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# Impacts of COVID-19 and options to build resilience and recovery in fish value chains in Myanmar

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# 1. Executive summary

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In response to the COVID-19 pandemic, the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) has established the CGIAR COVID-19 Hub as a global initiative (CGIAR COVID-19 Hub 2021a). Its objective is to develop scientific research and provide support to emergency crisis responses during the COVID-19 pandemic as well as long-term recovery and resilience strategies. The initiative is structured into four work areas: (1) value chain fractures, (2) One Health, (3) supporting country responses, and (4) food system fragilities. Under the third work area, five nations were selected as focal countries in 2021: Ethiopia, Bangladesh, Malawi, Myanmar and Nigeria. In coordination with national partners and governments, the Hub provided country-specific research support to address the challenges of COVID-19 faced by these countries and offer policy recommendations on recovery and resilience responses. The Hub's research team in Myanmar focuses on two research topics: (1) assessing impacts of COVID-19 on agri-food and fish supply chains and (2) assessing impacts of COVID-19 on women's agribusinesses and value chains in the Gulf of Mottama (CGIAR COVID-19 Hub 2021b).

This report focuses on assessing the impacts of COVID-19 and options to build resilience and recovery in fish value chains in Myanmar. A mixed-methods approach, comprising a quantitative survey and qualitative interviews and in-depth discussions, was used to implement the study. For the quantitative survey, we adapted the survey tool used in Belton et al. (2021). Common key indicators covered in the quantitative survey of value chain actors included average sales price, quantity of fish sold, cost of inputs and the quantity of inputs bought by different fish value chain actors. In total, 148 actors along the fish value chains in Myanmar in 2021 were interviewed by telephone, of which 103 participated in the 2020 survey, as reported in Belton et al. (2021). For the qualitative interviews, a semi-structured questionnaire checklist, key informant interviews and in-depth discussions were carried out with 56 agri-food and fish value chain actors in KenTung Township and Lampi Community in Kaw Thauung District.

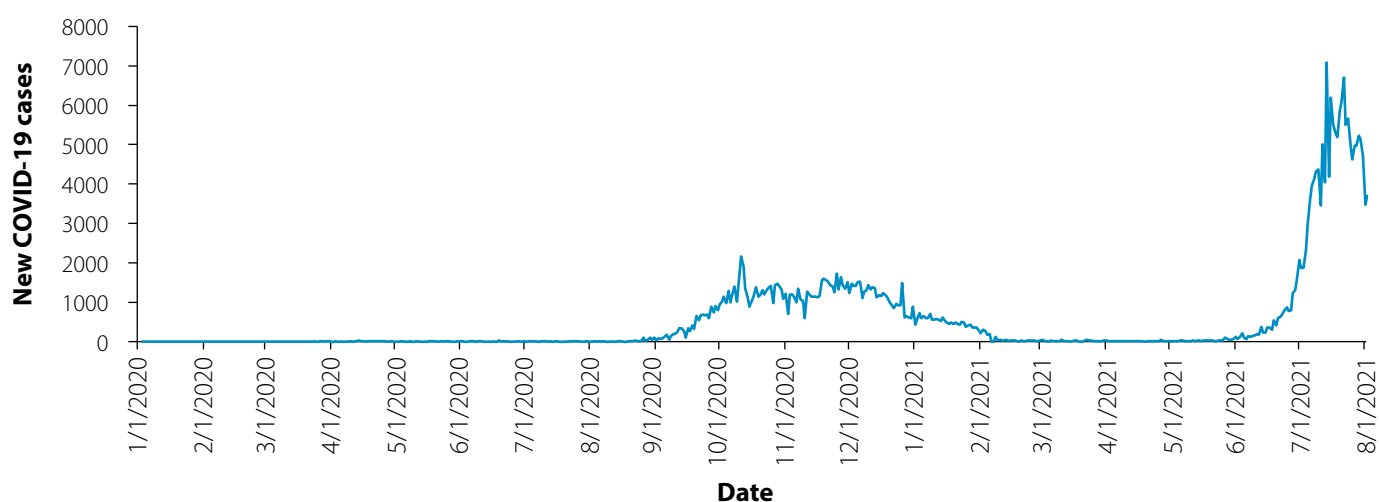
The overall findings are as follows:

- Impacts of COVID-19 on fish value chains were more severe in 2021 than 2020 because of the prolonged pandemic and stricter measures implemented to contain the spread of the virus, as well as the political instability in Myanmar since the beginning of 2021.
- Sales of farmed fish dropped significantly in 2021 from 2020. Most notably, the total cost bought by the surveyed farms outweighed the total sales earned in March 2021.
- The quantity of processed fish sold was significantly higher in 2021 than 2020.
- Diverse fish products, especially high-value fish species, fetched higher prices in 2020 than 2021.
- Surveyed respondents have adopted different coping mechanisms to build recovery and resilience during this ongoing crisis. Among the most common practices are borrowing, using savings and buying inputs on credit.

## 2. Introduction

From 2015 to 2018, Myanmar's national economy grew rapidly. However, the COVID-19 pandemic halted economic activities in 2020 (World Bank 2021), and the gross domestic product (GDP) declined 4.5% in 2020 from USD 79.8 billion of GDP in 2019 (World Bank 2021). Measures to contain the spread of COVID-19 have caused significant disruptions in food, land and water systems in Myanmar, posing severe risks to food, nutrition and water security, and both local businesses and the national economy (Boughton et al. 2021). Furthermore, migrants returning from cities and overseas to rural areas after losing their jobs due to COVID-19 have also added pressure on agriculture-based livelihoods and natural resources (Ferrer et al. 2021). Farmers have been forced to adopt risky and unsustainable coping mechanisms to buffer the COVID-19 shocks, and their indebtedness is likely to rise (World Bank 2020).

Myanmar initially had a low COVID-19 infection rate during the first wave of the pandemic, but the rate rose steeply in the last quarter of 2020 (Figure 1). As of August 2020, the country had reported 353 cumulative COVID-19 cases, but an outbreak in the second wave of the pandemic caused cumulative cases to increase sharply to a total of approximately 124,630 by the end of the year. During the surge in COVID-19 cases, the country's COVID-19 Economic Relief Plan has helped 400 fishers receive loan assistance, and training about health prevention was provided to small-scale fishers (Ferrer et al. 2021). Because of the ongoing outbreak from 2020 and the political instability at the beginning of 2021, fish value chains are expected to experience even more disruptions.



Source: WHO 2021.

**Figure 1.** Total number of new COVID-19 cases in Myanmar.

With support from the CGIAR COVID-19 Hub, the objectives of this study are

- to assess the impacts of COVID-19 across different actors in fish value chains;
- to understand the adaptation and coping strategies value chain actors have undertaken to build resilience and recovery in these unprecedented times.

This report is structured as follows: After the introduction, we summarize a literature review of COVID-19 impacts and resilience on fish value chains in Myanmar, followed by the data methodologies used. Second, we present quantitative key findings of COVID-19 impacts on fish actors along the value chains, including the impacts on cost and quantity of inputs purchased, fish prices and quantity sold by businesses. Third, we assess the key results on coping mechanisms adopted by fish value chain actors to build resilience and recovery. Last, we conclude with several policy recommendations and interventions to improve the resilience of fish livelihoods in the long term.

### 3. Literature review

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Of the types of food in Myanmar diets, fish is a critical source of animal protein and an essential supply of micronutrients, with an annual per capita consumption of 45.6 kg in 2018 (FAO 2021). As the COVID-19 pandemic has escalated, fish value chains in Myanmar have been exposed to high risks and vulnerabilities in a number of ways. COVID-19 containment measures, such as movement restrictions and limited working hours, have severely impacted fish supply chains. Many fish-related activities, including fishing, post-harvesting, trading and selling, were prohibited because of transportation restrictions and market closures (Diao et al. 2020; FAO et al. 2020; Belton et al. 2021). As a result, fish value chain actors earned lower profits than they did pre-pandemic, and the second wave of the outbreak only worsened the situation (Belton et al. 2021). Furthermore, delays in transporting fish to the market have led to more volatile fish prices in Myanmar and caused substantial fish loss (MDN 2020b). From the demand side, the restrictions placed on restaurants and hotels collapsed demand for fish (MDN 2020b; Ferrer et al. 2021). Also, the temporary shutdown of processing factories and the closure of international borders with Thailand and China disrupted fish export markets for Myanmar (MDN 2020b).

People relying on fish as their main livelihood and primary source of income were highly vulnerable to these restrictions because of the reduction in employment and daily income (FAO et al. 2020; Belton et al. 2021). The daily income of fishers dropped 30%–50% in 2020 compared with the pre-pandemic period (MDN 2020b). Borrowing money and looking for alternative sources of income have been the main coping practices and mechanisms during the crisis (World Bank 2020). Many households have had to take out loans, as they have insufficient income to cover household expenditures and business capital. Even before the pandemic, some people were finding it difficult to repay loans, so borrowing more money has added even more financial burden as they will have to pay off larger debts in the future. Some microfinance lenders have helped borrowers find temporarily relief from their financial burdens by

extending repayment periods (World Bank 2020). Other than borrowing, many people, including returned migrants, have sought out alternate job opportunities, such as working as casual laborers and agricultural workers (FAO et al. 2020; World Bank 2020). However, rural households had fewer opportunities to engage in seeking alternative income sources if the village was located far from urban areas (FAO et al. 2020).

To date, limited studies have been done on the impacts of COVID-19 on fish value chains in Myanmar. Belton et al. (2021) conducted a multicountry survey of fish value chain actors in five countries: Bangladesh, Egypt, India, Myanmar and Nigeria. The study mentions that COVID-19 impacts severely disrupted fish value chains in 2020, mainly because of the negative impacts on transportation and logistics. Despite the rise of fish retail prices, fish prices in other segments of the fish value chains declined 10%–15% over the survey period in 2020 (Belton et al. 2021).

Ferrer et al. (2021) focus on the impacts and responses to COVID-19 restrictions on small-scale fisheries in Southeast Asian countries, including Myanmar. The study reports that the negative impacts on small-scale fisheries in Myanmar were caused by movement restrictions that prohibited the flow of logistics and consumer access to markets. The price of fish caught by small-scale fishers dropped approximately 70% compared with the pre-pandemic period.

Middleton et al. (2021) focus on assessing the impacts of COVID-19 in Myanmar in 2020. The study suggests that the availability and price of fish, as well as production inputs, have fluctuated over the course of the pandemic. We hypothesized that the ongoing pandemic and the political instability in 2021 will cause more severe negative effects on fish value chains. To fill the gap, we analyze the negative impacts of COVID-19 and options to build resilience and recovery in fish value chains in Myanmar.

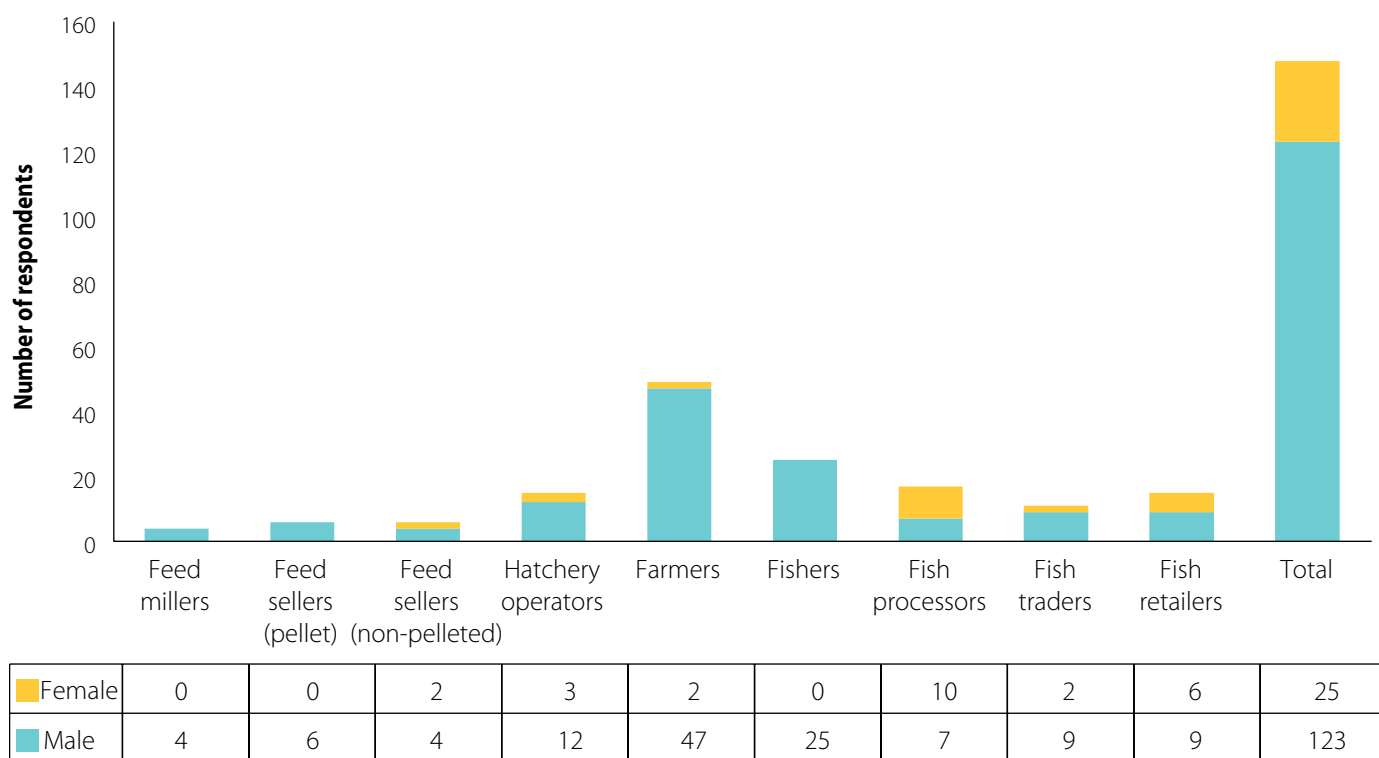
## 4. Methodology

In this study, we applied a mixed methods approach, including a quantitative survey, qualitative interviews and in-depth discussions, to assess the impacts of COVID-19 on fish value chain actors in Myanmar. We carried out the quantitative survey between June and July 2021, collecting data on business operations in March, April and May 2021.

