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DEUTSCHE ZUSAMMENARBEIT

INLAND MYSAP

MYSAP
Myanmar Sustainable Aquaculture Programme
မြန်မာရေသတ္တဝါမွေးမြူရေးကဏ္ဍရေရှည် ဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်း

Value Chain Report - Amarapura

DEPARTMENT OF FISHERIES MYANMAR

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

WorldFish

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.

Value Chain Report – Amarapura Township

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?

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?

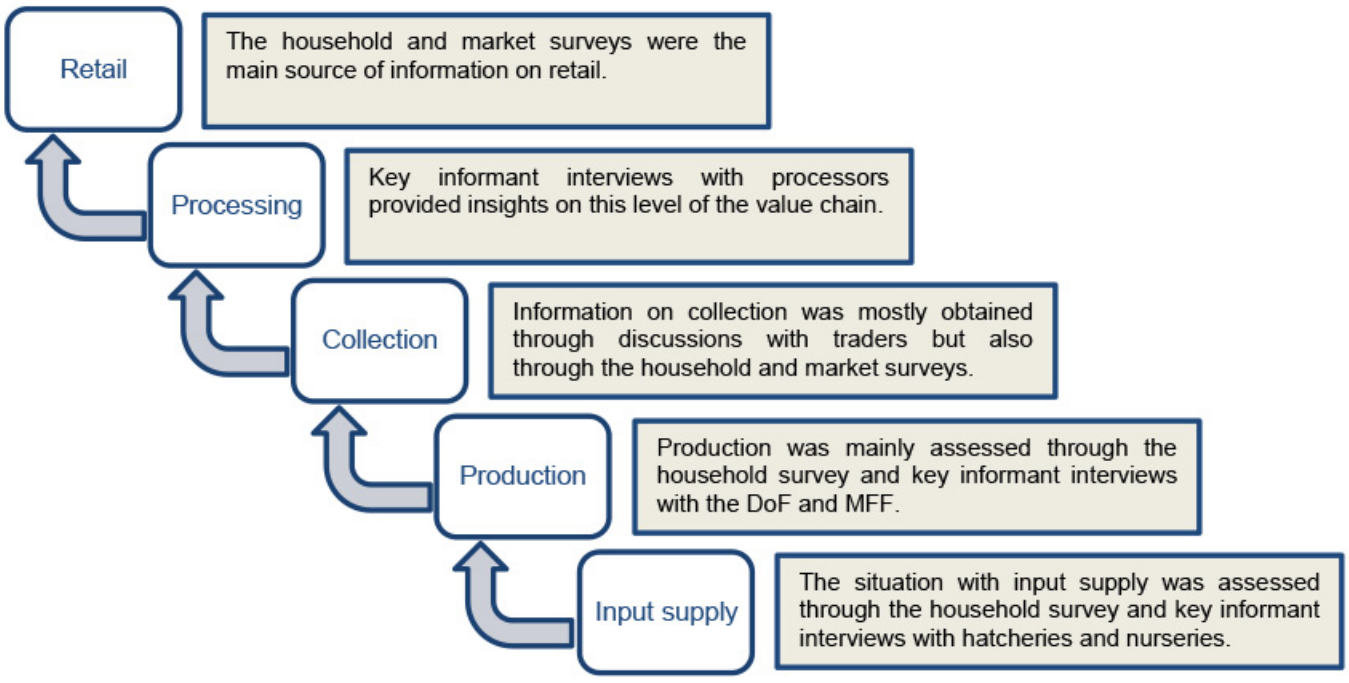
Sub-question 4: How is local fish farming positioned compared to the wild-caught and Yangon-farmed fish supply? What are the main interrelations between these three supply chains?

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).

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 189 were sampled from Amarapura 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 Amarapura value chain study were comprised of key informant interviews (KIIs) and a focus group discussion (FGD). A KII is a conversation with a relevant individual conducted by trained staff that usually collects specific information about one person. An FGD involves gathering people from similar backgrounds or experiences to discuss a specific topic of interest. 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	24/04/2018	Mandalay
KII	MFF	24/04/2018	Mandalay
KII	DoF hatchery	24/04/2018	Mandalay
KII	Private nursery	26/04/2018	Amarapura
KII	Processor (female)	28/04/2018	Amarapura
KII	Trader (female)	30/04/2018	Amarapura
FGD	Traders (2 male, 3 female)	30/04/2018	Amarapura

3. Value Chain Map

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

4. Market Information

Market information was collected from the following two market locations: Thein Gyi (major market) and Nan Yadanar (minor market). The following map marks these locations. Randomly selected vendors accounted for roughly 20% and 40% of traded volumes at Thein Gyi and Nan Yadanar Markets, respectively, on the day of visit. All vendors randomly selected for interview turned out to be female, suggesting that Amarapura vendors were usually female.

