Gulf of Mottama Project

Rapid Assessment of Small-Scaled Processed Fish Production in Mon State of the Gulf of Mottma

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December, 2023

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Gulf of Mottama Project

Rapid Assessment of Small-Scaled Processed Fish Production in Mon State of the Gulf of Mottama

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Report No: TR-092023

Submission Date: 19 December 2023

EXECUTIVE SUMMARY

The study conducted interview with 40 processed fishery producers and 9 sub-collectors from four villages within Mon State in the Gulf of Mottama (GoM) to understand the complex value chain, community dependency, and future directions for further development of the production systems. The processed fishery products processed and marketed in the region are dried shrimp, dried fish, salted fish and fish paste but the production rate and dependency varied across the study villages. The variations are influenced by fishing gear, fish species, and village location. For example, Zee Gone and Ah Lat (A Nauk Paing) heavily depends on the production of processed fish products whereas Wae Pa Tan has lower dependency. Dried shrimp production reportedly contributed as an important source of income for Small-scaled Fisheries (SSF) communities in Zee Gone and Ah Lat (A Nauk Paing), while salted fish is more important in Koe Tae Su. However, the dried fish are producing opportunistically in all study villages.

The value chain is simply composed of processed fishery products producers, collectors, or traders (in village, township, and city levels), and consumers. Throughout the value chain, the SSF fishers oversee production, and women are essential to the processing and marketing of the goods. In terms of women participation, they are prominent in management of value chain, with some expressed concerns in relation to workload and income balance although most of the women have no challenges in managing the whole process. The study also recorded changes over the past decade such as issues like diminishing fish catches and a rise in the use of illegal fishing gear caused in lower productivity of the products. However, the demand got higher and consequently received better prices.

Even though the majority of respondents do not intend to change to improve the value chain, the SSF producers can be empowered to produce better products and can align with the market through skill development and resource availability. To address declining fish catches and guarantee long-term viability, sustainable fishing practices and management should be promoted. In alignment with ongoing fishery management activities, the focus should be eliminating or reducing the use of illegal fishing gears (Than Za Kar) which is one of the primary causes of major fish decline. In addition, other intervention should be supporting community-based fisher management practices such as establishment of fish conservation zones. In conclusion, although conventional processes have produced high-quality items suitable for market demand, the value chain for dried and processed fishery products has room for improvement and sustainability especially in access to market systems which promote better roles for SSF producers in selecting favourable markets and improve their power in negotiating the prices of the products.

TABLE OF CONTENTS

EXECUTIVE SUMMARY **3**
TABLE OF CONTENTS **4**
1 INTRODUCTION **5**
1.1 Processed Fishery Products in Small-scaled Fisheries **5**
1.2 Value Chain of Processed Fishery Products **5**
1.3 Processed Fishery Products in GoM **6**
1.4 Goals and Objectives **6**
2 METHODS **7**
2.1 Study Area **7**
2.2 In-depth Interviews and Data Analysis **7**
3 RESULTS **8**
3.1 Processed Fishery Products **8**
3.1.1 Types of processed fishery products in study village 8
3.2 Community Dependency on Processed Fishery Products **8**
3.2.1 The importance of processed fishery products in small-scale fisheries 9
3.2.2 Seasonal production of processed fishery products 10
3.3 Marketing Channel of Processed Fishery Products **11**
3.4 Changes in Production of Processed Fishery Products **12**
3.5 Roles of women in production of processed fishery products **13**
3.6 Opportunities for Upgrading Processed Fishery Products in GoM **13**
4 DISCUSSION **15**
4.1 Key Insights **15**
4.2 Key Recommendations **15**
5 ACKNOWLEDGEMENT **16**
6 REFERENCES **17**

1 INTRODUCTION

1.1 Processed Fishery Products in Small-scaled Fisheries

Dried fish has long been an integral part of south and southeast Asian food systems, social-cultural processes, and the regional and global fish trades (Ruddle & Ishige, 2010). The term "processed fish" in the study covers fish products that are processed locally to preserve and add value in the villages by drying, fermenting, salting, smoking that enables them to be stored as food at room temperature for ex-tended periods of time. However, it does not cover industrially produced fishery goods from large companies. Thus, processed fish excludes industrially produced canned fish and cold smoked fish that require refrigeration. It includes product types, like fish paste, salted fish that are not actually dried, but which share the property of storage at room temperature (Belton et al., 2022).

The Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty eradication also considers fishing and dried fish processing as important drivers of food security and poverty eradication (FAO, 2015). On the supply side, production of processed fish provides a source of livelihood, income, and employment to millions of people. Actors involved include small- and larger-scale fishers and processors, and traders at various scales from large urban wholesalers to small urban and rural retailers. Women dominate the fish-drying workforce in many locations, including regions such as South Asia (Belton et al., 2022).