The survey instrument that we adapted from the 2020 survey, as reported in Belton et al. (2021), was divided into three modules. In the first module, the respondents were asked about their general business performance, such as labor employment and access to inputs and outputs. The second module included common quantitative indicators such as average sales price and quantity of fish sold, unit cost and quantity of production inputs purchased. The third module was comprised of behavioral questions to understand the COVID-19 responses and coping mechanisms adopted by the respondents. A total of 148 actors across the fish value chains were interviewed

by phone, of which 103 participated in the 2020 survey. The actors that participated in the 2021 survey comprised 49 farmers, 25 fishers, 17 fish processors, 15 hatchery operators, 15 retailers, 11 fish traders, 6 pelleted feed sellers, 6 non-pelleted feed sellers and 4 feed millers (Figure 2).

Qualitative interviews and in-depth discussions were conducted in KenTung Township and the community of Lampi in Kaw Thaug District in July and August 2021. Interviews with open-ended questions were designed to capture the impacts of COVID-19 on fish value chain actors, businesses and livelihoods, and the coping mechanisms respondents used in response to build recovery and resilience. A sample size of 56 fish actors and consumers were interviewed, including women, youths and returning labor migrants. The respondents comprised 14 fishers, 6 fish processors, 6 fish retailers, 6 fish collectors, 6 fish farmers, 4 fish traders, 2 fish feed operators, 2 fish seed operators and 10 people from other professions (Table 1).



**Figure 2.** Total number of respondents for the quantitative survey.

Profession of respondents	Total number of respondents	Share of female respondents (%)	Share of male respondents (%)	Share of total respondents (%)
Fish feed miller	2	50	50	3.6
Fish seed seller	2	0	100	3.6
Fish farmer	6	50	50	10.7
Fisher	14	29	71	25.0
Fish processor	6	100	0	10.7
Fish trader	10	90	10	17.9
Fish retailer	6	100	0	10.7
Other	10	60	40	17.9
<b>Total</b>	<b>56</b>	<b>63</b>	<b>37</b>	<b>100</b>

**Table 1.** Total number of respondents for the qualitative interviews.





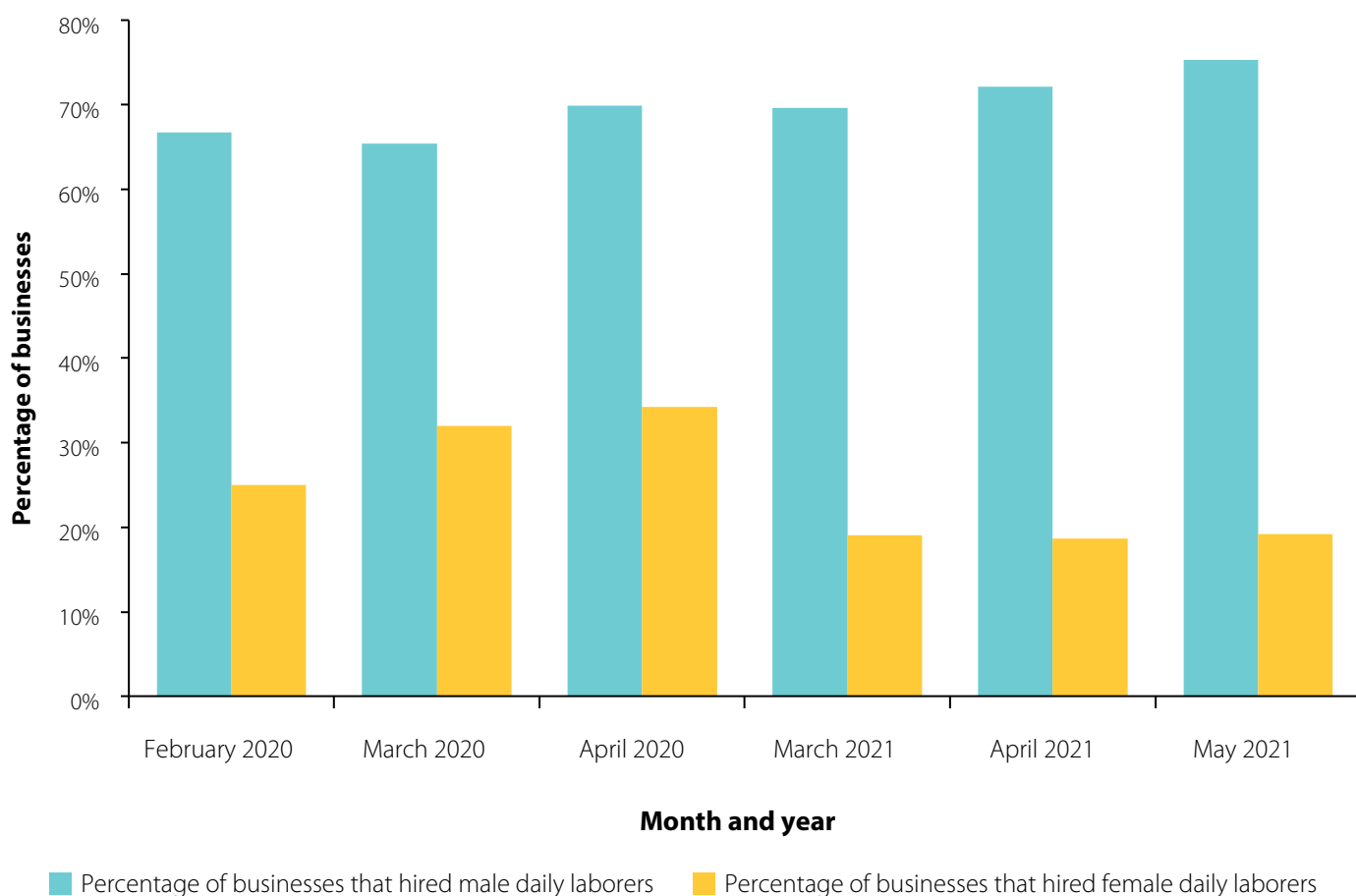
## 5. Key findings

### 5.1. Business overview

#### 5.1.1. Employment

Myanmar's fishery and aquaculture sector provide employment to approximately 3.2 million people in the country (World Bank 2019). In this study, surveyed respondents were asked if they had hired any daily laborers throughout the survey period (Figure 3). Overall, the results suggest that the employment rate for women was more severely impacted than for men. The share of male day laborers hired increased gradually from 67% in February 2020 to 75% in May 2021. In contrast, fewer female day laborers were employed in 2021 than 2020. The share of female day laborers hired increased gradually from 25% in February 2020 to 34% in April 2020 but plummeted and remained static at 19% in 2021.

When the survey respondents were asked about the average daily wages paid to hired laborers, it was notable that women's wage increased 40% in 2021 from 2020. These trends may reflect a strategy to retain skilled female laborers and reduce less-skilled positions (Belton et al. 2021). On the other hand, the daily wage paid to male laborers decreased gradually over the same period. In 2020, the average wage for a male laborer was MMK 8746.5, but this trended downward approximately 6% over the survey period in 2021. Furthermore, the ongoing currency depreciation and rising inflation caused a decline in real wages paid to laborers from 2020 to 2021. As a result, fish value chain actors were more severely impacted in 2021 because of the lower purchasing power of the currency.

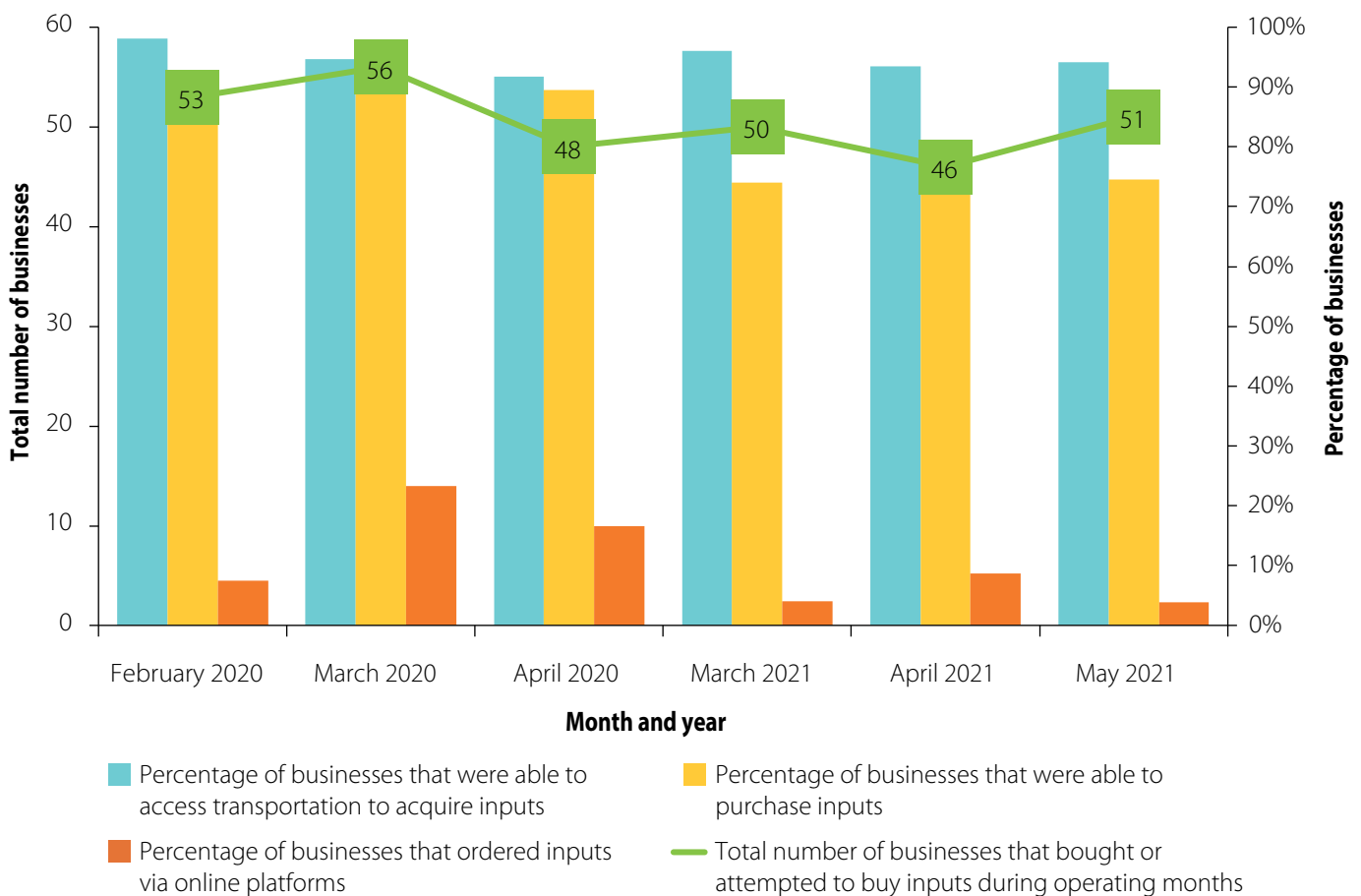


**Figure 3.** Employment.

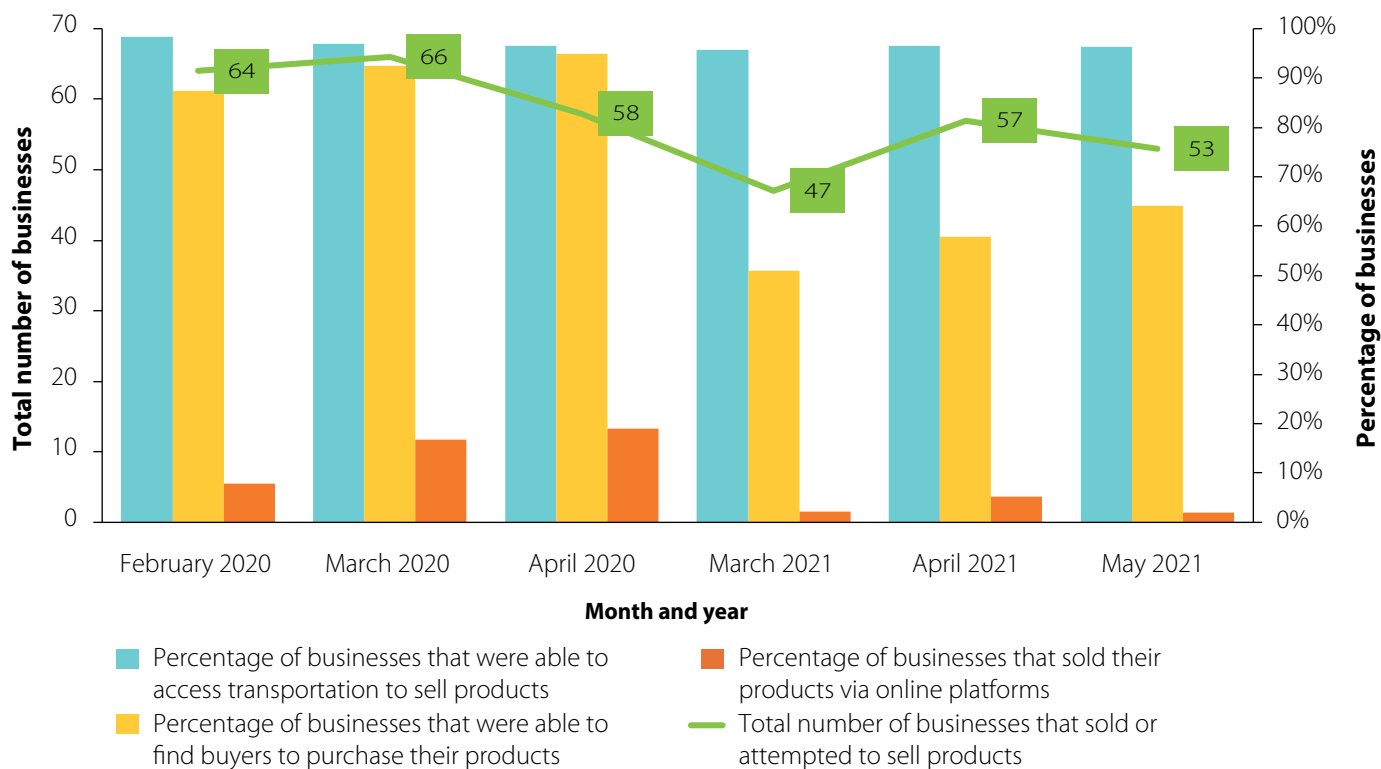
### 5.1.2. Access to inputs and sales output

Approximately half of the businesses attempted to purchase inputs throughout the survey period in 2020 and 2021 (Figure 4). Among those, more than 90% were able to access transportation to buy inputs. However, the rate of those who were able to successfully acquire inputs dropped, down from an average share of 90% in 2020 to 75% in 2021. These findings suggest that access to inputs became worse in 2021 because of the political coup and the implementation of stricter containment measures. Furthermore, the number of businesses that attempted to purchase inputs online was higher in 2020 than 2021. The share climbed sharply in 2020 from 8% in February to 23% in March and then fell to 17% in April. On the other hand, in 2021 the share of businesses that purchased inputs online constituted less than 10%. These findings indicate that the internet outage and political coup in the beginning of 2021 prevented the respondents from making online business transactions.