Fish Sales

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

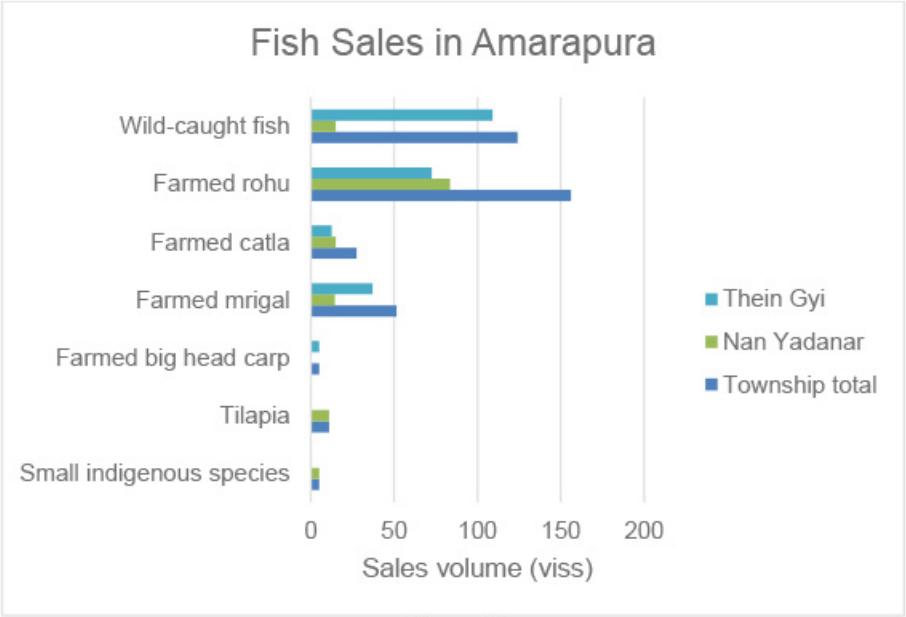


Figure 1

Wild-caught fish found in the township included: tilapia, mrigal, snakeheads (multiple varieties), *Wallago attu* and small indigenous species. The small indigenous species observed consisted of mainly mola carplet and spotted barb, with very small quantities of Malabar loach found as well. Farmed fish brought from Thiri Marlar wholesale market in Mandalay included: rohu, catla, mrigal and big head carp. Small quantities of tilapia were sold by two vendors in Nan Yadanar market – these were wild-caught from Taungthaman Lake and Ayeyarwady River. No farmed small indigenous species were observed, with only wild-caught varieties being sold in local markets.