1.2 Value Chain of Processed Fishery Products

Dried fish value chains are an important sub-sector of small-scale fisheries that support fishing livelihoods and local economies, predominantly in the Global South. Despite their importance, dried fish value chains remain hidden and undervalued (Belton et al., 2022; Galappaththi et al., 2022). Value chain refers to "*the full range of activities that are required to bring a product or service from its conception to the final consumers. This includes activities such as design, production, marketing, distribution, and support services. Value chains include local, regional, and global markets. Key activities in a fisheries value chain can include fishing, aquaculture production, processing, transport, wholesale and retail marketing*" (FAO, 2019).

Despite the production of processed fish constituting about 12% of the global fish production, the organization and functioning of activities and nodes that comprise dried fish value chains have been rarely documented and poorly understood. Better understanding of the workings of these value chains is crucial to identify the opportunities to improve them to better support the livelihoods of those who participate in them (Belton et al., 2022; FAO, 2015; Galappaththi et al., 2022).

In addition, the dried fish value chain confronts and contributes to multiple sustainability challenges. First of all, many labourers in dried fish value chains belong to marginalized groups (widows, refugees, religious minorities, and lower castes, for example) and are vulnerable to a variety of forms of exploitation and exposure to health and personal safety risks and hazards (Belton & Thilsted, 2014; Deb & Emdad Haque, 2011). Furthermore, the use of pesticides during the drying and storage of fish to protect against insect infestation is thought to be widespread, and may imply serious health risks for producers and consumers exposed to these contaminants on a regular basis and sanitary conditions at production sites are also often poor (Amuna, 2014). Besides, the ecological integrity of some fisheries on which dried fish production is based is threatened, resulting in fish shortages and price shocks (Hall et al., 2013). Moreover, in many locations, high levels of informality and marginality mean that the dried fish economy falls outside the purview of formal governance structures and policies, and lacks political representation, rendering it vulnerable to development processes that may threaten longer term sustainability (Hossain et al., 2013; Salagrama & Dasu, 2021)

1.3 Processed Fishery Products in GoM

The markets and value chain of processed fishery products are understudied in the GoM. Salagrama (2015) identified key fisheries value chains and assessed the processed fish value chains of SSF of the GoM. One of these was processed fish value chains, which is produced only in some of the villages in the GoM and mostly intended for household consumption and local sales. Therefore, Turner (2020) suggested that the market of processed fish is unimportant. However, women usually take the lead in the processing and trading activities, although their role seems to diminish as the markets grow bigger and more distant (Salagrama, 2015).

Figure 1.1. A woman in Aung Kan Thar village sun-drying the fish. (Photo: Wint Hte, IUCN)

Regardless of these findings, the study on opportunities in small and medium enterprises (SMEs) in SSF in GoM stated the importance of production of dried fish, shrimps and fish paste as potential SMEs. In addition, the Mon State Fishery Development Association (MFDA) initiated the production of ready to eat dried fish products from locally available fish and it is proven to be a profitable small-scaled business (Hte et al., 2022). As a result, undermining factors influencing the improvement of value chain of processed fishery products with focus on the role of women throughout the chain is an interest for the Gulf of Mottama Project (GoMP).

1.4 Goals and Objectives

Therefore, the study was conducted with the following objectives:

- To identify processed fishery products by the small-scale fisheries in the Mon State of GoM,
- To assess the marketing channels of identified processed fishery products in the region,
- To investigate the challenges and opportunities to produce marketable processed products and identify supports for community,
- To distinguish the role of women to participate in the process of processed fishery products productions.

2 METHODS

2.1 Study Area

The rapid assessment focused on villages where fishery products are being processed and produced in Mon State, following the recommendation of Fishery Officer and MFDA. The study was conducted in four villages in Mon State: Zee Gone, Ahlat (A Nauk Paing), and Wae Pa Tan in Paung Township, and Koe Tae Su in Bilin Township. Due to travel restriction in Chaungzone township, the dried fish and shrimps producing villages such as Zee Gone and Sepalar were not included in the study.

Table 2.1. Number of producers and sub-collectors participated in the surveys.

