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Impacts of COVID-19 on aquatic food supply chains in Myanmar

February – November 2020

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About FISH

The CGIAR Research Program on Fish Agri-Food Systems (FISH) is a multidisciplinary research program. Designed in collaboration with research partners, beneficiaries and stakeholders, FISH develops and implements research innovations that optimize the individual and joint contributions of aquaculture and small-scale fisheries to reducing poverty, improving food and nutrition security and sustaining the underlying natural resources and ecosystems services upon which both depend. The program is led by WorldFish, a member of the CGIAR Consortium. CGIAR is a global research partnership for a food secure future.

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Table of contents

Table of contents	3
1. Background.....	4
2. Overview.....	4
3. Key findings	4
Hatcheries	7
Feed mills.....	8
Feed sellers.....	9
Farmers.....	9
Fishers	10
Processors	11
Traders.....	12
Retailers	12
4. Recommendations	13

1. Background

The first laboratory confirmed case of COVID-19 was registered in Myanmar on 23 March 2020. On 18 April a 'lockdown and stay home' order was given for seven Townships in Yangon Region. Restrictions were subsequently eased and on 21 July 50% of high schools opened. Gathering restrictions were also eased from a maximum of 5 to 15 people on 29 July. Subsequently an increase in COVID-19 cases led to a return of restrictions on 1 September and these remain in place to date. At the start of November 2020, 78% of cases and 96% of deaths had been recorded in Yangon City. The main fish wholesale markets for the country are located in Yangon. Fish are distributed from these markets nationwide.

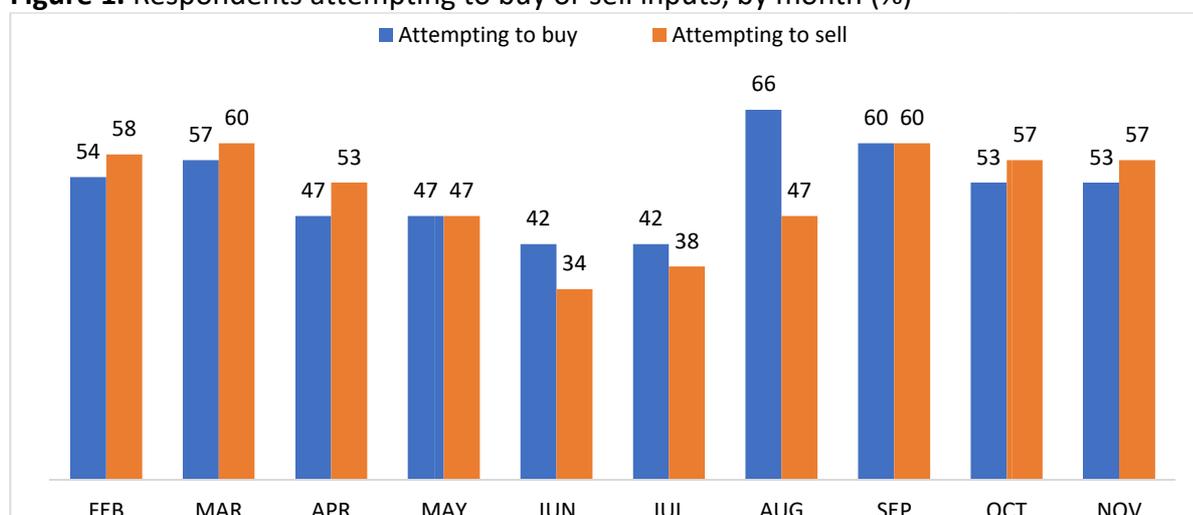
2. Overview

We conducted a monthly phone survey with fish supply chain actors in Myanmar to assess impacts of COVID-19 on the availability and price of aquatic foods and production inputs. Respondents answered questions about their activity between the months of February and November 2020. The sample totaled 143 respondents, comprised of the following: feed mills (5), feed sellers (12), fish hatcheries (15), fish farmers (45), fishers (25), traders (12), processors (11) and retailers (14). Areas covered included the regions of Ayeyarwady (29%), Yangon (21%), Shan State (25%), Sagaing (22%), and Mandalay (3%). A complete summary of survey results can be accessed [here](#).