In a similar trend, more than 95% of businesses had access to transportation to sell their products throughout the survey period (Figure 5). Yet, buyers for their products dropped approximately 40% in 2021 from 2020. The average share of businesses that were able to find buyers to purchase their products remained stable at 92% in 2020 but fell to 58% in 2021. Meanwhile, the percentage of business that used online platforms to sell products was relatively low in 2021 compared to 2020, comprising of less than 5% of businesses that received online transactions for their products. Overall, fish value chain actors were more severely impacted in 2021 than 2020 because of the COVID-19 outbreak and the political coup. Because they occurred at the same time, we are unable to separate the effects of each crisis on fish value chain actors. One thing to note, however, is that March 2021 saw the lowest rate of purchases for inputs and sales for products.



**Figure 4.** Access to inputs.



**Figure 5.** Sales output.

## 5.2. Impacts on purchases, price and sales by fish value chain actors

### 5.2.1. Feed millers

Feed is one of the most important inputs for aquaculture production, accounting for almost 70% of variable costs on an average-sized farm in Myanmar (Belton et al. 2017). Despite the disruption of aquaculture production due to the pandemic, feed is still considered an essential input in fish farming activities to maintain production cycles. Of the four feed millers interviewed in 2021, all of them continued operating their business between March and May 2021. They were asked if they had bought any feed ingredients during this period, three reported that they had not. Instead, they used excess feed ingredients left over from the previous year to save on input costs. In addition, most of the feed millers produced fish feed for their own fishpond production, so they had no sales to report in 2021.

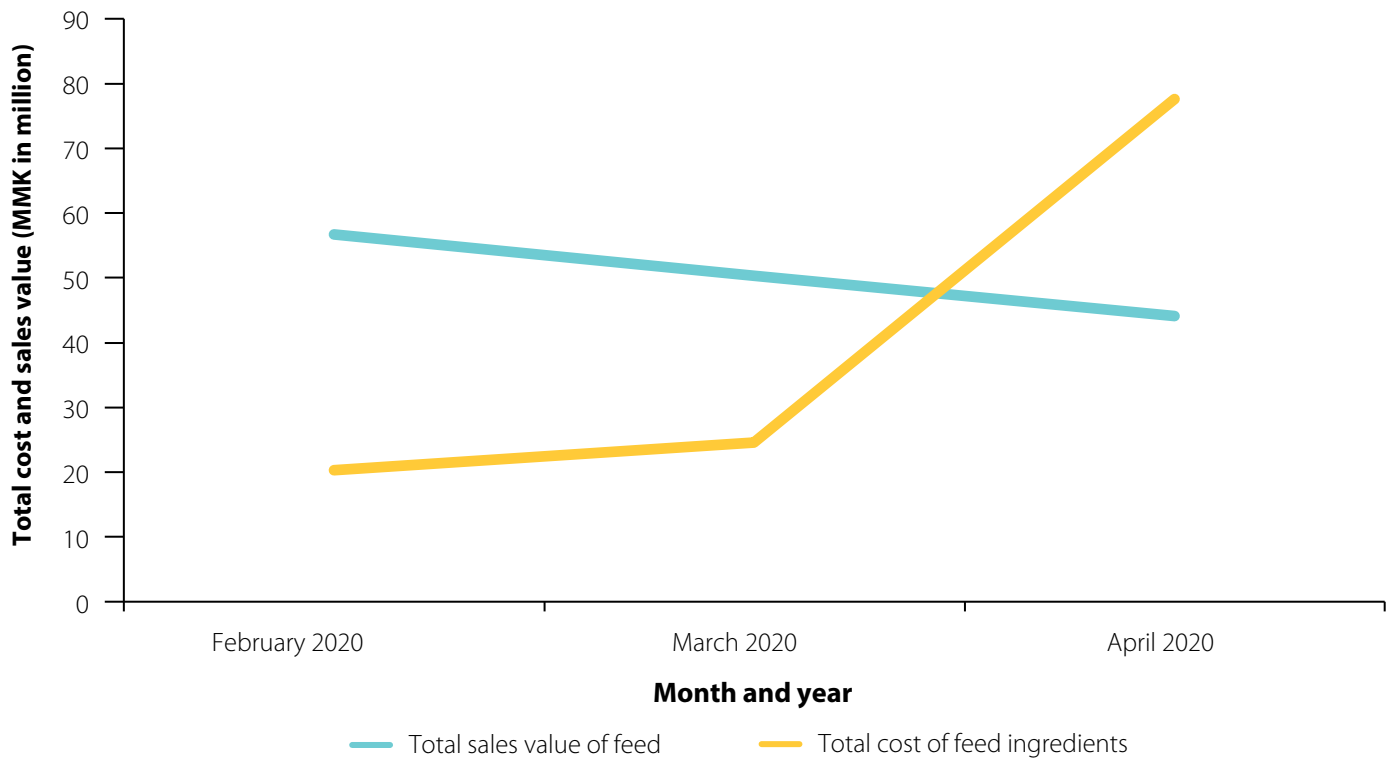
Among the four feed millers, two participated in the survey in 2020, as reported in Belton et al. (2021). In 2020, the total feed cost for these feed millers increased gradually from MMK 25 million in March to MMK 78 million in April. Most notably, the total cost of feed ingredients was higher than total sales revenue earned in April (Figure 6). This suggests that

the feed mills operated at a loss in April 2020. Total sales value decreased roughly 11% over the survey period in 2020, indicating a decline in feed demand during the first-wave of the outbreak. For 2021, the two feed millers had no business activities to report.

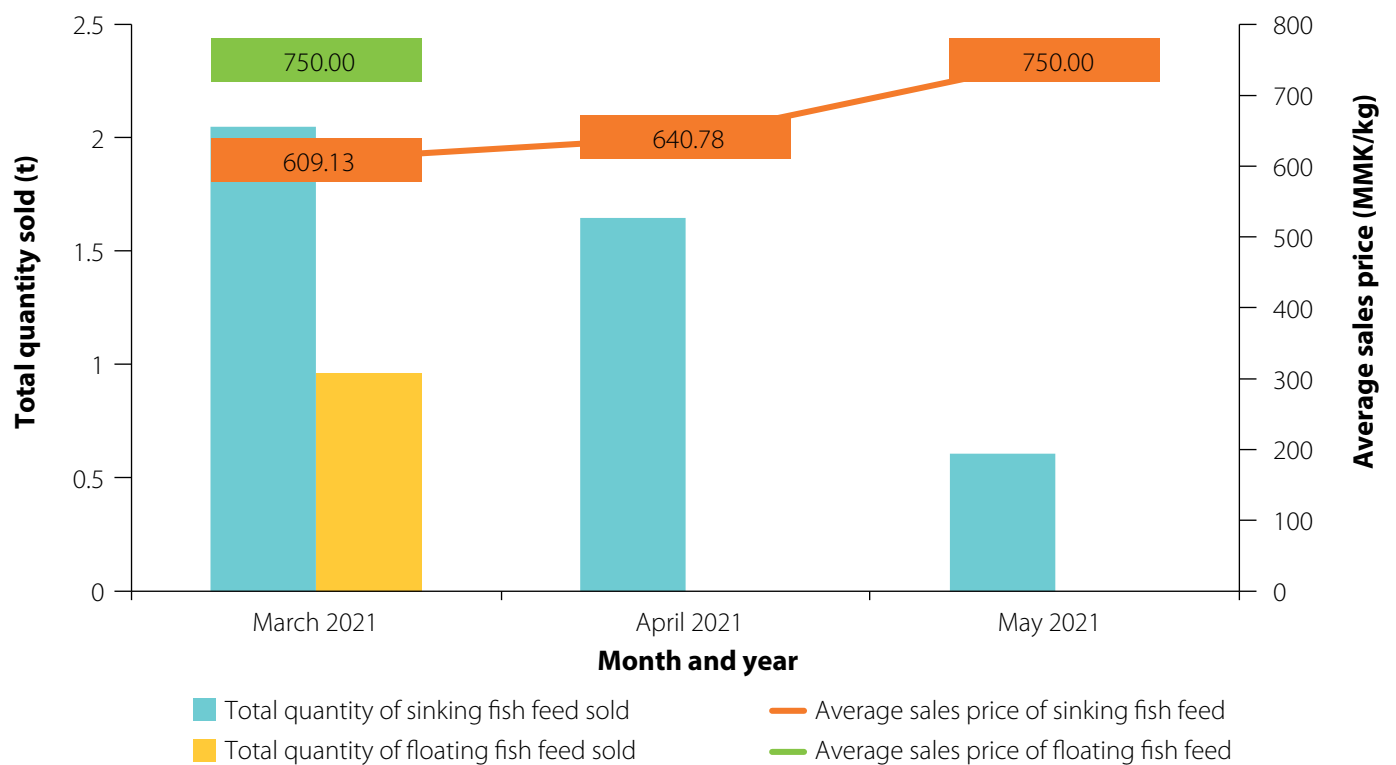
### 5.2.2. Pelleted feed sellers

Floating feed and sinking feed are both commercially manufactured pelleted feeds that provide better nutrition for farmed fish at a higher feed conversion ratio (Belton et al. 2017). However, not many aquaculture farms in Myanmar use pelleted feed (Belton et al. 2017; World Bank 2019). In this study, six pelleted feed sellers were interviewed in 2021. Their business operations decreased from 100% in March 2021 to 33% in May 2021, with an average of five operating days a month during the survey period.

Overall, sales of floating fish feed remained low, accounting for just 1 metric ton (t) of the total amount sold at MMK 750/kg in March 2021. More sinking feed was sold than floating feed, but the number trended downward from 2 t in March 2021 to 600 kg in May 2021 (Figure 7). The average sales price of sinking fish feed surged from MMK 609.1/kg in March 2021 to MMK 750/kg in May 2021. Overall, demand was higher for sinking than floating feed over the survey period in 2021 because it was cheaper.



**Figure 6.** Total cost of feed ingredients and total sales value of feed.



**Figure 7.** Total quantity and average sales price of pelleted feed sold.

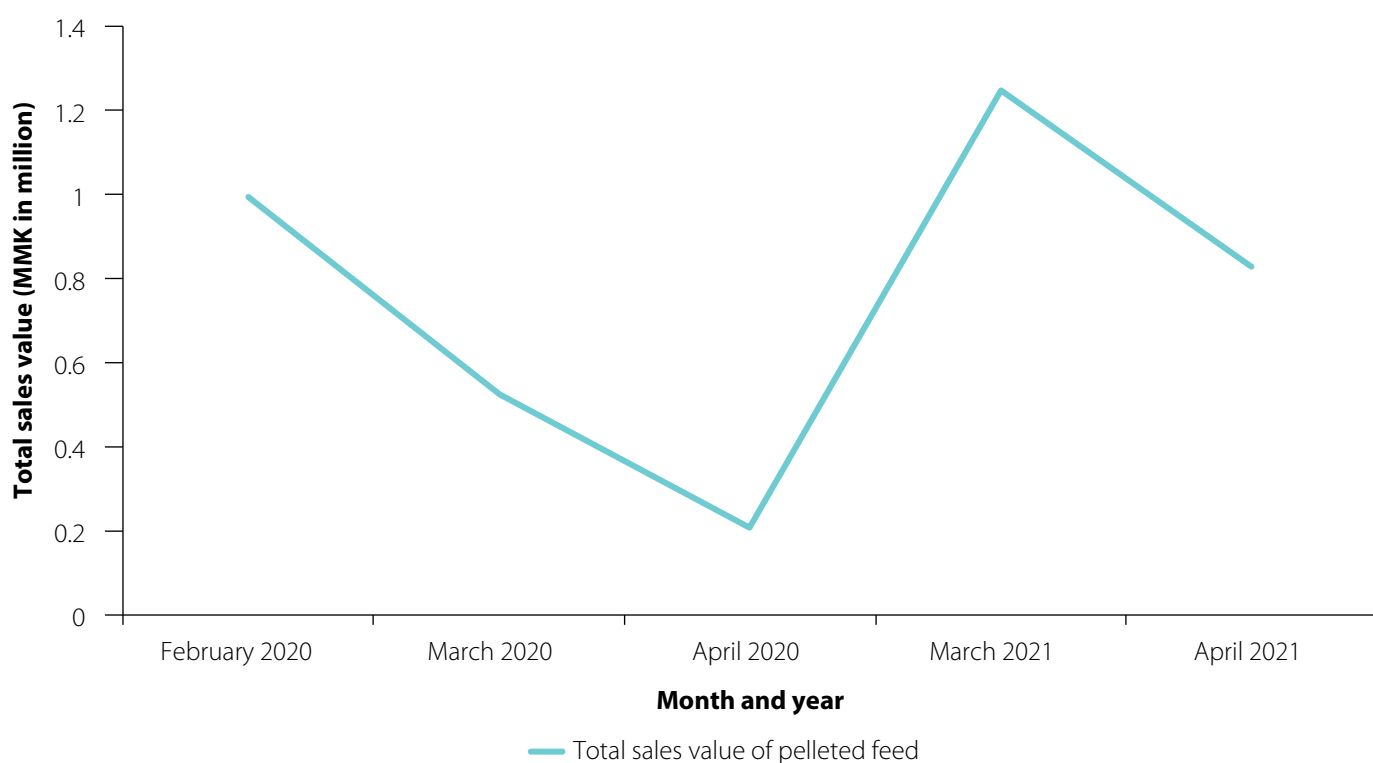
Among the six pelleted feed sellers, five participated in the 2020 survey. Based on sales revenue earned in 2020 and 2021, revenue shrunk 80% during the first wave of the COVID-19 in 2020, from MMK 1 million in February to MMK 200,000 in April (Figure 8). In 2021, sales dropped from MMK 1.2 million in March to MMK 800,000 in April, and none of the sellers had any sales to report in May.