Village	Township	# SSF Producers	# Sub-collectors
Zee Gone	Paung	10 (M = 0, F = 10)	3 (M = 0, F = 3)
Ahlat (A Nauk Paing)	Paung	13 (M = 6, F = 7)	3 (M = 1, F = 2)
Wae Pa Tan	Paung	9 (M = 2, F = 7)	3 (M = 1, F = 2)
Koe Tae Su	Bilin	8 (M = 6, F = 2)	0
Total		**40 (M = 14, F = 26)**	**9 (M = 2, F = 7)**

2.2 In-depth Interviews and Data Analysis

The research applied a mixed quantitative and qualitative method to identify the value chains of processed fish, including dried fish, dried shrimps, salted fish and fish paste. The survey involved visiting selected households for in-depth interviews, normally lasted between 30 to 45 minutes, and were generally carried out by a trained interviewer and a notetaker. The reason for conducting the interviews was to collect specific information from each respondent. The number of interviews with producers and sub-collectors are tabulated as in **Table 2.1**.

The field data were entered into an Excel file which is uploaded on dashboard after gathering data. To interpret patterns in qualitative data, the research team utilized thematic analysis which captured themes in terms of codes. The encrypted data were analyzed in Excel, applying an uncomplicated Pivot Table.

Figure 2.1. The field researchers conducting interview with a woman dried fish producer in Zee Gone village, Paung Township. (Photo: Wint Hte, IUCN)

3 RESULTS

The rapid assessment on the value chain of processed fishery products interviewed a total of 49 respondents from 4 villages in Mon State. The study identified different processed fishery products produced by the SSF, community dependency for household income on production of these products and its importance in household income of fishing communities and explored different components throughout the value chain of production to marketing these products, and potential to improve the market chain for the purpose of fishery development in the region.

3.1 Processed Fishery Products

3.1.1 Types of processed fishery products in study village

In the study villages, processed fishery products include dried fish, dried shrimps, salted fish, and fish paste. The processed produce based on the location of the fishing village, application of various fishing gears (and the quantity of fish landing / available in the village), and fish species caught. In Zee Gone and Ah Lat (A Nauk Paing), three products except fish paste are being produced (See Figure 3.1). The number of producers is similar between the two villages as they use the same types of fishing gears, like bag nets (Taing-Htaung-Kyar), in their village vicinity. Therefore, they target mostly on shrimps and less commercially important but more profitable fish species for producing value-added products such as dried fish, salted fish or fish paste.

In Wae Pa Tan, the respondents are only producing dried shrimps as they fish further from the shore, use bigger fishing gears, and caught commercially important fish species such as Pama croaker and mango fish. Therefore, they are only opportunistically producing dried shrimps. Similarly, Koe Tae Su has more fishers, producing dried shrimps.

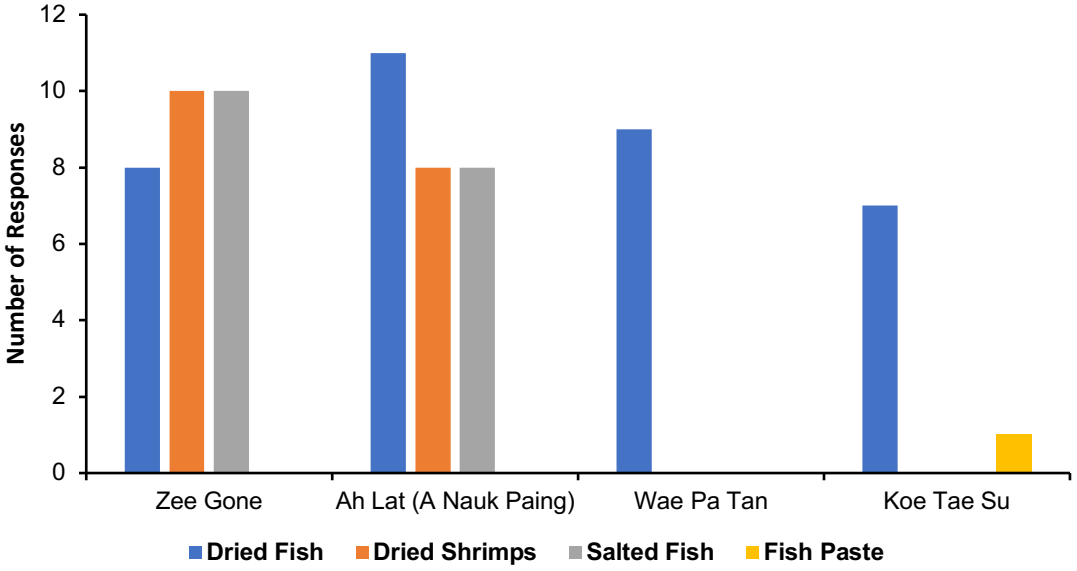

Figure 3.1. The response frequency of fishers on production of different types of processed fishery products in each study village.

3.2 Community Dependency on Processed Fishery Products

The contribution of processed fisheries products to annual household income varied across the study villages. Zee Gone and Ah Lat (A Nauk Paing) have respondents who are dependent more than 80% of their annual income on processed fish products as in Figure 3.2. About 90% of respondents from Koe Te Su reported that these products are contributing more than half

of their annual income. Whereas, Wae Pa Tan has the lowest dependency (less than 40%) on the production.