3. Key findings

The share of respondents attempting to buy products dropped from 57% in March to 47% in April, when the first lockdown was implemented. It fell further thereafter, remaining at 42% in June and July, before jumping to 66% in August, only to fall again to 53% from October onwards, following the newly enforced COVID-19 restrictions and the 'second wave' of the virus (Figure 1). The share of respondents attempting to sell inputs followed an even more marked downward trend, declining steadily from 58% in February to 34% in June, before recovering to 60% in September and remaining stable until November. These trends suggest that demand for production inputs was substantially impacted during both lockdowns.

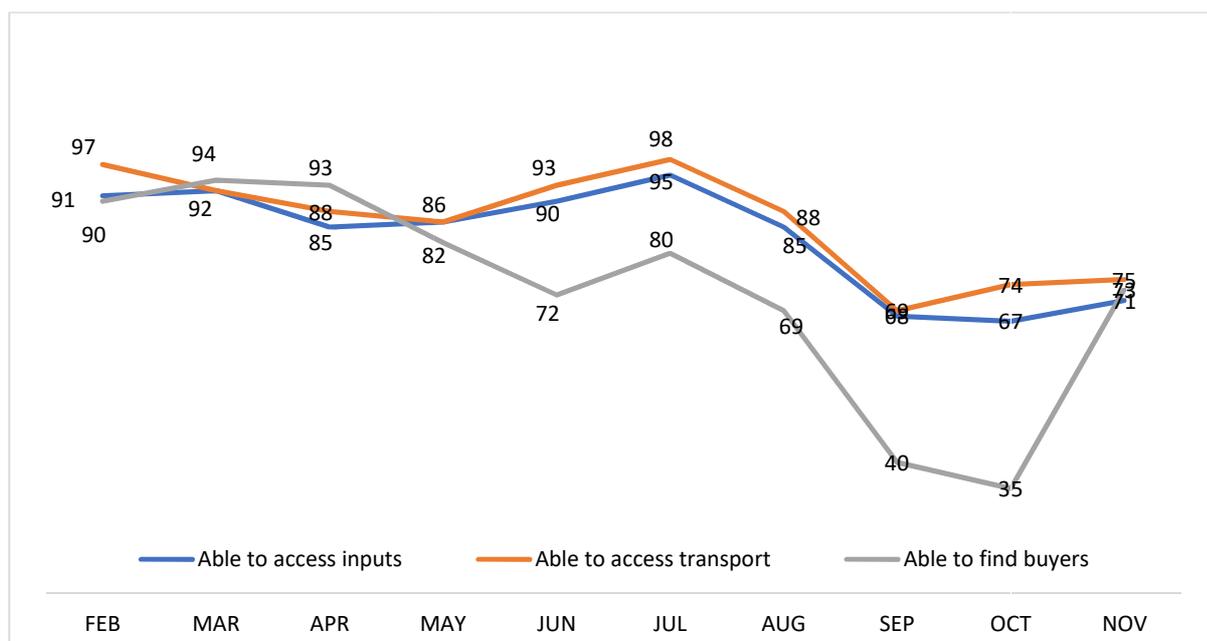
Figure 1. Respondents attempting to buy or sell inputs, by month (%)



The share of respondents able to access inputs and transport on all occasions needed remained relatively stable between February and July before quickly dropping in September, to the lowest levels over the survey period (Figure 2). The share of respondents able to access transport for their business needs fell by only 10 percentage points during the initial lockdown (from 97% in February to around 87% on April and May), but the impact was less severe than might have been expected given the movement restrictions in place, and rebounded quickly, to reach 98% in July. This number dropped sharply to 69% during the second lockdown in September however, the lowest level over this period, before climbing to 75% by November. The share of respondents reporting being able to access inputs when needed followed an almost identical pattern.