### 5.2.3. Non-pelleted feed sellers

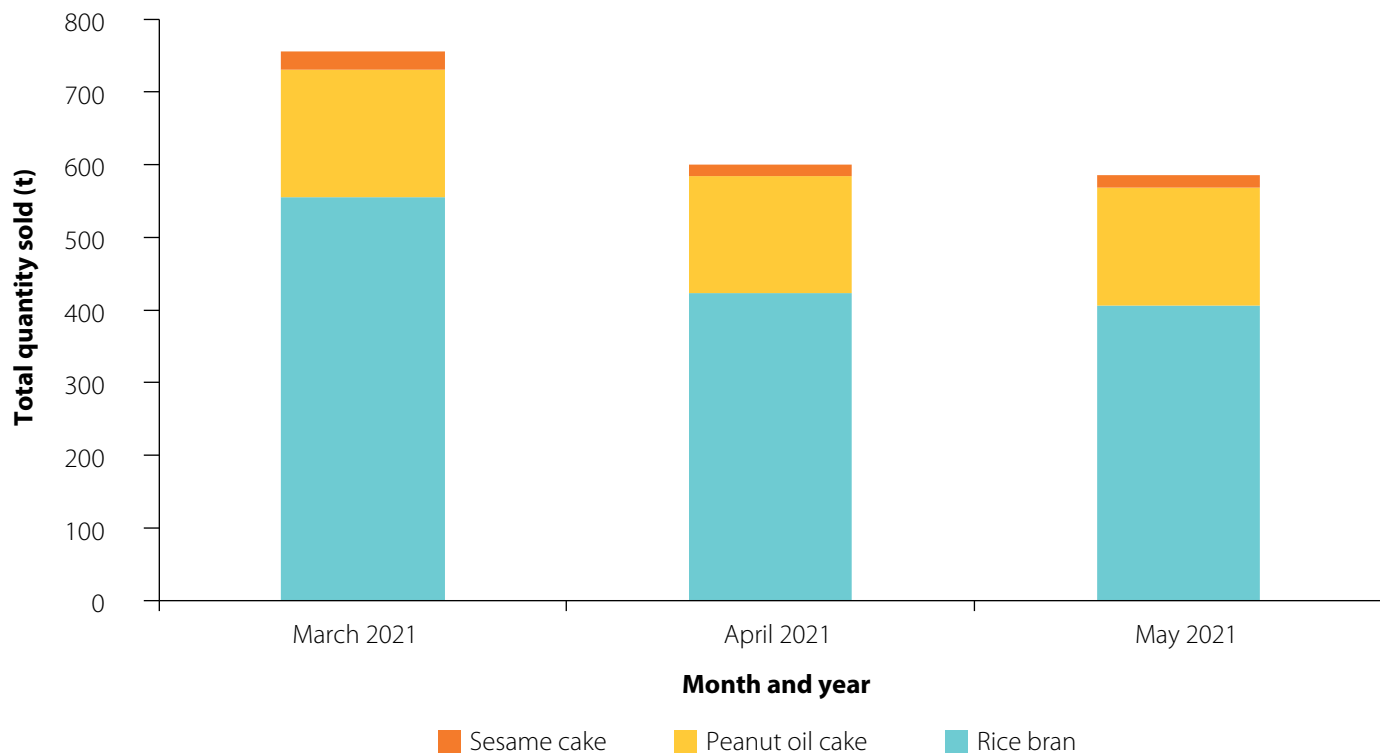
Roughly 40% of aquaculture ponds in Myanmar use non-pelleted feed, especially rice bran (Aung et al. 2018). Six non-pelleted feed sellers were interviewed in 2021, all of whom continued operating throughout the survey period that year. Rice bran constituted roughly 70% of the total amount they sold, followed by peanut oil cake and then sesame cake. In total, they sold 555 t in March but just 424 t in April, after which sales

remained static (Figure 9). Sales of peanut oil cake and sesame cake followed the same trend, with an estimated 10%–30% decline in April from the total amount sold in March. Overall, the average sales price remained relatively stable in 2021 (Figure 10). Rice bran had the lowest average sales price at MMK 253/kg, followed by sesame cake and then peanut oil cake.

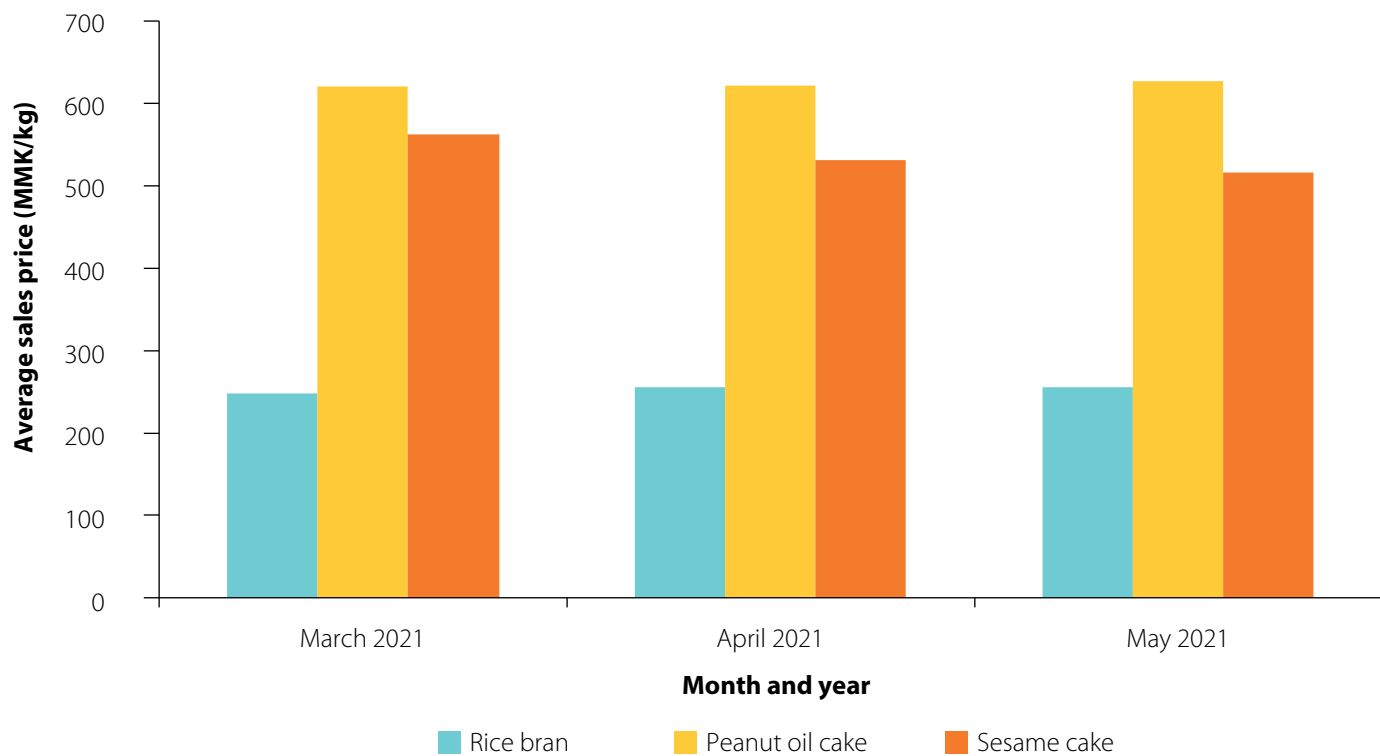
All six of the sellers participated in the survey 2020. Sales of non-pelleted feed were lower in 2021 (Figure 11). In 2020, however, revenue fluctuated monthly. That year, sales increased from MMK 20.7 million in February to MMK 55.8 million in March and then decreased to MMK 33.7 million in April. In contrast, sales revenue earned in 2021 trended downward. Sales were initially reported at MMK 48 million in March, but then declined 50% to MMK 24.3 million in April before plummeting to MMK 11.2 million in May.



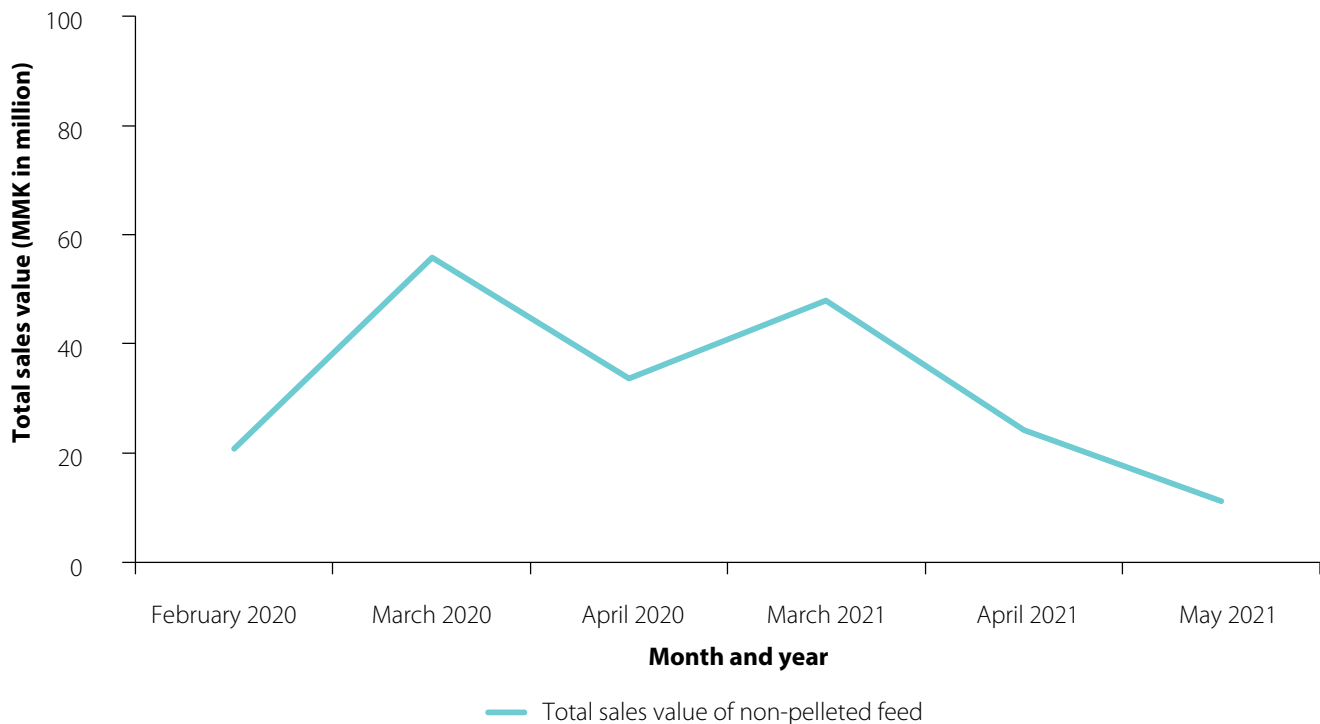
**Figure 8.** Total sales value of pelleted feed.



**Figure 9.** Total quantity of non-pelleted feed sold.



**Figure 10.** Average sales price of non-pelleted feed.



**Figure 11.** Total sales value of non-pelleted feed.

### 5.2.4. Hatchery operators

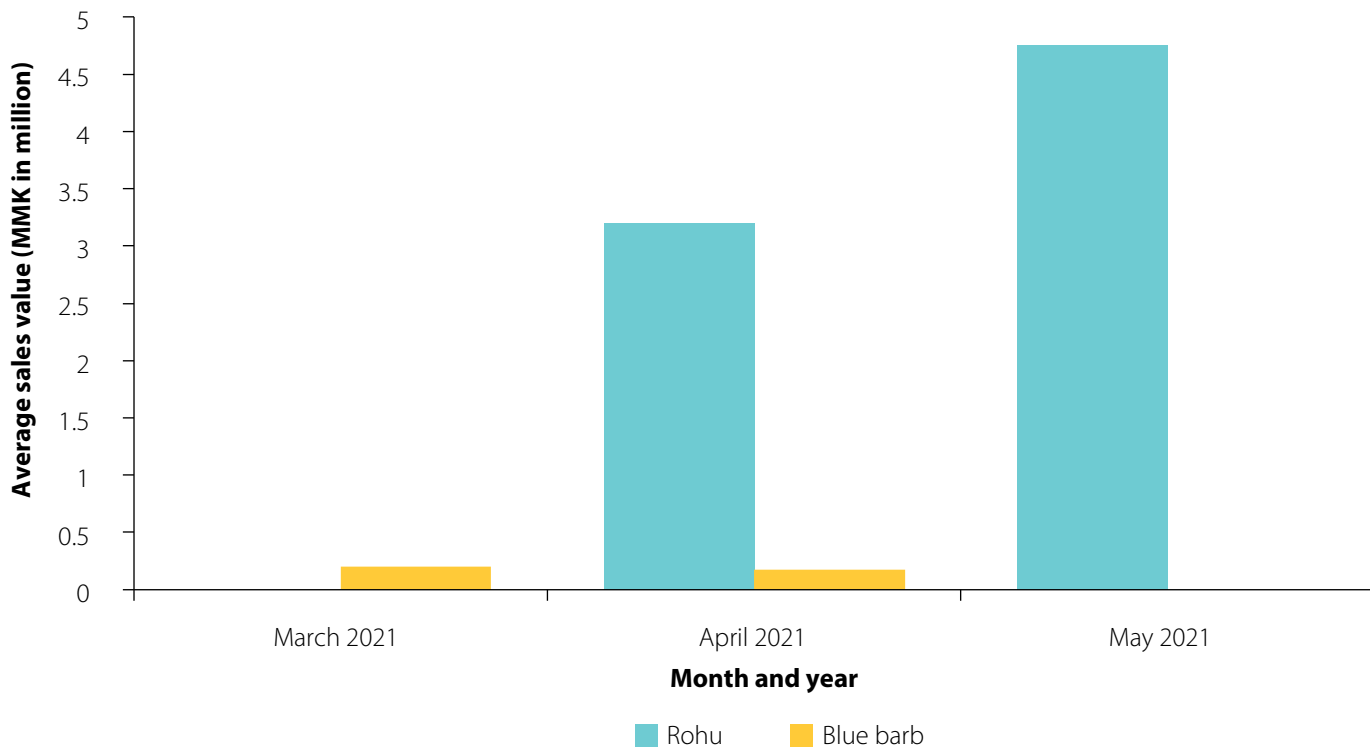
A total of 15 hatchery operators were interviewed in 2021. More than half did not operate in March 2021, though this increased to 73% in April and 87% in May. According to the respondents, their hatcheries were unable to operate during the survey months in 2021, mainly due to transportation restrictions and bad weather during the pandemic, and because the fishing season had closed. Water restrictions were another major issue the respondents faced during the summer.