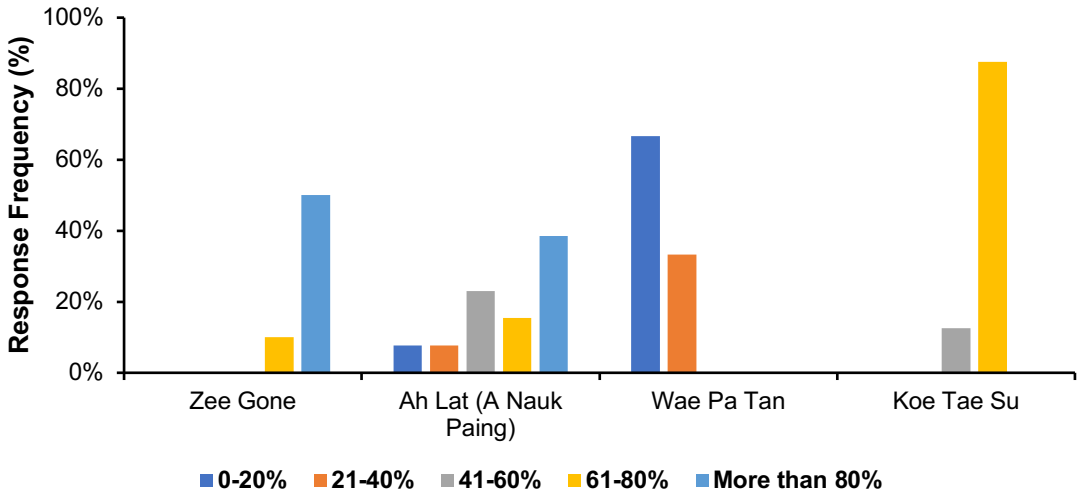

Figure 3.2. Response frequency on share of income from direct selling of processed fishery products to the total household income.

3.2.1 The importance of processed fishery products in small-scale fisheries

The study further explored the production rate of processed fish products and net revenue from each respondent to better understand the commercial importance of these products to SSF communities.

Dried shrimp is produced only in Zee Gone and Ah Lat (A Nauk Paing) villages with mean annual production of about 788 kg in Zee Gone and 1,244 kg in Ah Lat (A Nauk Paing). From the production, the annual revenue from dried shrimp is about 3.1 million MMK in Zee Gone and 5.5 million MMK in Ah Lat (A Nauk Paing). In contrast, higher volume of dried fish was produced in Wae Pa Tan (156 kg/ year) and Koe Tae Su (505 kg/ year). The annual income for dried fish in Koe Tae Su is 5.1 million MMK. Although the production rate in Wae Pa Tan is very low compared to Koe Tae Su, fishers in Wae Pa Tan earned about 4.2 million MMK per year from selling dried fish. Zee Gone and Ah Lat (A Nauk Paing) annually produced only around 40 kg with income of 150,000 – 200,000 MMK. Production of fish paste is the highest in Koe Tae Su (1,102 kg/year) with the mean revenue of 5.4 million MMK, suggesting a higher value than dried fish production.

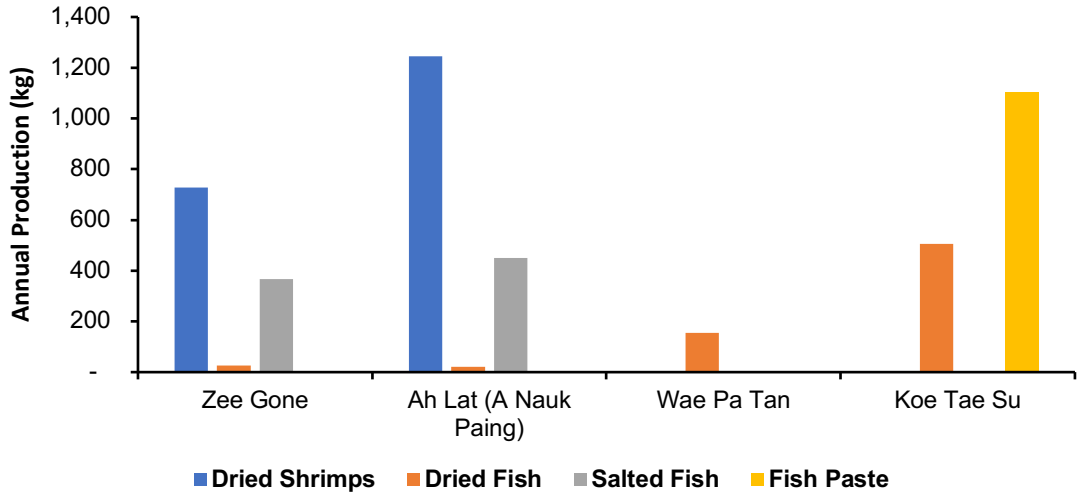

Figure 3.3. The annual production (kg) of different processed fishery products in each study village.