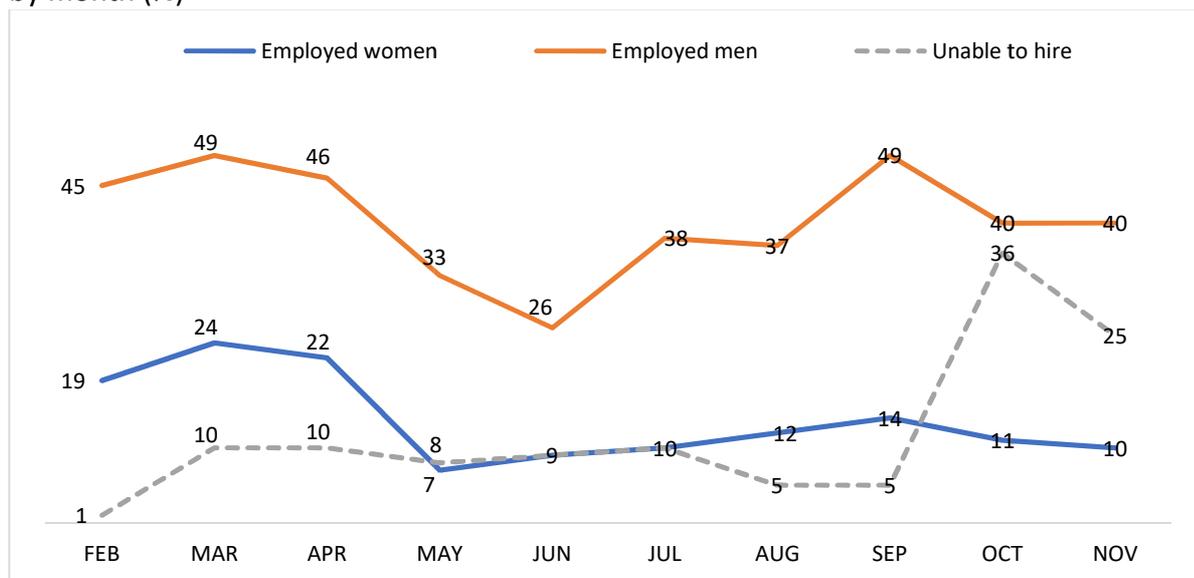
In contrast, the share of respondents reporting that they were able to find buyers for all the products they expected to sell remained fairly stable from February to April, at 91-94%, but declined to 72% in June, climbing to 80% in July, before plummeting to 35% in October and rebounding to 73% in November. This pattern appears indicative of a drop in the purchasing power from buyers that continued after the easing of initial restrictions implemented to control the COVID-19 outbreak and worsened after the second outbreak in August.

Figure 2. Respondents able to access inputs, transport or buyers, by month (%)



Employment followed a somewhat similar pattern. The share of respondents hiring both female and male labor appeared to recover after the initial lockdown measures were lifted, but worsened after the cases of COVID-19 started surging again in August. The percentage of respondents reporting employing male casual workers fell steeply between March and June (from 49% to 26%), recovering to 49% in September, before dropping by 9 percentage points in October and remaining at this level in November (Figure 3). In contrast, the share of respondents hiring female casual workers dropped from 24% in March to 7% in May and remained low thereafter, reaching 14% in September, and dropped again afterwards. These findings suggest COVID-19 had differential impacts on men’s and women’s ability to access paid work.

Figure 3. Respondents employing women or men casual workers, or unable to hire casual workers, by month (%)



Around 10% of respondents were unable to hire labor between March and July, up from just 1% in February. After the lockdown measures were lifted, only 5% of respondents were unable to hire labor in August and September. This number jumped sharply to 36% in October, the greatest share over the survey period, falling to 25% in November. This suggests that the COVID-19 outbreak impacted employers' ability to find workers, as well as workers' ability to find employment, especially after the COVID-19 situation worsened.

In May, we began asking respondents whether they had experienced delays in accessing inputs or reduced the quantity of inputs used, as compared to 'business as usual'. 43% and 26% of respondents, respectively, reported that they had used fewer inputs than usual in May or experienced delays in accessing them. These numbers fell to 27% and 16% in July, before rising to 32% and 23% in August and remaining at approximately this level in the following months. This pattern suggests that access and availability of inputs worsened with the second wave of the pandemic, consistent with trends in Figure 2.