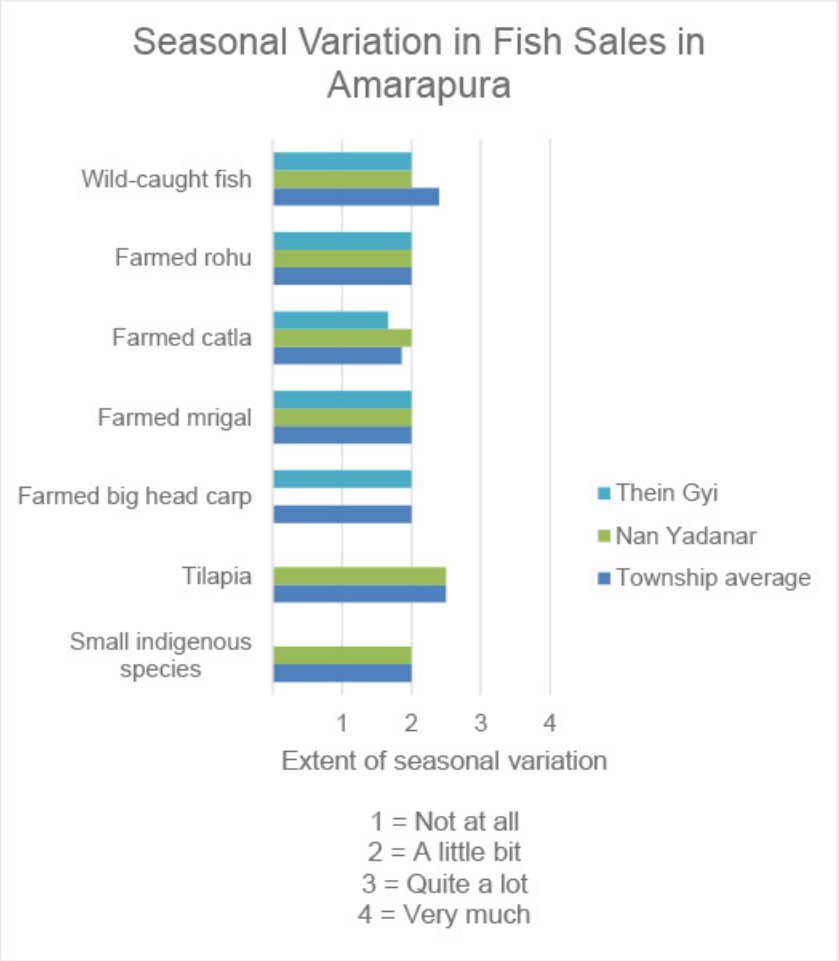


Figure 2

Seasonal Variation

Figure 2 depicts the extent of seasonal variability in sales of different kinds of fish in Amarapura 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 both markets.

There were few local fish farms, so consumption of local fish was noted to be very seasonal and comprised mainly of wild-caught fish only. It was mentioned that during the rainy season seasonal fishers rent land adjacent to the Ayeyarwady River from landowners. During peak season, some fisher families catch up to 200 viss of fish per day. Some of the fishers sell their fish to vendors; others sell the fish they catch themselves.

Fish Prices

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

Mrigal, which is typically a farmed fish brought in from Mandalay, fetches the highest prices – even higher than locally wild-caught snakehead species.