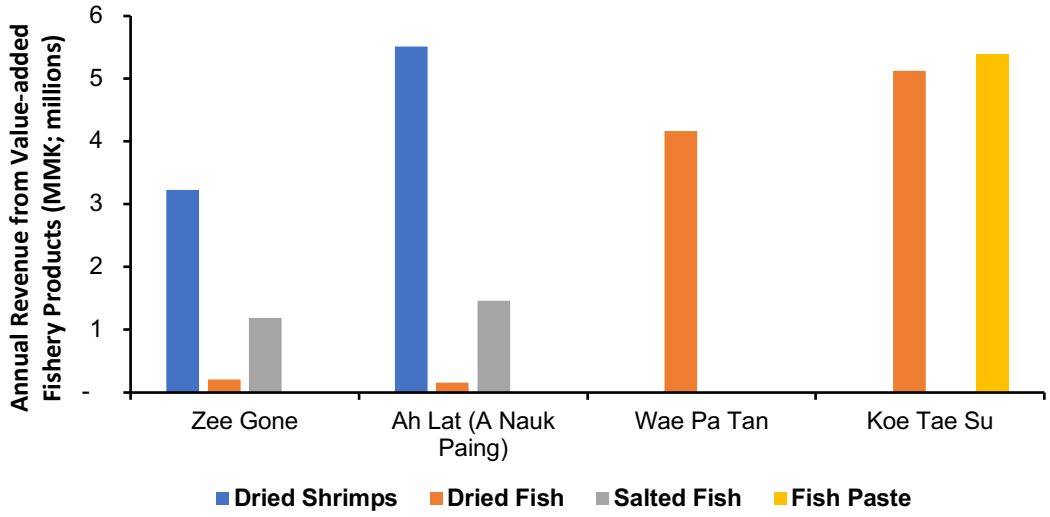

Figure 3.4. The annual revenue (MMK) from direct selling of different processed fishery products in each study village.

3.2.2 Seasonal production of processed fishery products

The production months for dried shrimps, salted fish and fish paste, linking with the availability of raw products, are shown in Figure 3.5. According to the survey responses, salted fish production occurred consistently throughout the year in these villages. The peak production months were July to October, with 14 responses, while the lowest production months was May, with only 3 responses. Regarding dried shrimp production, the months with the highest reported output in the study area were August, September (17 responses), and October (16 responses), while the least productive months were April and May (1 response). As for fish paste, only one producer mentioned production occurring from July to September.

Figure 3.5. The response frequency on seasonal availability of raw materials to produce dried shrimps, salted fish and fish paste in the study villages of GoM.

Table 3.1 illustrates availability of different fish species for production of dried fish based on the responses from the interview. Overall, different types of fish are available throughout the year, except in April for dried fish production with low or no production during monsoon seasons. Mullet shows consistent availability throughout the year, with higher availability from July to December. Bombay duck, on the other hand, shows substantial availability from July to September, with sporadic availability in other months. However, mixed species are available almost throughout the year with low catch between March to June.

Table 3.1. The response frequency on seasonal availability of different fish species to produce dried fish in the study villages of GoM.

Fish Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mullet	6	1	0	0	0	2	7	7	7	7	7	7
Pony Fish	5	3	1	0	0	0	6	6	6	6	5	5
Mixed	5	3	1	0	1	2	5	5	5	5	5	5
Bombay duck	1	0	0	0	0	1	11	15	8	2	1	2
Pama Croaker	5	1	0	0	0	2	5	5	5	5	5	5
Giant Catfish	4	2	1	0	0	0	4	5	5	5	5	4
Four Finger Threadfin	3	1	0	0	1	1	5	4	4	4	4	4
Toli Shad	3	2	0	0	0	0	3	4	4	4	4	4
Indian Threadfin	2	1	0	0	0	1	2	2	2	2	2	2
Gold Spotted Anchovy	2	1	0	0	0	0	2	4	1	1	1	1
Mudskipper	2	0	0	0	0	0	0	1	0	0	2	4
Sillago	1	0	0	0	0	1	1	1	1	1	1	1
Seabass	1	1	0	0	0	0	1	1	1	1	1	1
Mango fish	1	0	0	0	0	1	1	1	1	1	1	1
Osterobrama	1	1	0	0	0	0	0	1	1	1	1	1
Hairfin Anchovy	1	0	0	0	0	0	0	1	1	1	1	1
Pangus Catfish	0	0	0	0	0	1	1	1	0	0	0	0
Bronze Croaker	0	0	0	0	0	0	0	1	1	1	0	0
Striped Dwarf Catfish	0	0	0	0	0	0	0	1	1	0	0	0

3.3 Marketing Channel of Processed Fishery Products

The following components were recorded throughout the value chain of processed fishery products in the study area.