We also asked about delays in selling products and reductions in quantities sold, relative to normal expectations. Respondents reported similar but even pronounced patterns to those described above for inputs. The share of respondents experiencing delays in selling products rose from 29% to 34% between May and June, before dropping to 18% in July. The situation quickly worsened, with the share experiencing delays in accessing products jumping to 52% in October. By November, however, the situation improved with only 25% experiencing delays, a similar level to that of May. Following the same trend, those selling less product than expected fell from 43% in May to 29% in July, but then jumped sharply to 67% in September, improving only slightly in November, to 49%.

From May onwards, we asked respondents if they had sufficient income to pay for their household's weekly expenses, and how the quantity of purchased food in the past month compared to usual circumstances. Both indicators worsened from May to June and remained relatively unchanged in July before continuing to worsen after August. The percentage of respondents earning a sufficient weekly income shrunk from 77% to 65% between May and July, rising back to 75% in August, only to fall again to the same levels as July from September onwards.

29% of respondents reported purchasing less food than usual in May, which quickly rose to 39% in June, remaining fairly stable in July, but continued to climb to 52% in September-November, suggesting that the COVID-19 crisis negatively impacted respondent's food security, with the second wave exacerbating the situation.

From May onwards, we also asked respondents if they had received any form of assistance, and whether they had travelled more than one mile from home during the past month (as an indicator of the severity of movement restriction). Following the same trend as the quantity of food purchased by respondents, those receiving assistance was low between May and July, at 2% and 8%, respectively. Between August and November, however, a larger share of participants received assistance (between 29% and 46%), with the highest aid occurring in October (46%) and the Government and NGOs cited as the main source. Fishers and farmers accounted for almost all of those who received assistance, with very other actors in the supply chain reporting receiving and support. These findings reflect the rollout of a universal cash transfer scheme during September and October, timed to offset the economic impacts of the second lockdown.

The share of respondents travelling more than one mile from home trended upward, rising from 45% to 59% between May and July, before dropping to 40% in September and remaining stable thereafter, reflecting the relaxation of travel restrictions in May and the increase in restrictions and lockdown measures in August.