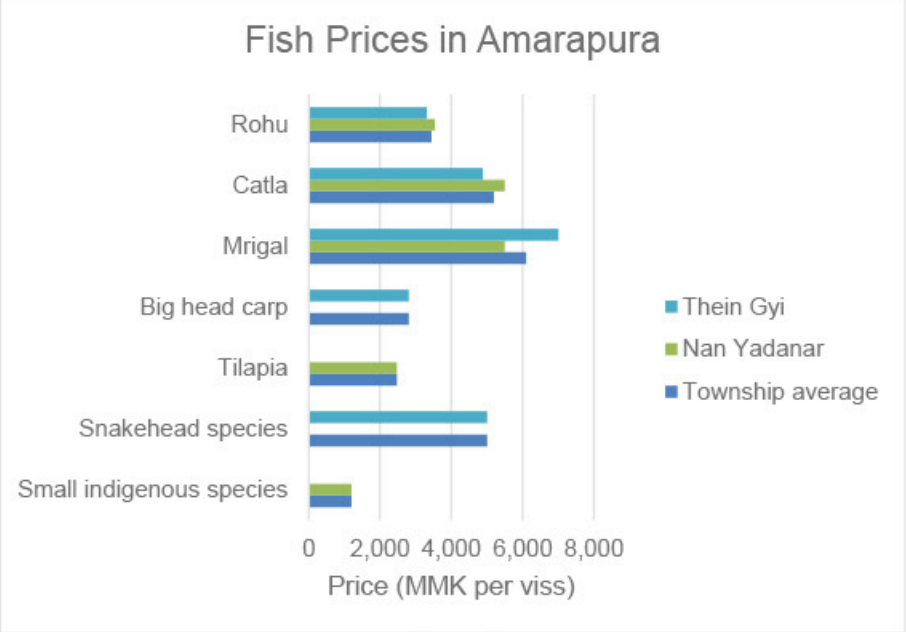


Figure 3

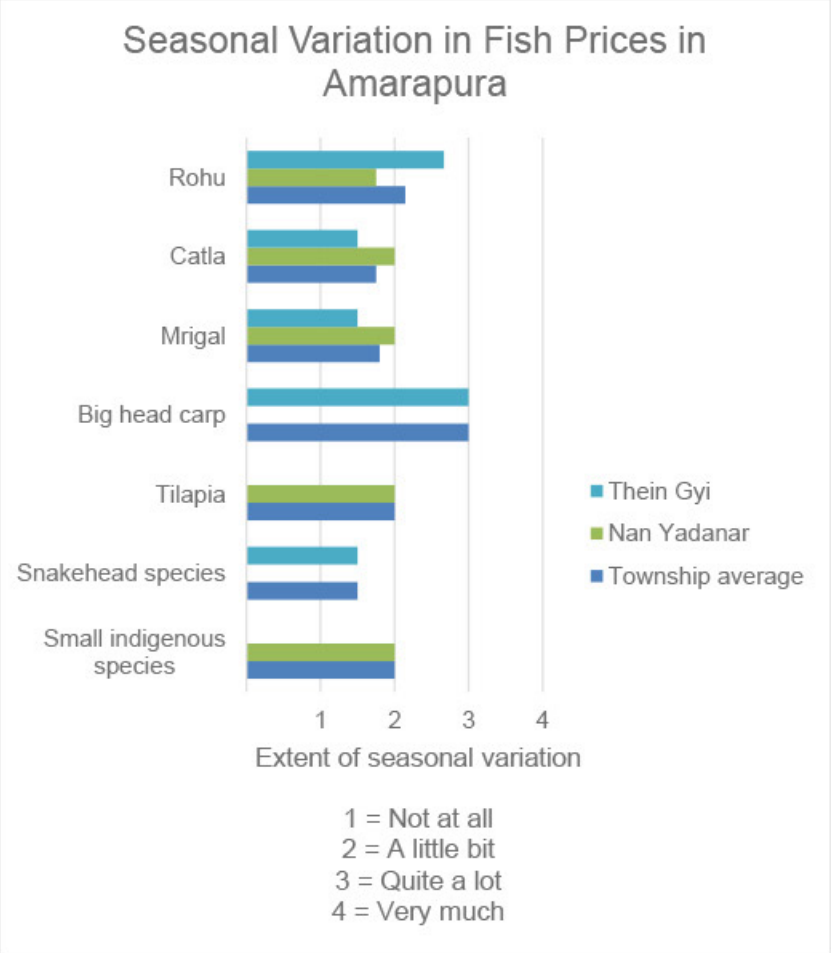


Figure 4

Seasonal Variation

Figure 4 depicts the extent of seasonal fish price variation in Amarapura using the same four-point Likert-type scale as Figure 2.

Surprisingly, wild-caught snakehead species were reported to exhibit the least seasonal price variation among the fish species of interest. On the other hand, big head carp in Thein Gyi was reported to have the greatest seasonal price variation.

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

The lack of significant local fish farming and a potential decline in the supply of farmed fish from external sources present an opportunity for local fish farming to replace wild-caught or externally sourced fish and contribute to an increase in fish consumption, particularly during months when wild capture is low. The township already consumes more meals per week containing fish than the other four townships studied, with an average of 4.56.

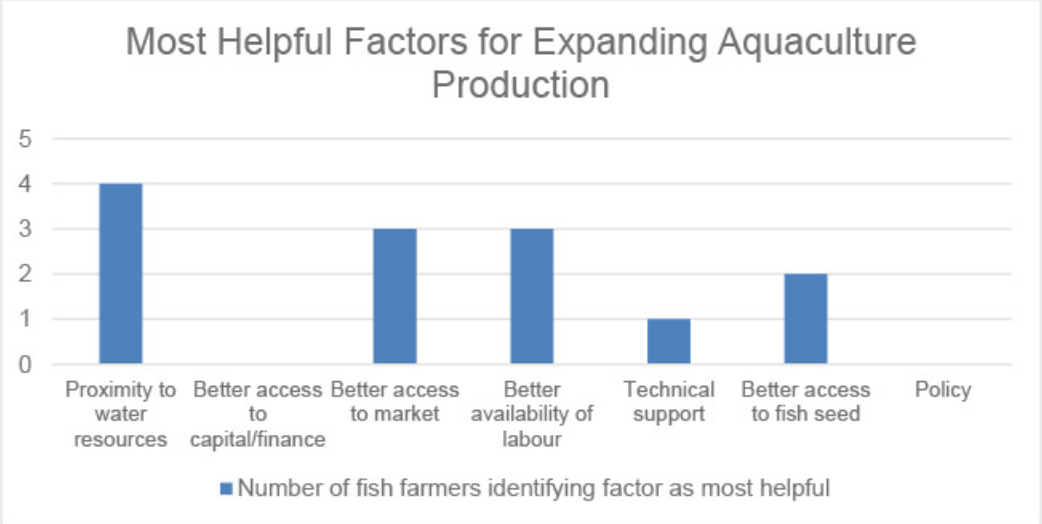


Figure 5

It was mentioned that inadequate water supply was a key constraint preventing households from taking up fish farming. As per the DoF, another challenge is the current land use policy (La Ya 30), which makes it difficult to legally convert paddy fields into fish farms or rice-fish systems. Moreover, there is a lack of insurance to protect against losses from fish farming, as pointed out by the MFF. The household data, on the other hand, revealed that those fish farmers that do exist in Amarapura perceive proximity to water resources, better market access and better availability of labour as most helpful for expanding their aquaculture production (see Figure 5). These challenges need to be addressed if local fish farming is to successfully replace wild-caught or externally sourced farmed fish.