Small-scale Producers: This includes SSF fishers who produce the products seasonally based on availability of the raw fish or shrimps. The women play a very important role managing from landing to the final products. In cases of processing on the boat due to long day fishing trips in some areas, men (especially the crews on the fishing boat) also involve in the processing. This process can be labor intensive and depends on the availability of the sun light for drying products. Alternative drying process such as smoking is not recorded in the study. During the rainy season, they tend to produce salted products or fish pastes. The

products were sold primarily to sub-collectors, or some fishers sold at wholesalers in township. In some villages, the fishers directly sold to consumers. Only low-quality products were used for household consumptions.

Sub-Collectors in the Village: Most of the sub-collectors are jointly working as fish collectors in the village. There are some opportunistic sub-collectors, who collect available products and sold to wholesalers in the township or directly to consumers in the market. Most of them are responsible to produce finer quality and more durable products before selling to other components of the market chain. Almost of the sub-collectors in the study do not have any financial prearrangement such as loan with wholesalers, and so they have freedom in choosing wholesalers who offer better prices. However, they do not have bargaining power in pricing of the products.

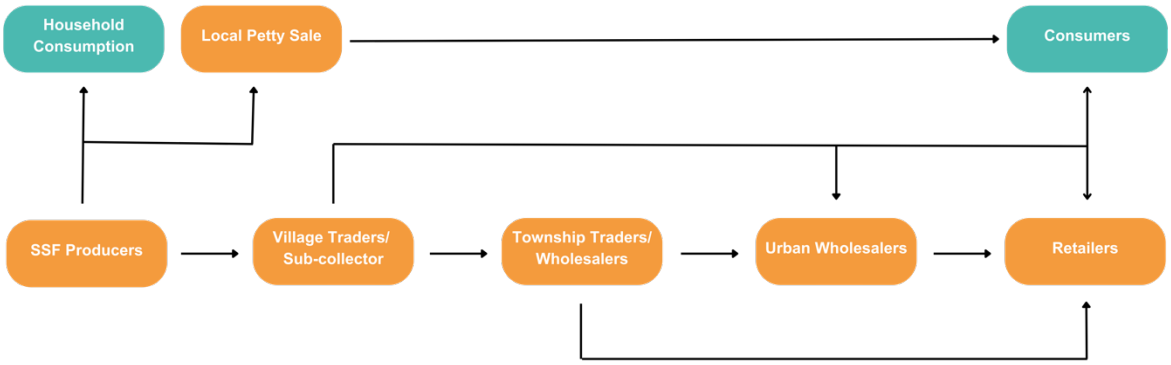

Figure 3.6. The value chain of processed fishery products in the Gulf of Mottama.

Wholesalers/ Traders in the Township: In Mon, the traders are mostly based in Thaton, Kyaikto or Mawlamyine. They collect products directly from SSF producers or through sub-collectors and then sell directly to consumers or traded to wholesalers in Yangon.

Consumers: The consumers are mostly local people, currently living in the region or migrating to neighboring countries. As the shipping access to neighboring countries is growing, the people residing in other countries can access the products directly from producers through brokers (mostly relatives, the service providers for shipping products to other countries).

3.4 Changes in Production of Processed Fishery Products

The percentage change in response frequency concerning the value chain of processed fishery products over the past 10 years is depicted in Figure 3.9. The detailed information on these changes is as follows:

Availability: Over the past decade, 56% of respondents highlighted a decline in the number of fish due to increased modification of fishing gears and the use of illegal fishing methods, such as stake nets (Than Za Kar), in their fishing grounds. However, 20% observed a positive effect on fish catch in 2023 due to the lunar leap year.

Productivity: More than half of the respondents (58%) reported a significant decrease in the production rate of value-added fishery products, owing to lower fish and shrimp catches. Conversely, 18% noted an increased fish catch in 2023, leading to a higher production rate. Among them, 8% (from Wae Pa Tan) claimed no change in production rate as they mainly sell raw fish for household income.

Demand: About 33% of respondents did not notice changes in demand for value-added fishery products, often due to sustained relationships with one collector over an extended

period. However, 28% mentioned a positive change in demand due to an increase in collectors seeking higher quality products amid job scarcity and income needs. Meanwhile, 23% cited lower demand stemming from reduced collector numbers due to decreased profits from higher commodity and market prices.