Rohu and blue barb were the main fish species spawned in 2021 (Figure 12). The average sales of rohu trended upward, from zero in March to MMK 3.2 million in April and peaking in May at MMK 4.8 million. In contrast, average sales of blue barb hatchlings were relatively low and remained static at MMK 200,000 in both March and April. In a similar trend, average sales of fry were highest for rohu throughout the survey period, followed by grass carp, mrigal and silver carp (Figure 13). Sales of tilapia fingerlings were highest among all types of fingerlings, with an average sales value of MMK 1.5 million in March and MMK 1.6 million in May (Figure 14). Overall, sales increased gradually from March to May 2021. Most notably, more fingerlings species were sold in May than in the previous months of 2021.

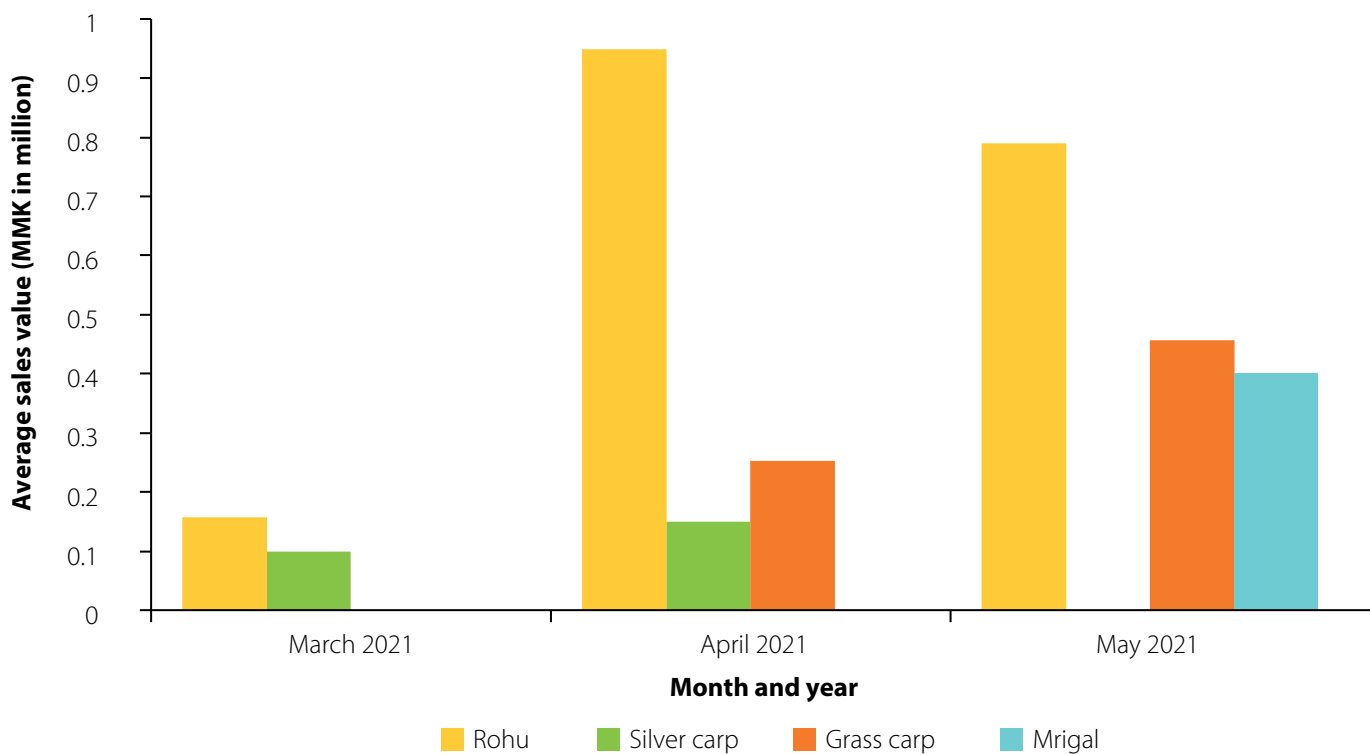
Based on what the surveyed hatcheries reported, total sales were lower in 2021 than the previous year (Figure 15). In 2020, hatchling sales peaked at MMK 22 million in March before dropping sharply to MMK 1.5 million in April. By March 2021, hatchling sales had dropped to just MMK 400,000 before rising to MMK 8 million in April and remaining stable in May. In a similar pattern, fingerlings sales in March 2020 were highest at MMK 11 million before plummeting to MMK 800,000 in April. In 2021, sales of fingerlings went from zero in April to MMK 11 million in May. Sales of fry fluctuated the least, remaining stable at roughly MMK 1 million throughout the survey period, except for February 2020, with no sales reported, and March 2021, which had just MMK 300,000 in sales. Overall, the results suggest more severe negative impacts of COVID-19 on hatcheries in 2021 than 2020.

### 5.2.5. Farmers

A total of 49 farmers were interviewed in 2021, of whom 98% operated in March and 94% in May. Despite the slight decline in business operations during the survey period, the percentage of inputs they purchased increased steadily in 2021. More than half of the farmers bought inputs in March, two-thirds in April and 80% in May.