Sub-question 1: Changes in Supply of Farmed Fish

According to traders, the DoF and the MFF, there were no aquaculture producers in the township, so there was no supply of locally farmed fish. The household survey, however, found five households engaged in fish farming activities. A DoF hatchery interviewed in Mandalay and a private nursery in Amarapura also reported selling fish seed to

Amarapura fish farmers. The former recalled selling to about 50 different people from Amarapura in the past year, while the latter sold fish to 14-15 individuals from the township in the past year.

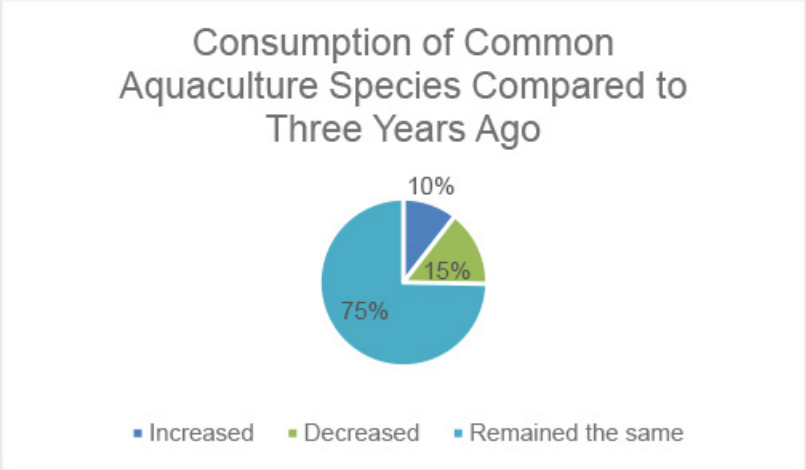


Figure 6

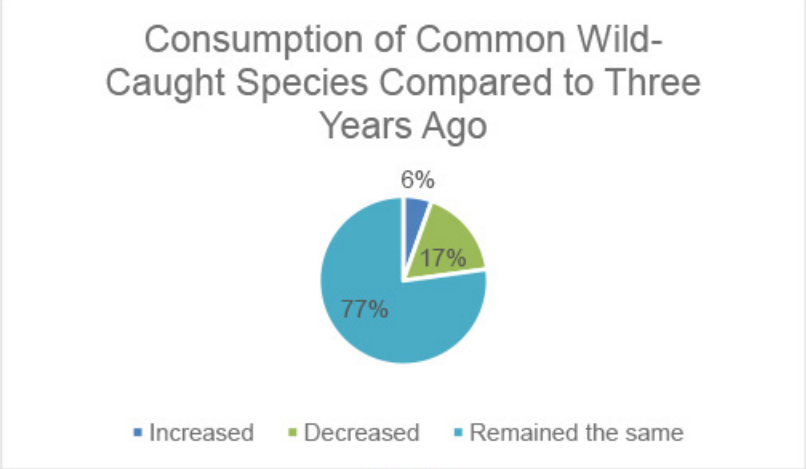


Figure 7

The DoF and MFF suggested that the supply of wild-caught fish was declining and that there had been no change in the supply of farmed fish from outside the township. Interestingly, the market survey revealed that vendors were witnessing a decrease in the supply of farmed fish relative to wild-caught fish. The implication was that total trade in fish may be declining as a result of decreases in the supply of both wild-caught and externally farmed fish[1], with the latter perhaps declining at a faster rate. However, consumption has concomitantly decreased for only a minority of households, since the household data revealed that the majority of households believe their consumption of common aquaculture and wild-caught species had remained constant over the past three years (see Figures 6 and 7).

Sub-question 2: Changes in Market Price of Fish

The gathered evidence suggested that there had not been an increase in fish from aquaculture in the area.[2] The market survey revealed that perceptions of changes in the market price of fish species over the past three years were mixed,

[1] The five Amarapura fish farmers in the household survey indicated that production remained the same, except for a decrease in mrigal production in the case of a single farmer.
[2] It was estimated that 958 viss of aquaculture products were traded in Amarapura markets on a typical day in the last month.

although leaning towards decreases, as can be seen in Table 2. However, a focus group discussion held with traders as well as an interview with the DoF Amarapura Township Officer suggested that prices had increased somewhat, which would be in line with a decrease in the availability of fish in the township.