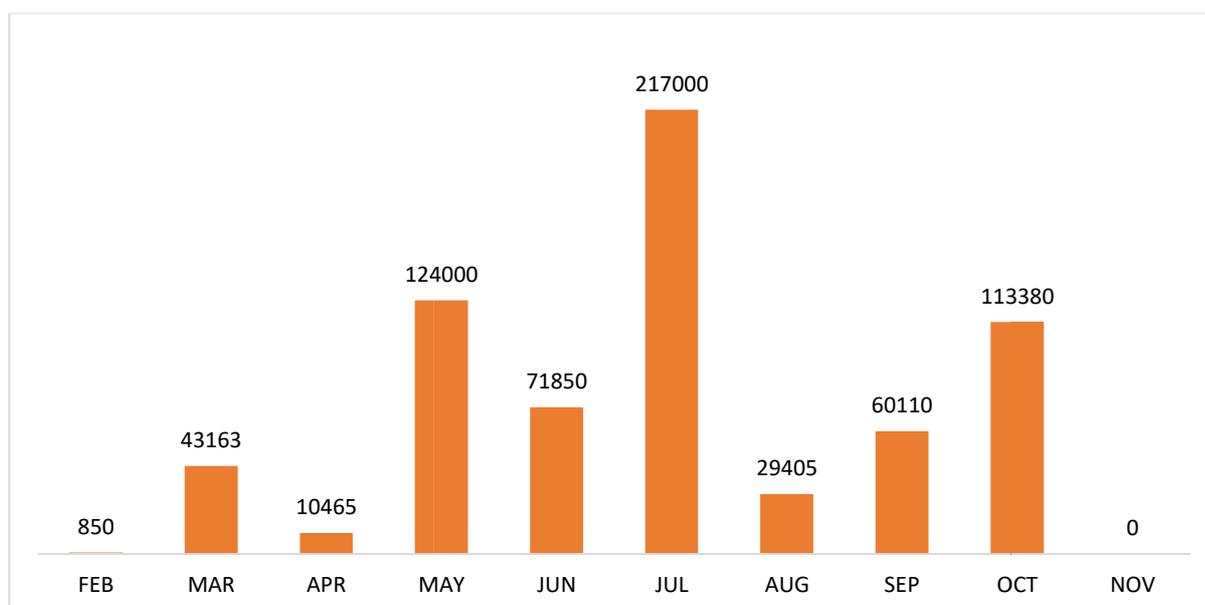
Hatcheries

A little over half of the hatcheries were operational between February and April. This number rose to 79% in May and June and increased further to 93% in July. August was the only month when 100% of hatchery businesses operated. In the following months, the share of inoperational hatcheries increased from 8% in September to 77% in November. The average number of days per month in which working hatcheries operated, climbed slowly from 7 days in February to 25 days in August and, consistent with the increase in businesses suspending in October, reduced to 12 days per month in October and 7 days in November. This trend indicates that seasonality exerted a greater influence on the timing of hatchery operations than the impacts of COVID-19. Hatchery operations are planned to ensure that fish are available for stocking at the start of the monsoon in late-May and early-June. To ensure fry or fingerlings of adequate size this means hatchery operations start as early as March-April.

Hatchling production peaked in July at 22 million, rising from 850 thousand in February. Hatchling production was not linear, fluctuating between February and July while trending upward overall. Production plummeted in August, then trended upward until October, before falling to zero production in November (Figure 4). Sales of hatchlings climbed steadily from May to July from 9 million to 33.5 million, but quickly dwindled to 920 thousand in August, staying low in the following month.

Fry sales accounting for the bulk of seed sales, and followed a somewhat similar trend, peaking at 242 million in June. Fry sales shrunk in August (242,000), then trended upward to 1 million in October before no sales were made in November. In contrast, sales of fingerlings, which take longer to raise to larger sizes than hatchlings or fry, began to trend upward from June onwards and remained stable in July and August when they reached 3.7 million. Fingerling sales spiked at 21 million in September, then quickly dropped in October to similar levels as July and fell even further to its lowest in November, with 180,000 fingerlings sold.

Figure 4. Total quantity (in 1000) of hatchlings produced, by month



Feed mills

Most surveyed feed mills were operational during the whole survey period, apart from April, June and September. During April and June, a single mill (representing 25% of the sample) closed, citing ‘other’ reasons and low demand, as the main reasons for halting operations in these months. 100% of feed mills halted operations in September citing temporary closures due to COVID-19 as the main cause, consistent with the second wave of the pandemic after cases surged in August. The average number of days feed mill businesses operated increased from 18 days in February to 26 days in July as the main growing season for farmed fish began with the onset of the monsoon, before dropping to 7 days in November.

Prices of raw materials used to manufacture feeds (most importantly, rice bran, peanut oilcake, and fish meal) remained fairly stable over the survey period. In most months between February and August, the average procurement price of raw material stood between MMK 480,000/t and MMK 510,000 /t, dropping to MMK 409,868/t in October, the lowest price over the survey period. The total quantity of raw material procured by surveyed feed mills gradually rose from 42 t in February to a peak of 554 t in July as production was ramped up, and slightly dropped to 401 t and 383 t in August and October, respectively. No raw materials were procured in September and November.

The total amount of feed manufactured followed the same pattern as procurement, falling from 103 t to 52 t between February and May, before peaking to 931 t in August, dropping to 701 t in October, before plummeting to 147 t in November. In May we began asking respondents about the quantity of feed sold in the past month. Following the same pattern, the total amount of feed sold by surveyed feed mills climbed from 59 t to 908 t between May and August, before falling to 571 t in October, with the total value of sales reflecting a similar trend.

Feed sellers

We surveyed two sets of feed trading businesses; pelleted feed sellers, and non-pelleted feed sellers. The main non-pelleted feeds sold were rice bran and peanut oil cake. Pelleted feed sellers sold floating and sinking feeds.

All non-pelleted feed sellers were operational between February and November, but the number of operational pelleted seed sellers declined fairly steadily, from 100% in February to just 14% in June, with a large share still in-operational until August. Bad weather and low demand were the main reasons given by pelleted feed sellers who did not operate in March and April, with low demand and 'other' reasons the main causes cited thereafter. This pattern seems to suggest that farms continued to use cheaper feeds such as rice bran, while reducing purchases of more expensive pelleted feeds. Between September and November, 100% of pelleted feed sellers were fully operational, with the number of days pellet feed businesses operated falling from 7 days in February to 2 days in August, before climbing back to February levels (around 7 days).