Market prices: According to interviews, the majority of respondents (78%) stated that market prices for value-added fishery products increased over the past decade due to higher commodity prices and increased product demand. Consequently, collectors purchased products at competitive prices due to this rising demand.

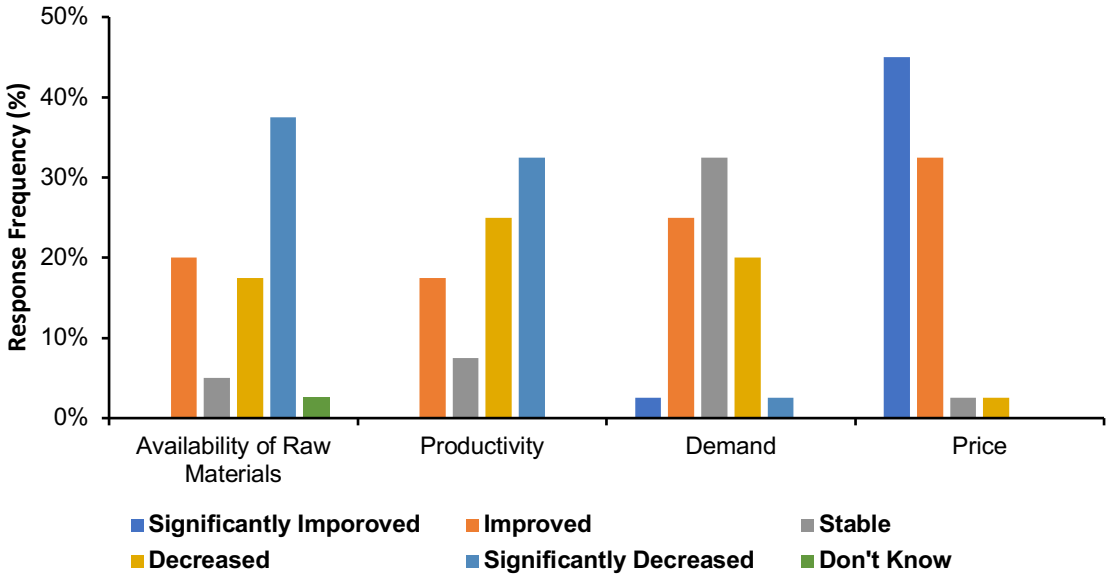

Figure 3.7. Response frequency on reported changes in value chain of processed fishery products.

3.5 Roles of women in production of processed fishery products

Women play a critical role in the value chain of processed fishery products in the Gulf of Mottama. Most fisherwomen from Zee Gone and Ah Lat (A Nauk Paing) independently manage the entire production and marketing process. Except for fishing, most other activities such as sorting, cleaning, salting/curing, drying, storage, and marketing are solely handled by women. Conversely, women from Wae Pa Tan and Koe Tae Su focus on reprocessing dried fish from the boats and primarily engage in market-related activities. According to this research, decision-making in the fishery products trade involves a joint effort, with women having a moderate level of influence compared to men.

While most of the women expressed no challenges in managing the entire value chain for fishery products, considering it a normal part of their work, some also conveyed feelings of exhaustion due to the lack of rest time. They find it challenging to handle every step of the value chain effectively and express concern about the imbalance between income and expenses when managing fishing-related earnings.

3.6 Opportunities for Upgrading Processed Fishery Products in GoM

The level of interest in upgrading processed fishery products in the GoM is depicted in Figure 3.9. The majority of respondents (83%) expressed no interest in upgrading the production of processed fishery products. They believed that products produced through traditional methods were already of high quality. In addition, their capacity to supply the demand is also in equilibrium.

However, among the respondents, 14% expressed interest in enhancing the value chain of processed fishery products to achieve higher quality and better market prices. The constraints for upgrading the system are lack of resources, technical skills, and declining fish catches. Furthermore, 6% of respondents mentioned their inability to comment on product upgrading.

