - ii) Are there any species that are becoming more popular in your township?
7.
 - i) How often do you replace your broodstock (parent fish)? Differentiate between species.
 - ii) Where do you get replacement broodstock from (e.g. another farm, DoF)? Differentiate between species.
 - iii) What is the country of origin of your broodstock? Differentiate between species.
8. What is your main source of technical advice?

9.
 - i) Have you heard of anyone producing/selling genetically improved fish seed of any kind? How about specifically carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and/or small indigenous species?
 - ii) If yes, is demand strong?
10. What do you think are the main constraints for hatcheries, nurseries and grow-out farms in your township?

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QUESTIONNAIRE FOR KII WITH NURSERY

Date of interview: __/__/__

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

Ask to share data on main costs of nursing (including different kinds of costs, e.g. seed and feed, water, energy) as well as data on sales price and volume. Ask for separate price and volume data for carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and small indigenous species.

1.
 - iv) What are the top three fish species that you nurse? (Number 1, 2, 3.)
 - v) Do you nurse/sell seed of carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and/or any small indigenous (local) fish species?
 - vi) What kind of fish seed do you sell (swim-up fry, fry, fingerlings)?
2.
 - iii) To how many people did you sell fish seed in this township in the last year?
 - iv) Do you supply farmers outside the township? If yes, where?
3.
 - iii) Approximately how many fry did you sell in the last year?
 - iv) What are your top three species in terms of fry sales? (Number 1, 2, 3.)
4.
 - iii) Approximately how many fingerlings did you sell in the last year?
 - iv) What are your top three species in terms of fingerling sales? (Number 1, 2, 3.)
5.
 - iii) Are there many other nurseries in the township supplying fish seed?
 - iv) What percentage of the township demand for seed do you think is supplied from nurseries within the township? What percentage do you think is supplied from outside?
6.
 - iii) In the last three years, have you noticed any increase in the demand for fish seed by farmers for stocking?
 - iv) Are there any species that are becoming more popular in your township?
7.
 - i) Which hatchery/ies do you buy the fish seed that you nurse from? Differentiate between species.
 - ii) Is any of the seed from outside the township or even from another country?
8. What is your main source of technical advice?
- 9.

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- iii) Have you heard of anyone producing/selling genetically improved fish seed of any kind? How about specifically carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and/or small indigenous species?
- iv) If yes, is demand strong?

10. What do you think are the main constraints for nurseries and grow-out farms in your township?

QUESTIONNAIRE FOR KII WITH DOF

Date of interview: __/__/__

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

If not already identified, ask to identify [minor market 1] and [minor market 2].

Ask for a list of any private hatcheries and nurseries and DoF hatcheries and nurseries in the area, together with their contact details.

Ask to share any data on production, sales volume and price of fish in the area. If possible, data should differentiate between carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and small indigenous species and between farmed (locally farmed, Yangon-farmed) and wild-caught fish.

1. Can you give us an estimate of the total number of aquaculture producers in the township?

2.
 - i) Do you think the amount of wild fish being caught in the township is going up or down?
 - ii) Do you think the total amount of farmed fish and the proportion of farmed fish in the market is increasing in the township?
 - iii) How have these trends influenced trade and consumption patterns in your area?

3. If there has been an increase in fish from aquaculture in the area, has the price of fish at local markets remained stable, lowered or increased?

4.
 - i) Are local fish farmers and traders facing important logistical challenges to supply their products to the market?
 - ii) What are they and how do they address these?

5.
 - i) How is local fish farming positioned compared to the wild-caught and Yangon-farmed fish supply in your area?
 - ii) What are the main interrelations between these three supply chains?

6.
 - i) What are the main types of fish processing conducted in this township and how do they impact on fish consumption patterns in your area?
 - ii) Are there potential processing activities that MYSAP Inland could support?

7.
 - i) Are there any shops in the area that sell livestock and fish feed and fish-farming products like medicine, fertiliser, etc.? What products do they sell?
 - ii) Are there any specialist shops in the area that sell imported fish-farming products from India, China and/or Thailand? What products do they sell?