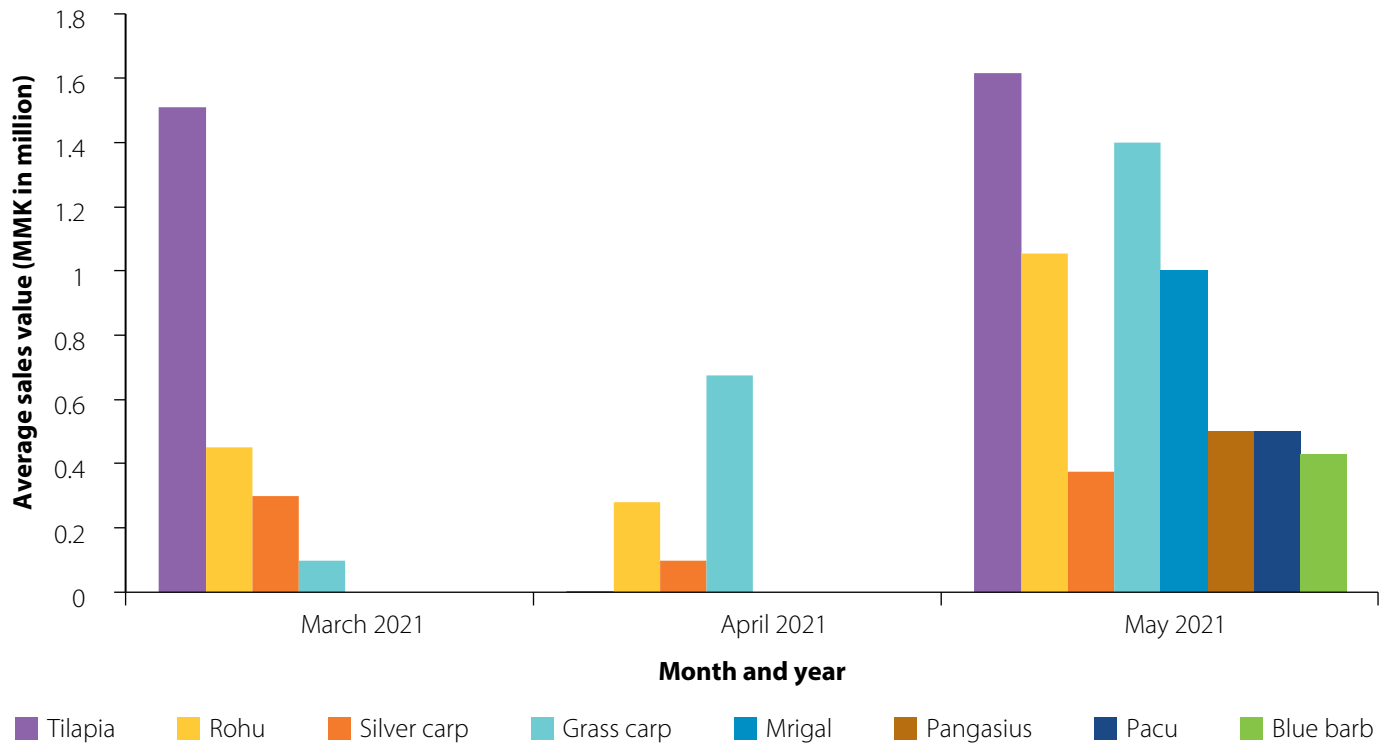


**Figure 12.** Average sales value of hatchlings per hatchery.

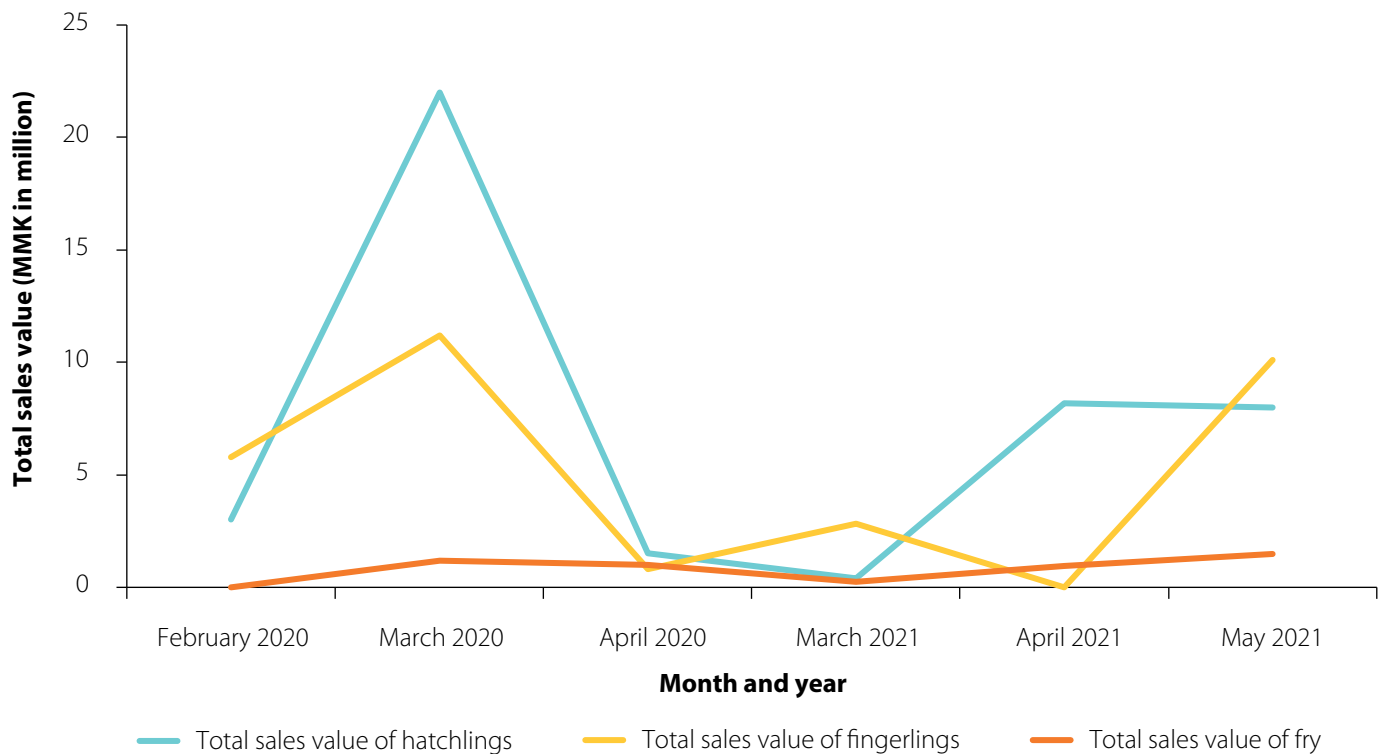


**Figure 13.** Average sales value of fry per hatchery.





**Figure 14.** Average sales value of fingerlings per hatchery.

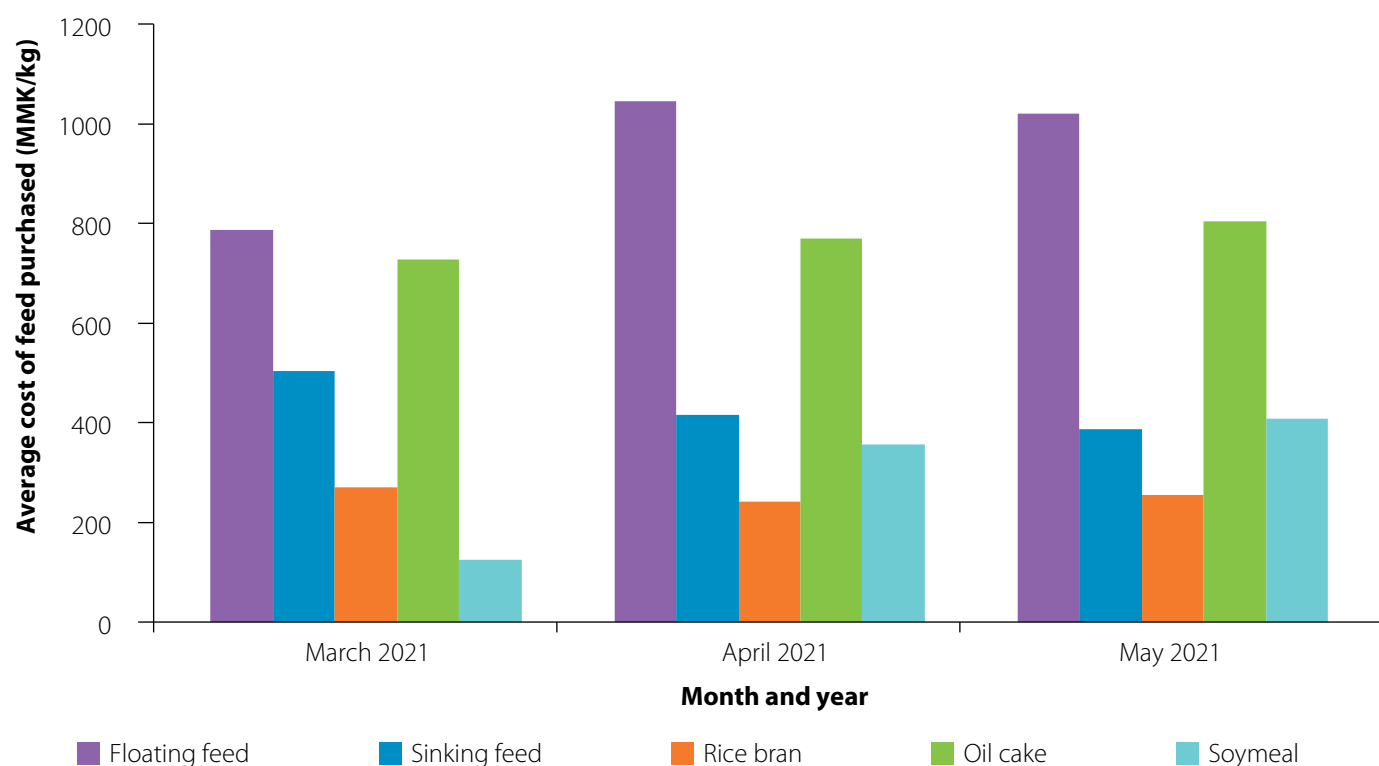


**Figure 15.** Total sales value of hatchlings, fingerlings and fry.

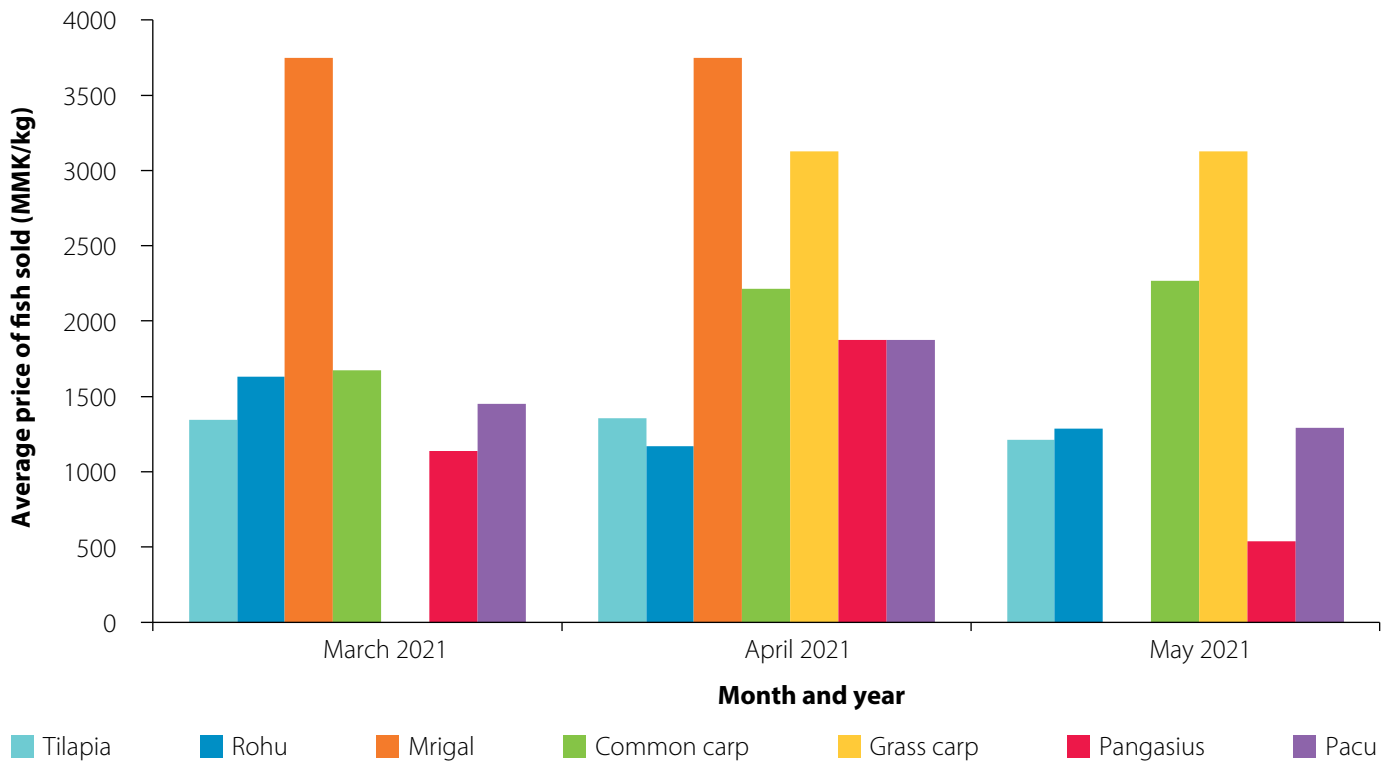
The farmers revealed that they incurred high input costs to maintain their production cycle during the pandemic. As a result, they bought less feed in order to save on input costs. Among the types of feed they bought in 2021, floating feed remained the most expensive, followed by oil cake and then sinking feed (Figure 16). The average cost of floating feed was MMK 785.9/kg in March, which increased gradually to MMK 1044.5/kg in April and MMK 1019.3/kg in May. The average price of oil cake purchased remained relatively stable, with a slight increase from MMK 728.1/kg in March to MMK 804.6/kg in May, while the price of sinking fish feed dropped from 7% to 17% over the same period. In a similar trend, the average price of rice bran purchased remained relatively stable, at MMK 255.6/kg. In contrast, however, the price of soymeal increased two-fold from MMK 125/kg in March to MMK 242.4/kg in April and remained stable thereafter.

Fish demand was lower in 2021 compared to the pre-pandemic period, which cut fish prices in half. Among the fish species that the farmers sold, mrigal had the highest farmgate price at MMK 3750/kg, followed by common carp at MMK 3125/kg (Figure 17). The average sales price for each fish species, except for pangasius, fluctuated 40%–50% on average during the survey period. The farmgate price for pangasius stood at MMK 1136.4/kg in March before surging to MMK 1875/kg in April, followed by a sharp decline to MMK 540.4/kg in May.

Among the farmers, total sales outweighed total costs in 2020, with a steep rise in net profit from MMK 269.8 million in February to MMK 1.8 billion in March before plummeting to MMK 165.8 million in April (Figure 18). In contrast, net profit was lower in 2021 than 2020. Total costs outweighed total revenue by MMK 3 million in March 2021, followed by a net profit of MMK 42.7 million in April and MMK 126.6 million in May.



**Figure 16.** Average cost of feed purchased by farmers.



**Figure 17.** Average farmgate price of farmed fish.



**Figure 18.** Total cost of inputs purchased and total sales value of farmed fish.

### 5.2.6. Fishers

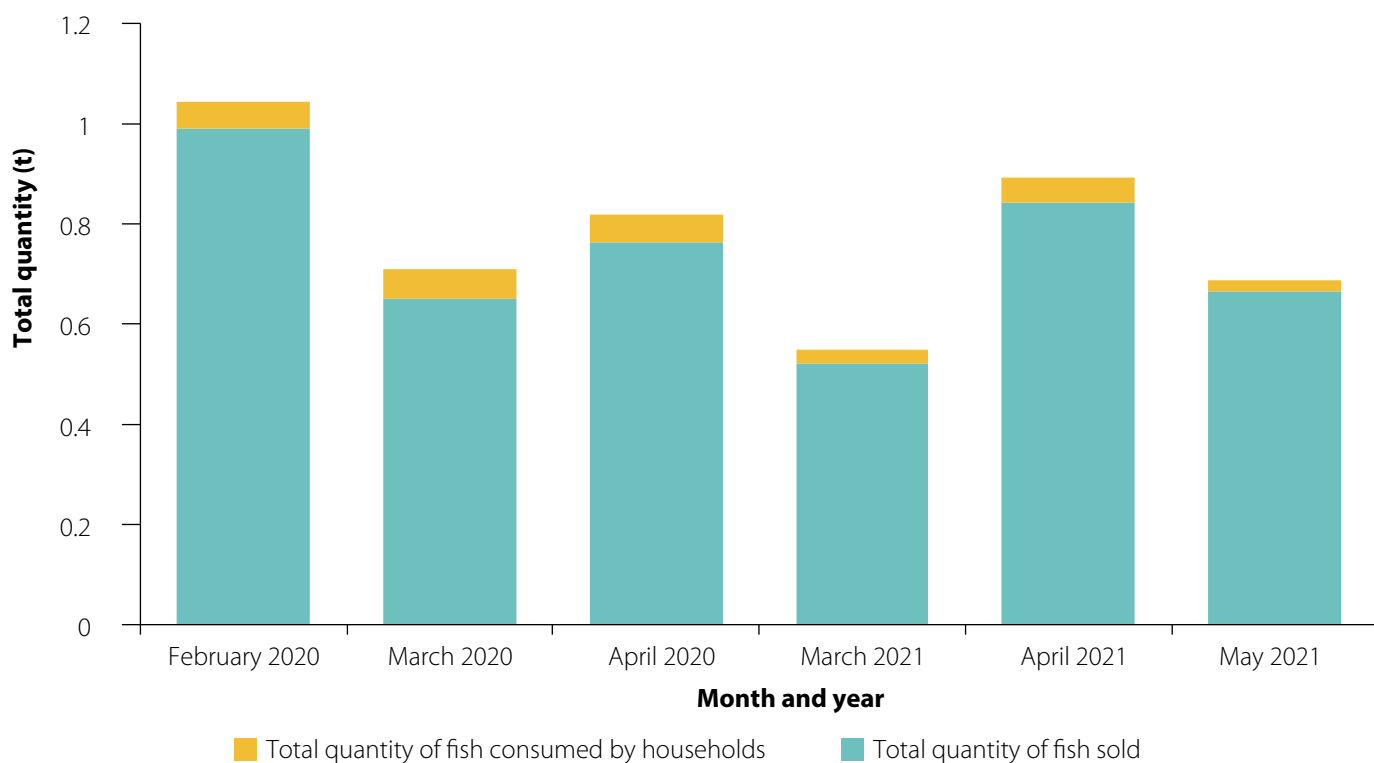
The COVID-19 pandemic has severely impacted the livelihoods of small-scale fishers in Myanmar, with an estimated 30%–50% reduction in income (MDN 2020a). Among the surveyed fishers in this study in 2021, 36% reported that they did not go fishing in March because they said it was out of season, whereas 17 of 25 fishers reported that the fishing season was closed in May. The average number of days for fishing trips per month was 14, with an average of 5 hours spent per day. More than 75% of interviewed fishers went fishing in rivers, followed mangroves and then natural waterbodies, such as beels, inns and lakes.

Among the 25 surveyed fishers, 24 of them participated in the 2020 survey, as reported in Belton et al. (2021). The total amount of fish that they caught fluctuated between 500 kg and 1 t in 2020 and 2021 (Figure 19). The fishers caught the most amount of fish in February 2020 and the least in March 2021. Their households consumed an average of 5.7% of the fish they caught, and the rest were sold for income. Most notably, the percentage of fish consumed from the total amount of fish caught was lowest in May 2021, accounting for just 3.4%.

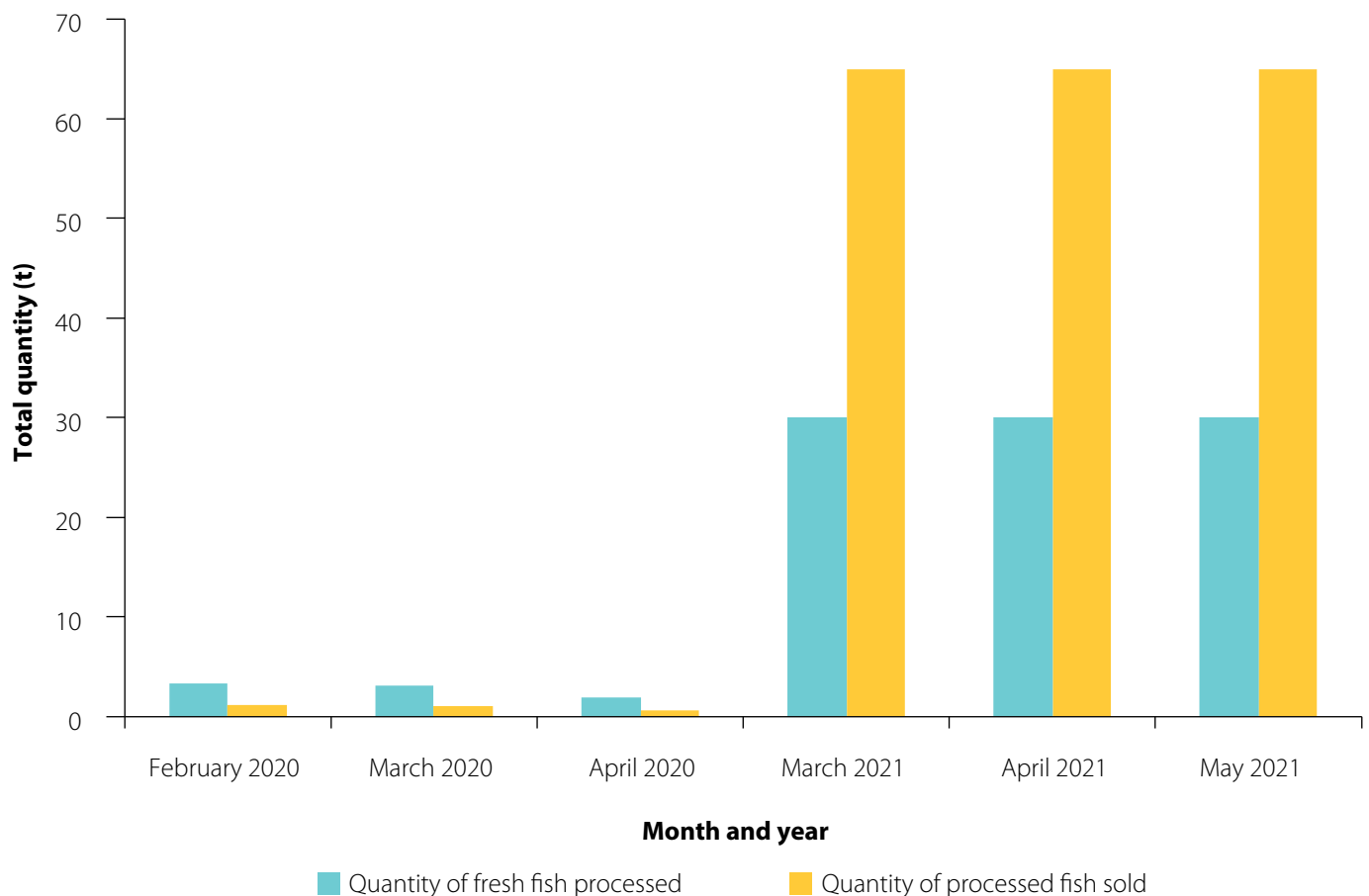
### 5.2.7. Processors

During the survey period in 2021, more than two-thirds of processing businesses had ceased operations because the fishing was closed and there was a shortage in the supply of fresh fish. When they were in operation, the types of fish processed included dried fish, fried prawn and dried prawn. Of the 17 processors interviewed in 2021, six had participated in the 2020 survey. Based on the observations from these processors, processing businesses were more severely impacted in 2020 than 2021 based on the quantity of fresh fish processed and also processed fish sold in these years.