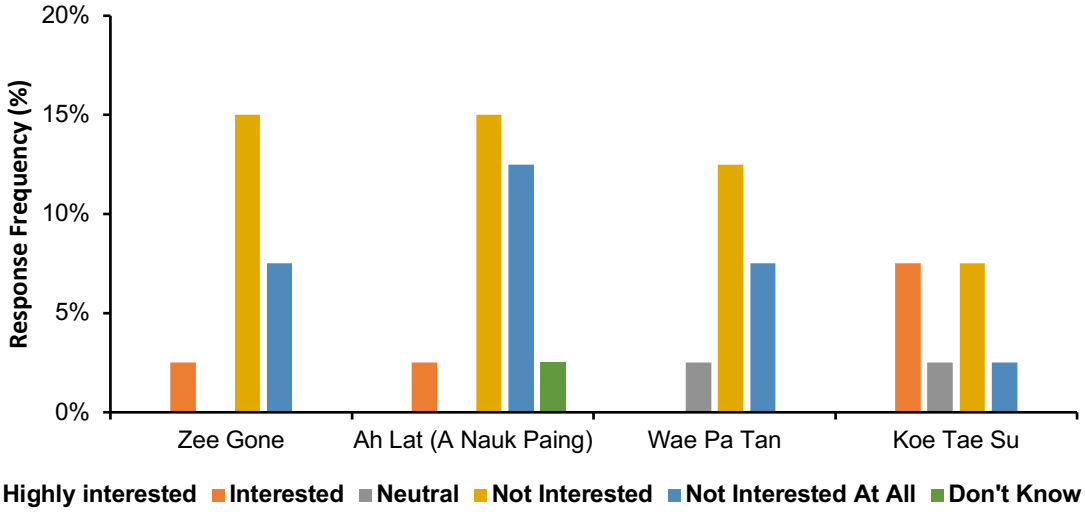

Figure 3.8. Response frequency on interest of small-scaled fishers for upgrading the production of processed fishery products.

4 DISCUSSION

The rapid assessment of processed fishery products in the Gulf of Mottama (GoM), based on interviews with 49 respondents from 4 villages in Mon State, offered valuable insights into various aspects of the value chain, community reliance, and potential enhancements for fishery development in the region.

4.1 Key Insights

Diverse Product Range: The study identified four varieties of processed fishery products including dried fish, dried shrimps, salted fish, and fish paste although the production varied based on fishing gear, availability of raw materials and fish species, and location of the study village. Villages like Zee Gone and Ah Lat (A Nauk Paing) focus on multiple products except fish paste, while Wae Pa Tan mainly produces dried shrimps due to fishing specifics.

Economic Significance: The dependency on these products for household income varied across villages, with Zee Gone and Ah Lat (A Nauk Paing) relying significantly, while Wae Pa Tan had lower dependency. In addition, different products yield varying revenues, with dried shrimp highly profitable in some villages, while salted fish production significantly impacts income in others.

Value Chain Participants: Small-scale fishers predominantly manage the entire production, with women playing crucial roles in the process. Sub-collectors contribute to refining product quality, and wholesalers/traders facilitate distribution, but their roles are less understood.

Changes: Respondents noted challenges such as declining fish catches and illegal fishing practices affecting fish availability. Lower in productivity, varied in demand patterns, and higher market prices were observed over the past decade.

Women's Contribution: Women in most villages independently manage production and marketing, showcasing significant involvement in the value chain. However, some expressed concerns about workload and income balance.

Interest in Upgrading: While the majority were content with traditional methods, a portion showed interest in enhancing product quality and market prices. However, constraints like resource scarcity, technical skills, and declining catches hinder upgrading efforts.

4.2 Key Recommendations

Capacity Building: Initiatives focusing on skill development and resource provision can empower fisherfolk to enhance product quality and meet evolving market demands.

Sustainability Measures: Efforts to address declining fish catches through sustainable fishing practices and promoting the good fishing practices should be encouraged for long-term viability. In alignment with ongoing fishery management activities, the focus should be eliminating or reducing the use of illegal fishing gears (Than Za Kar) which is one of the primary causes of major fish decline. In addition, other intervention should be supporting community-based fisher management practices such as establishment of fish conservation zones.

Gender Equity and Well-being: Support mechanisms ensuring equitable work distribution and addressing challenges faced by women in managing the value chain can improve overall productivity and well-being.

Market Access and Diversification: Facilitating direct market access and understanding consumer needs can aid in diversifying products and tapping into broader markets, enhancing economic sustainability. This intervention should be supported from MFDA.

5 ACKNOWLEDGEMENT

The research project was supported by the Gulf of Mottama Project (GoMP) which is funded by the Swiss Agency for Development Corporation (SDC). Therefore, we would like to provide our sincere acknowledgement to SDC for supporting the research through the GoMP. Most importantly, we would like to appreciate the participants in the communities who involved in the interviews and discussions for their meaningful and valuable contributions. In addition, we wish to thank the Fishery Officer, the Township Clusters Coordinators (TCCs) and the Community Facilitators and Monitors (CFMs) of the project for their support in coordination of field activities. Finally, we would like to appreciate field researchers from Myanmar Coastal Conservation Lab (MCCL) @ Point B Design + Training, who actively participated throughout the research process.

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