- 8.

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- i) What would you say are the main constraints to expanding fish production/sales in the area (e.g. low technology, high price)?
 - ii) What would you say are the main opportunities for expanding fish production/sales in the area (e.g. upcoming policies, extension services)?
9. To what extent do local markets in the township function as redistribution points for regional fish trade and what is their geographical reach?
- 10.
- i) Do you think if people were more aware of the nutritional benefits of eating fish that they would eat more fish?
 - ii) Do you think if people were more aware of the nutritional benefits of eating small indigenous species that they would eat more of these?
- 11.
- i) Are there particular concerns regarding the climate resilience of fish in the area?
 - ii) Do you have suggestions for how MYSAP Inland can contribute to sustainable fish production and consumption in the area?
12. Are there particular challenges faced by female fish farmers/fishers, traders, processors and/or vendors in the area that their male counterparts do not face?
13. Are there particular governance challenges (e.g. land use rights) that hamper aquaculture production and/or fish consumption by low-income people in the area?

QUESTIONNAIRE FOR KII WITH MFF

Date of interview: __/__/____

Name of interviewer: _____

Name of respondent: _____

Position of respondent: _____

Gender of respondent: _____

Phone number of respondent: _____

If not already identified, ask to identify [minor market 1] and [minor market 2].

Ask for a list of any MFF hatcheries and nurseries, other private hatcheries and nurseries and DoF hatcheries and nurseries in the area, together with their contact details.

Ask to share any data on production, sales volume and price of fish in the area. If possible, data should differentiate between carp (rohu, mrigal, catla, common carp, big head carp, silver carp, grass carp), tilapia and small indigenous species and between farmed (locally farmed, Yangon-farmed) and wild-caught fish.

1. Can you give us an estimate of the total number of aquaculture producers in the township?

2.
 - iv) Do you think the amount of wild fish being caught in the township is going up or down?
 - v) Do you think the total amount of farmed fish and the proportion of farmed fish in the market is increasing in the township?
 - vi) How have these trends influenced trade and consumption patterns in your area?

3. If there has been an increase in fish from aquaculture in the area, has the price of fish at local markets remained stable, lowered or increased?

4.
 - iii) Are local fish farmers and traders facing important logistical challenges to supply their products to the market?
 - iv) What are they and how do they address these?

5.
 - iii) How is local fish farming positioned compared to the wild-caught and Yangon-farmed fish supply in your area?
 - iv) What are the main interrelations between these three supply chains?

6.
 - iii) What are the main types of fish processing conducted in this township and how do they impact on fish consumption patterns in your area?
 - iv) Are there potential processing activities that MYSAP Inland could support?

7.
 - iii) Are there any shops in the area that sell livestock and fish feed and fish-farming products like medicine, fertiliser, etc.? What products do they sell?
 - iv) Are there any specialist shops in the area that sell imported fish-farming products from India, China and/or Thailand? What products do they sell?

- 8.

Value Chain Report - Shwebo Township

- i) What would you say are the main constraints to expanding fish production/sales in the area (e.g. low technology, high price)?
 - ii) What would you say are the main opportunities for expanding fish production/sales in the area (e.g. better technologies, improved access to finance)?
9. To what extent do local markets in the township function as redistribution points for regional fish trade and what is their geographical reach?
- 10.
- iii) Do you think if people were more aware of the nutritional benefits of eating fish that they would eat more fish?
 - iv) Do you think if people were more aware of the nutritional benefits of eating small indigenous species that they would eat more of these?
- 11.
- iii) Are there particular concerns regarding the climate resilience of fish in the area?
 - iv) Do you have suggestions for how MYSAP Inland can contribute to sustainable fish production and consumption in the area?
12. Are there particular challenges faced by female fish farmers/fishers, traders, processors and/or vendors in the area that their male counterparts do not face?
13. Are there particular governance challenges (e.g. land use rights) that hamper aquaculture production and/or fish consumption by low-income people in the area?