Table 2

Change in price compared to three years ago (% of responses)	Fish						
	Rohu	Catla	Mrigal	Big head carp	Tilapia	Snakehead species	Small indigenous species
Increased	14%	12%	0%	100% (single vendor)	0%	50%	0%
Decreased	29%	38%	60%	0%	100% (two vendors)	50%	100% (single vendor)
Remained the same	57%	50%	40%	0%	0%	0%	0%

Figure 8: Thiri Marlar Wholesale Market in Mandalay

Sub-question 3: Logistical Supply Challenges

Where applicable, the five fish farmers in the household survey all indicated "quite easy" or "very easy" in response to questions assessing challenges posed in the transportation of fish to the point of sale or the use of ice before sale. Amarapura traders reported no logistical challenges as such in qualitative interviews. The fact that the township is small and relatively well connected might explain why no logistical challenges were found.

Sub-question 4: Comparisons Between Supply Chains

There were very few local fish farmers in Amarapura. Fish vendors in Amarapura were found to rely heavily on mostly farmed fish from Thiri Marlar – a wholesale market in Mandalay – particularly during the dry season, when wild-caught fish are scarce. During the rainy season (June-October), Amarapura vendors also obtain wild-caught fish from local seasonal traders. Wild fish in Amarapura are typically caught from Taungthaman Lake and the Ayeyarwady River. The price of farmed fish was reported to be stable across the year and generally lower than wild-caught fish, which increase in price during the dry season.

Sub-question 5: Prevalence of Fish Processing

A processor interviewed in Amarapura reported that fish balls made from farmed rohu[3] were the usual form of processing in the township, and was typically done by females. She herself purchased rohu from fish farms in Mandalay and sold her fish balls directly to consumers. According to her, fish balls were widely consumed in the township – even more so than fresh fish. However, the household survey found that consumption of processed fish (4.41 meals containing processed fish per week, on average) was relatively high when compared with other townships – only Kalay consumed more processed fish (6.28 meals per week) – but had a slightly higher corresponding figure for fresh fish consumption (4.56 meals per week). None of the five fish farming households in the household survey reported doing fish processing of any kind.

6. Additional Findings

In this section, we report additional findings from the field mission to Amarapura. We include estimates of price mark-ups along the value chain.

Price Mark-ups

Traders' mark-ups ranged from MMK 350 to MMK 750 per viss as displayed in Table 3. Bizarrely, the average mark-up for tilapia was cited to be 0. Whilst transport costs for traders ranged from MMK 3,000 to MMK 60,000, this equates to a range of only MMK 10 to MMK 12 per viss. Comparatively, there was more variation in the cost of ice, which ranged from MMK 17 to MMK 50 per lb from trader to trader.

Table 3

Fish species	Average markup (MMK per viss)	Transport cost (MMK per day)	Ice cost (MMK per day)	Labour cost (MMK per month)
Rohu	350	3,000-60,000	15,000-100,000	1,500,000
Mrigal	750			
Catla	500			
Snakehead	750			
Tilapia	0			

As has been seen in other townships, vendors posted higher mark-ups than traders, as can be seen in Table 4. The highest mark-ups were observed in the case of catla and mrigal. Daily ice costs for vendors were found to vary mildly from MMK 1,500 to MMK 2,500, while labour costs per day ranged from MMK 1,500 to MMK 16,000. Municipal fees across the surveyed markets were found to range from MMK 200 to MMK 550.

[3] It was indicated that 2.5 viss of rohu was required to make one viss of fish balls.

Table 4

Fish species	Average markup (MMK per viss)	Ice cost (MMK per day)	Labour cost (MMK per day)
Rohu	1,271	1,500-2,500	1,500-16,000
Mrigal	2,167		
Catla	2,329		
Big Head carp	1,000		
Tilapia	966		
Small indigenous species	400		

Hatcheries and Nurseries

There were no hatcheries in Amarapura Township. A staff member from the DoF Nad Yay Kan Hatchery was interviewed in Mandalay, which reported breeding mainly rohu, silver carp and big head carp. Striped river catfish and grass carp were also bred at the hatchery. They sold fish seed to fish farmers from Amarapura Township (approximately 50 in the past year) as well as Kyaukpadaung Township and Taungdwingyi Township. They also provided fish seed for restocking of natural ponds. The hatchery sold 5,000,000 fry and 2,200,000 fingerlings in the last year. The demand for rohu has been the strongest among the fish species. The hatchery also reported selling genetically improved rohu fingerlings, which were nursed from fry purchased from a hatchery in Patheingyi Township. They have obtained technical advice from China, India and Israel, as well as local sources.