In 2020, the quantity of fresh fish processed was higher (2.9 t) than the amount of processed fish sold (1 t) on average (Figure 20). However, the quantity of fresh fish processed declined gradually in 2020, from 3.3 t in February to 3.1 t in March before dropping to 2 t in April. The quantity of processed fish sold in 2020 also trended downward, with 1.2 t sold in February and 1.1 t in March before dropping sharply to 600 kg in April. In contrast, the results were different in 2021 as 65 t of processed fish were sold each month, with 30 t of fresh fish used for processing.



**Figure 19.** Total quantity of fish caught.



**Figure 20.** Total quantity of fresh fish processed and processed fish sold.

### 5.2.8. Traders

Among the 11 traders surveyed in 2021, all of them participated in the 2020 survey, as reported in Belton et al. (2021). While 91% of the businesses were in operation, the remaining 9% did not operate because of the unstable economic and political situation during the survey period.

Overall, the average sales price of traded fish was higher in 2020 than 2021 (Figure 21). In 2020, the traded price of farmed fish remained static at MMK 1820.9/kg in February and March before it peaked at MMK 2912.3/kg in April. In 2021, March recorded the highest average sales price of MMK 2336.1/kg before it declined to MMK 1524.3/kg in April and MMK 1440.4/kg in April and May. In 2020, a total of 1400 t of farmed fish were sold in February and 1900 t in both March and April. Then in 2021, the total amount of farmed fish sold increased sharply from 600 t in March to 1800 t in April and then 4200 t in May.

The average price of captured freshwater fish was MMK 11,243.5/kg in 2020, which dropped almost

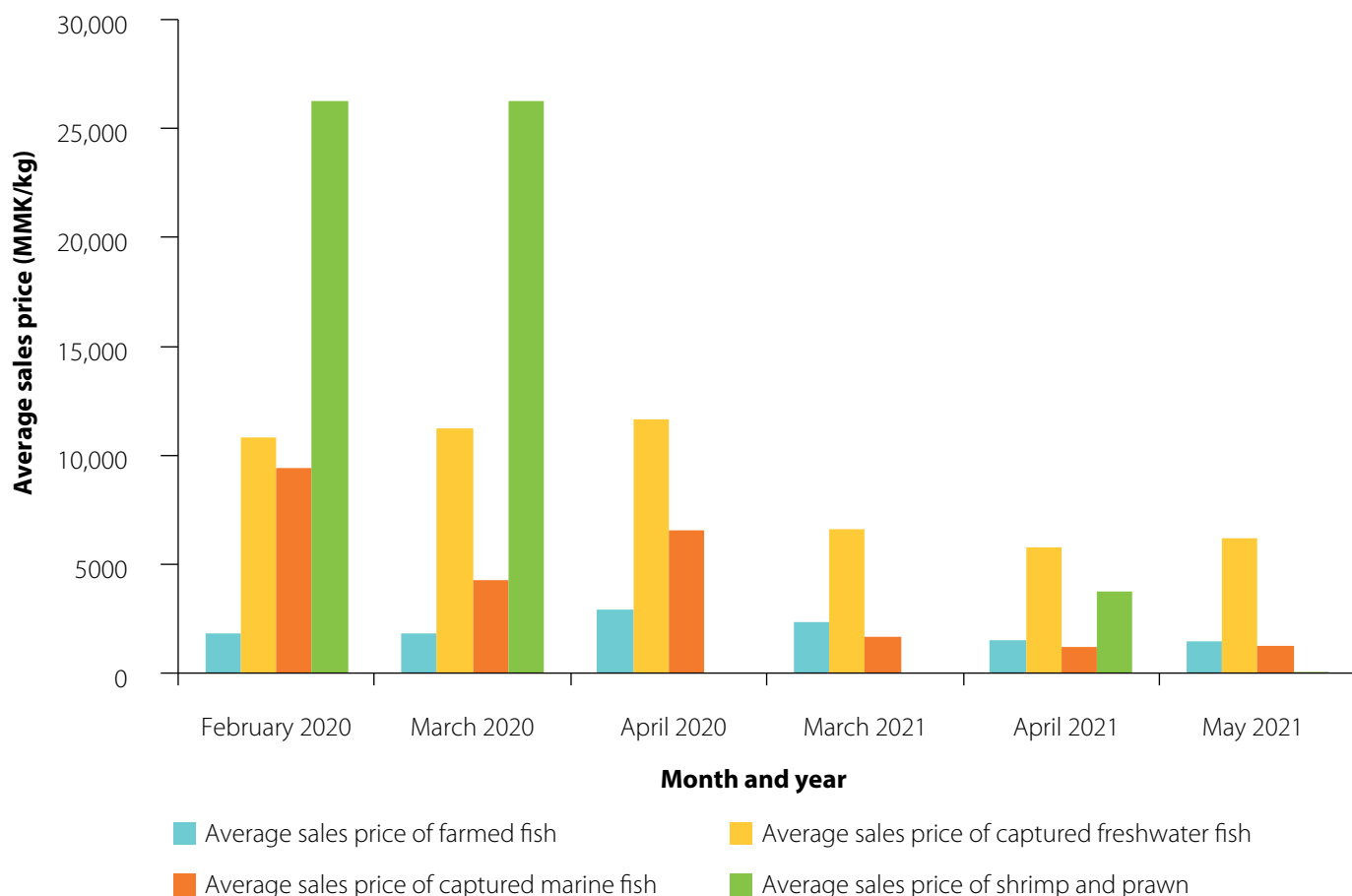
in half in 2021 to just MMK 6184.8/kg (Figure 21). This was mainly due to greater diversity of captured freshwater fish species traded in 2020 than 2021. The species traded in 2020 were striped snakeheads, small barb, small mixed freshwater fish and hilsa. In contrast, only freshwater hilsa and small mixed freshwater fish were traded in 2021. The total quantity of captured freshwater fish sold declined gradually from 383.9 t in February 2020 to 77.2 t in May. In 2021, the amount of fish sold was roughly 80% lower than in 2020.

A similar trend occurred with captured freshwater fish, where the traded price of captured marine species was higher in 2020 than 2021 (Figure 21). More marine species were traded in 2020, such as marine hilsa, small mixed marine fish and Spanish mackerel. In contrast, traded species of captured marine fish in 2021 comprised just marine hilsa and small mixed marine fish. The traded price of captured marine species fluctuated more in 2020, peaking at MMK 9421.6/kg in February and then dropping 50% in March before rising to MMK 6543.3/kg in April. In 2021, prices surged to MMK 1675.9/kg in March and then declined to

MMK 1191.7/kg in April and MMK 1226.6/kg in May 2021. Despite the higher average sales price of marine fish in 2020, the total amount of fish sold was lower in 2020 than 2021, accounting for approximately 50 t on average in February and March 2020. The total quantity of marine fish sold in 2021 ranged between 171.2 t and 240 t.

In 2020, the average traded price of shrimp in both February and March stood at MMK

26,250/kg (Figure 21). This was mainly due to higher-value prawn species such as freshwater prawn (macrobrachium) being traded. In contrast, small freshwater shrimp was the main shrimp species traded in 2021, trading at MMK 3750/kg in April. Overall, the total quantity of shrimp traded was lower than freshwater captured fish, marine captured fish and farmed fish, with an average amount sold of just 100 kg in 2020 and 10 t in 2021.



**Figure 21.** Average sales price of traded fish.

### 5.2.9. Retailers

Among the 15 fish retailers surveyed in 2021, more than 70% operated their business throughout the survey period, with an average number of operating days of 25 per month. Based on the business performance of the retailers, the average sales price of fish was lower in 2021 than 2020.

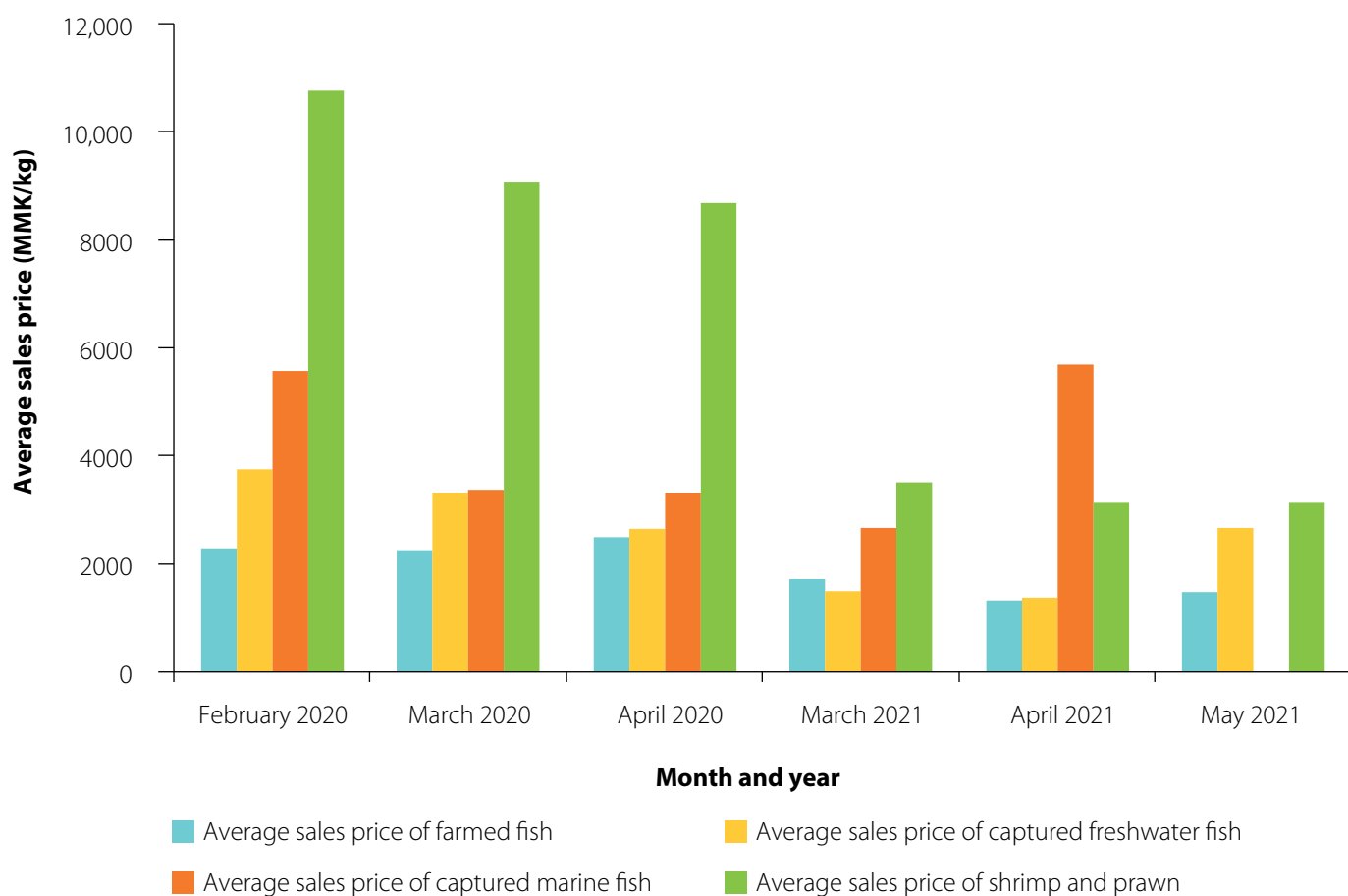
The most notable difference was the sales price of shrimp and prawn, which dropped approximately two-thirds from 2020 to 2021 (Figure 22). Overall, the average sales price of

shrimp and prawn declined significantly from MMK 10,759.3/kg in February 2020 to MMK 3125/kg in May 2021. This discrepancy was due to the higher-value giant freshwater prawn being sold in 2020, whereas small freshwater shrimp were sold in 2021. The total amount of fish sold in 2020 was roughly 15 t per month on average. In contrast, the demand for shrimp and prawn declined sharply in 2021, comprising of 40 kg sold in March and 60 kg in May. The findings indicate an approximate drop of 99% in terms of the total quantity of shrimp sold from 2020 to 2021.

In a similar trend, the average sales price of freshwater fish in 2020 was twice as high as in 2021, accounting for approximately MMK 3107.9/kg in 2020 and just MMK 1638.5/kg in 2021 (Figure 22). The total quantity of freshwater fish sold was also lower in 2021 than 2020, with an average of 39.3 t sold per month in 2020 and 1.4 t in 2021.

Farmed fish had the lowest average sales price of all, going from MMK 2300/kg in 2020 to below MMK 2000/kg in 2021 (Figure 22). The types of farmed fish sold during the survey period were tilapia, major carp and walking catfish. Although the average sales price decreased, the demand of farmed fish gradually increased, with an average of 258.9 t sold in 2020 up to 791 t in 2021.

The average sales price of marine fish fluctuated over the survey period in both 2020 and 2021 (Figure 22). Initially, the average price stood at MMK 5573.3/kg in February 2020, but then declined to MMK 3345.2/kg in both March and April. In 2021, however, the average sales price of captured marine fish was reported at MMK 2658.9/kg in February before it surged to MMK 5699.1/kg in April. There were no sales of captured marine fish reported in May 2021. In 2020, the amount sold plunged from 120.9 t in February to 17 t in April. In contrast, the total quantity of captured marine fish sold in 2021 was higher, at 372 t in March and 500 t in April.



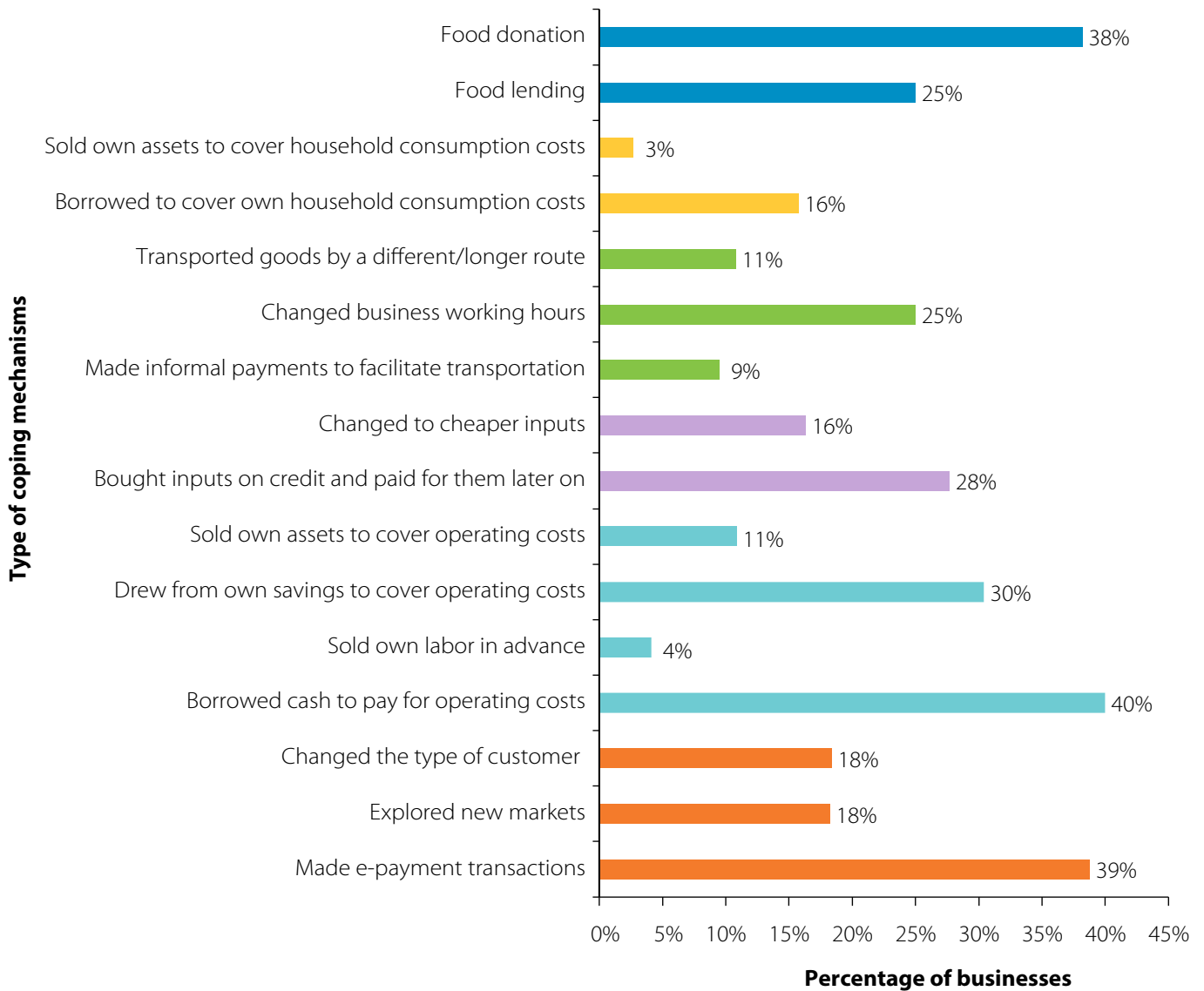
**Figure 22.** Average sales price of retail fish.

## 6. Resilience and coping mechanisms

In 2021, the respondents used a variety of coping mechanisms to build recovery and resilience during these unprecedented times. Both female and male respondents have played a significant part in supporting the community, with approximately 25% of respondents lending money or food to their staff and one-third donating food to others. This emphasizes the importance of community support to cope with external shocks.

In response to mitigating the socioeconomic impacts of COVID-19, the government has

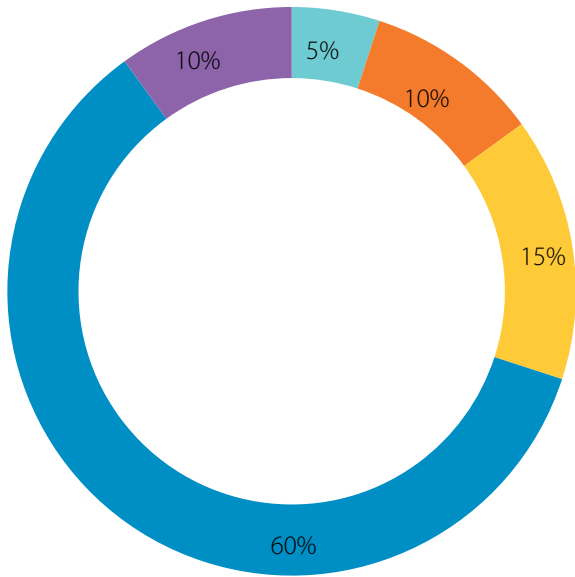
implemented several relief programs to help low-income and vulnerable groups (WorldFish 2020). For instance, early food relief packages were introduced, though they were distributed infrequently and only in limited areas (FAO 2020). Overall, only 12% of the respondents received assistance during the survey period in 2021. On average, more respondents received help from nongovernmental organizations, and all whom did so were male. Only 9% of female respondents received help from the government and community associations.



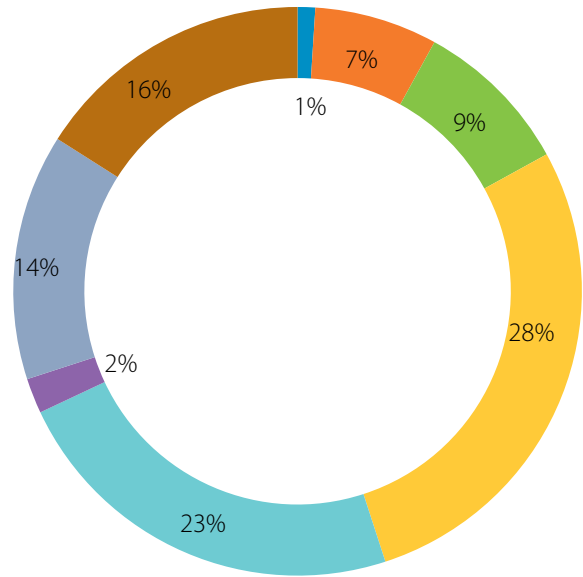
**Figure 23.** Coping mechanisms adopted by the respondents.



**Borrowed cash from any source to pay for the operating costs of their business**



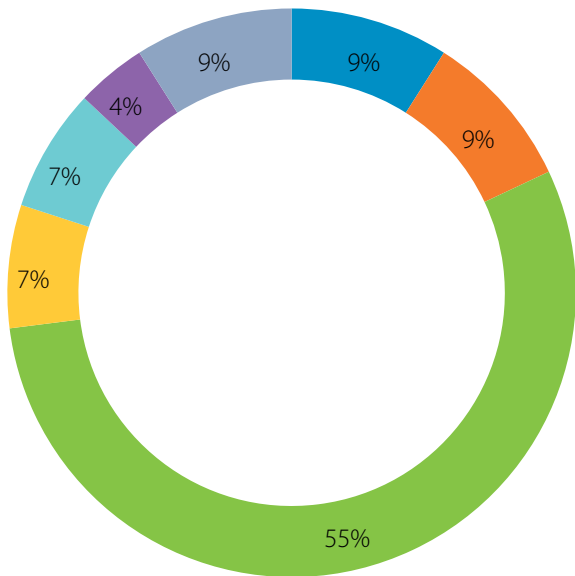
**E-payment**



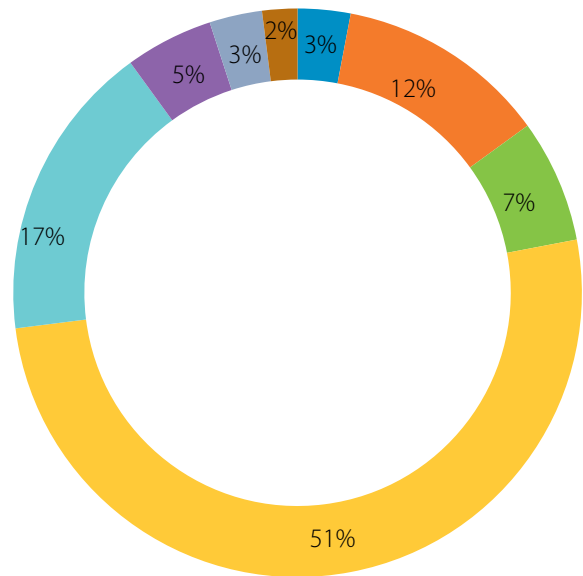
Feed sellers (pellet) Farmers Fish processors Hatchery operators Fishers

Feed sellers (pellet) Hatchery operators Fishers Feed sellers (non-pellet) Farmers Fish processors Fish traders Fish retailers

**Drew from own savings to cover operating costs**



**Bought inputs on credit**



Feed sellers (non-pellet) Fishers Fish retailers Feed millers Farmers Fish traders Hatchery operators Fish processors Feed sellers (non-pellet) Fishers Fish retailers Farmers Hatchery operators Fish processors

**Figure 24.** Main coping strategies adopted by the respondents.

Borrowing tends to be the customary coping strategy because of the decline in income and remittances during the ongoing crises. To cover their household consumption costs, 16% of the respondents resorted to borrowing, while 3% sold assets to cover these costs. Based on

the qualitative interviews with fish value chain actors from KenTung Township, households began eating more food that they grew at home, including fish, vegetables and local fruits, to cut down their expenditures. Furthermore, the fish value chain actors in the community of Lampi also

mentioned that they decreased their household consumption costs by substituting milk powder with rice porridge for newborn babies.

Two other main coping strategies were used to cover operating costs. Among the respondents, 40% borrowed cash and 30% drew on savings. Among those who borrowed money, 60% were farmers and 15% were fishers, while both hatchery operators and fish processors were 10% each. Among those who used savings, 55% were farmers, followed by fish retailers, hatchery operators and non-pellet feed sellers at 9% each. In other methods used to cover business operating costs, 11% of respondents sold assets while 4% sold labor in advance.

The respondents were also asked if they changed their transportation route during the crisis. Eleven percent took a longer route to transport goods while 9% made informal payments to facilitate transportation. In addition, 25% of respondents agreed that they had to change their business working hours because of the movement restrictions and curfews. On the other hand, the respondents adopted alternative methods to pay for inputs. Approximately 28% of the respondents received inputs on credit and paid for them later. Almost half were farmers, while 17% were fishers and 12% non-pelleted feed sellers. In addition, 16% of respondents switched to cheaper inputs to save on business costs.

During the survey periods, e-payment became one of the most important coping mechanisms among the respondents. Approximately 39% of them made or received payments electronically using mobile payment or a banking app. Of these, 28% were farmers, 23% were fishers, 16% fish retailers and 14% fish traders. Furthermore, approximately 18% of the respondents explored new customer segments and changed the type of customer they usually sell to. From the in-depth discussions with farmers from KenTung Township, they mentioned that they had reached out to customers in some alternative ways during the crisis, such as by phone, and provided delivery to customers based on the orders they received.

Based on the qualitative interviews and in-depth discussions in KenTung and Lampi, some of the households did not change their business strategies during the first wave of the pandemic,

as their businesses were not significantly affected. However, most of the respondents did change professions and sought alternative sources of income during the second-wave of the outbreak.

A fish retailer explained the way she generated additional income:

*"Since the beginning of 2020, I reduced the quantity of fish to sell in the market due to lesser demand. I have applied the technical skills that I have learned from WorldFish 2 years ago and managed to process the unsold fish from the market into dried fish and fish paste. I managed to sell my fish products and fish paste in our village as an alternative income."*

Another respondent shared her experience in generating additional income:

*"I do not have time to find customers online and am unable to provide delivery service to my customers. As an alternative method, I start selling pizza by the street while at the same time taking care of my child. However, I am unable to continue selling when stricter lockdown is implemented and we are all asked to stay at home. Therefore, our income is getting lesser and it is difficult to support our family."*

Based on the analysis from the qualitative interviews, other common strategies adopted by the households were reducing household expenditures, substituting with cheaper inputs, selling assets and using their own savings to support their family. The households suffered from unequal economic impacts according to their composition, household income level and the business strategies adopted during the COVID-19 pandemic. Even though some households received financial support from the government and informal networks, the amount of money ranged from MMK 20,000 to MMK 50,000 per household, which was insufficient for the family in the long-term. Because of this, many fish actors, especially farmers, found it difficult to live through the pandemic.

## 7. Conclusion and recommendations

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This study assessed the impacts of the COVID-19 pandemic on fish value chains in Myanmar and their options to build resilience and recovery. Overall, the COVID-19 outbreak had significant negative effects on the performance of business operations along fish value chains, particularly on sales, prices, and cost of inputs. As most of the respondents used only short-term coping strategies, long-term support is required to develop more resilient livelihoods in the future. The following provides an outline of policy recommendations to alleviate external shocks on fish value chain actors and their livelihoods in Myanmar:

- The pandemic has accelerated the digital transformation in our daily lives, and such adoption should be encouraged in the fish value chain. There is a need to provide educational programs and training for fish value chain actors, especially in rural areas, to improve their computer literacy skills.
- E-commerce should be greatly promoted as an alternative platform for business. By practicing digital marketing strategies, e-commerce will help fish value chain actors find new customers and boost sales. It also brings convenience to both sellers and buyers to avoid physical interactions under this new norm.
- Technical training in post-harvest fish processing can be provided to fish value chain actors. Fish that remain unsold at markets can be processed into nutrient-rich fish products like fish powder and dried fish to prolong shelf life.
- The government should provide more subsidies to vulnerable groups, such as providing loan discounts and credit support to improve the resilience of households.
- Training on disaster risk reduction can be implemented so that people can prepare and adapt for emergency and unforeseen circumstances.

# Notes

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<sup>1</sup> The exchange rate of USD 1 was equivalent to MMK 1428.6 in April 2020.

<sup>2</sup> The exchange rate of USD 1 was equivalent to MMK 1666.7 in May 2021.

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## **About WorldFish**

WorldFish is a nonprofit research and innovation institution that creates, advances and translates scientific research on aquatic food systems into scalable solutions with transformational impact on human well-being and the environment. Our research data, evidence and insights shape better practices, policies and investment decisions for sustainable development in low- and middle-income countries.

We have a global presence across 20 countries in Asia, Africa and the Pacific with 460 staff of 30 nationalities deployed where the greatest sustainable development challenges can be addressed through holistic aquatic food systems solutions.

Our research and innovation work spans climate change, food security and nutrition, sustainable fisheries and aquaculture, the blue economy and ocean governance, One Health, genetics and AgriTech, and it integrates evidence and perspectives on gender, youth and social inclusion. Our approach empowers people for change over the long term: research excellence and engagement with national and international partners are at the heart of our efforts to set new agendas, build capacities and support better decision-making on the critical issues of our times.

WorldFish is part of One CGIAR, the world's largest agricultural innovation network.