There was only one nursery in Amarapura Township, which was a private nursery.[4] They nursed and sold rohu, catla and silver carp fingerlings. They purchased most of their fry from the Mandalay DoF hatchery and some from the Madara DoF hatchery. They sold fingerlings to 14-15 fish farmers, who came from Madara Township and Shwebo Township, in the past year. DoF technicians were their main source of technical advice.

Other Observations

- No vendor interviewed had to bear the cost of transporting their fish to the market.
- Nine out of 10 vendors interviewed used ice to keep fish cool at the market.
- No one (vendors, traders or processors) reported using chemical preservatives.
- According to both the DoF and MFF, there were no specialised fish farming or fish feed shops in the area. There were, however, shops which sold livestock feeds and medicines.
- No concerns were voiced about gender-specific challenges faced by traders or processors.
- No concerns were voiced about the climate resilience of fish in Amarapura.

7. Recommendations

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

Input Supply

Recommendation: Establish Mono Sex Tilapia Hatchery
The establishment of a mono sex tilapia hatchery in Amarapura that supplies all-male tilapia seed can help farmers

[4] There was, however, a DoF nursery in Mandalay.

achieve better growth. Fish farmers in Amarapura 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.

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: Reintroduce Tender System at Taungthaman Lake

Taungthaman Lake fishing lot was previously tendered out by local authorities. When this was the case, tender owners would engage in restocking of fish in the lake as well as regular feeding. According to the DoF and MFF, the volume of fish captured from the lake has decreased since the tender system has stopped and, as a result, there is no longer restocking and general management of fish in the lake.

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.

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.

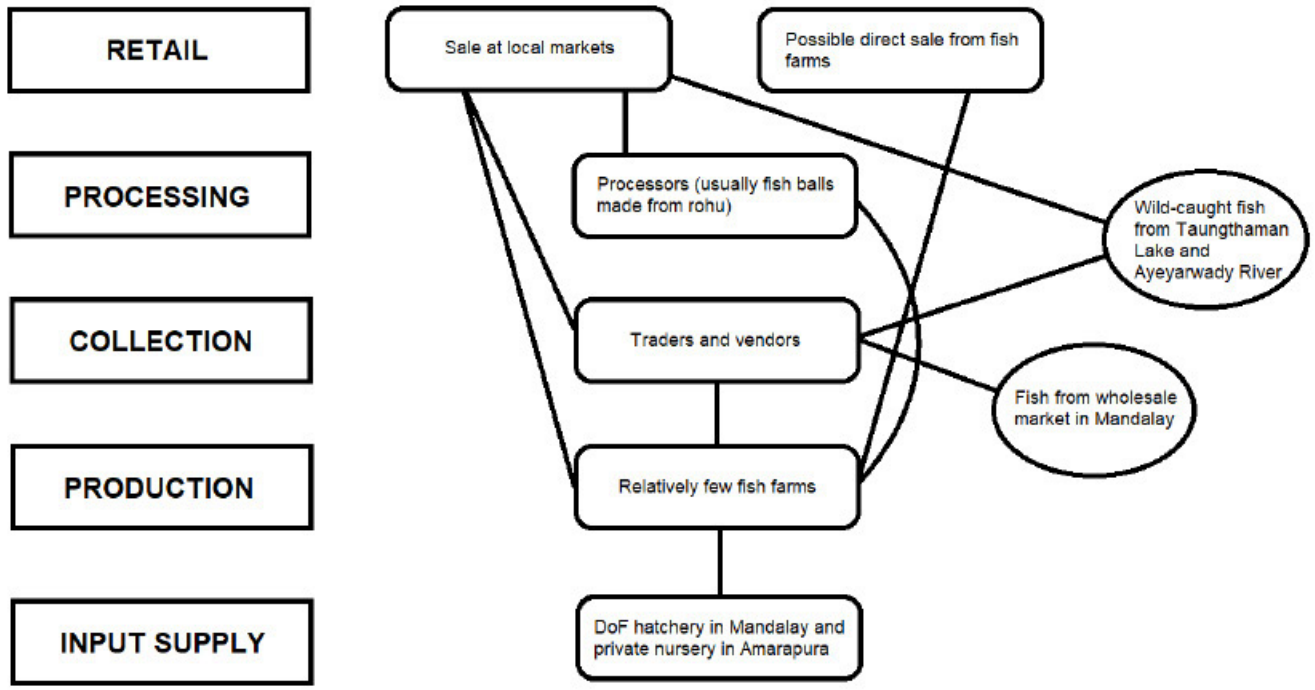
8. Conclusions

Amarapura's aquaculture sector is still nascent, so consumption of local fish comprises mainly of wild-caught fish. Wild-caught fish found in the township include: tilapia, mrigal, snakeheads (multiple varieties), *Wallago attu* and small indigenous species. These are caught from either Taungthaman Lake or the Ayeyarwady River. The small indigenous species observed in the market survey consisted of mola carplet and spotted barb, with very small quantities of Malabar loach found as well. Farmed fish was typically brought from Thiri Marlar wholesale market in Mandalay. These included: rohu, catla, mrigal and big head carp.

It is notable that the township appeared to consume more fish on average than the other townships studied. Despite this, it was reported that households are reluctant to take up fish farming because of inadequate water supply. Other challenges include Myanmar's land use policy and a lack of insurance. Recommendations include promotion of backyard farming and reintroduction of a tender system at Taungthaman Lake. Production of fish snacks could help

diversify fish processing in the township, which is currently dominated by production of fish balls using farmed rohu. It was found that processed fish is consumed almost as much as fresh fish in the township.

Annex A: Fish Value Chain Map for Amarapura



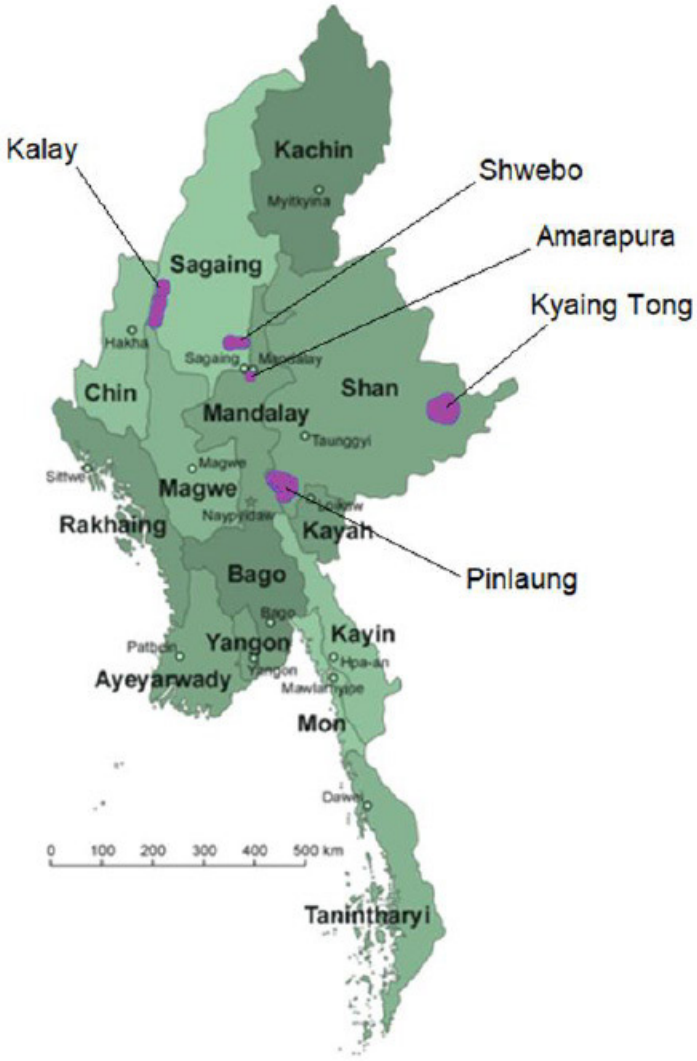
Annex B: Photos from Field Mission

Figure 9: Interview with Amarapura Nursery Owner

Figure 10: Thiri Marlar Wholsale Market in Mandalay

Figure 11: Interview with Mandalay DoF

Annex C: Map of Project Areas



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

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

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

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

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

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

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: _____

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 FGD WITH TRADERS (MALE)

Date of interview: __/__/____

Name of interviewer: _____

Ask to fill out FGD Attendance List.

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?
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 FGD WITH TRADERS (FEMALE)

Date of interview: __/__/____

Name of interviewer: _____

Ask to fill out FGD Attendance List.

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?
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?

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.

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.

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.

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?