The total quantity of feed procured by pelleted feed sellers remained low, rising from 5t in June to 10 t in August, the greatest amount purchased, before dropping to 3t in November. In contrast, the total quantity of feed procured by non-pelleted feed sellers rose from 105 t to 153 t between May and June, dropping to 12 t in July, before slightly increasing to 39 t in August only to drop to 25 t in September, remaining at this level until October. In November, procurement peaked at 353 t, a 70% increase from May.

Pelleted feed was sold by surveyed businesses in all months except July, with the quantity of sales fluctuating between 5 t and 10 t over the surveyed period, peaking in February and August (10 t) with the lowest quantity sold in October and November (3 t). The reported sales price remained steady throughout this period at roughly MMK 1000/kg, with the exception of May, where the average sales value plummeted to MMK 306,748/kg. Reported sales of non-pelleted feed were much lower than the quantities procured and dropped from 24 t in May to 9 t in June, before rising to 21 t in August, only to drop again in October to the same levels as June. Mirroring feed procurement trends, the amount of non-pelleted feed sold peaked at 38 t in November. The price of peanut oilcake, a key non-pelleted feed, remained stable during this period at around MMK 670/kg.

Farmers

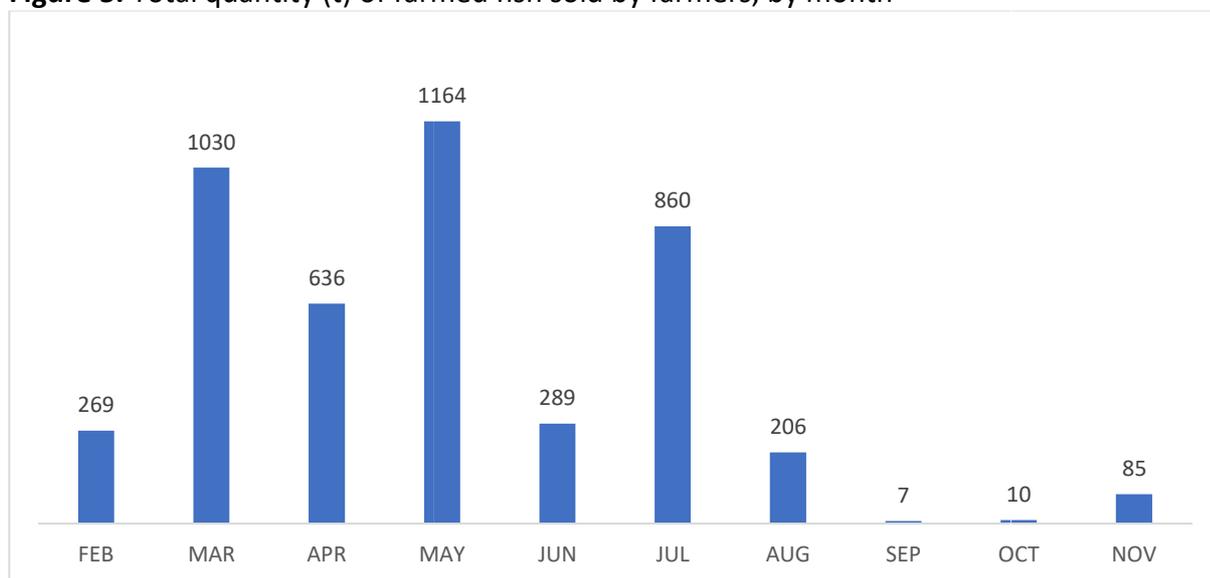
The share of surveyed farmers operating followed a strong seasonal trend, rising steadily from 38% in February (the cool dry season) to 89% in July (the monsoon season). Relatively few farmers, who remained inoperative after the onset of the pandemic, cited problems related to COVID-19 as the cause, with most mentioning 'other reasons'. Almost all farmers were operating in August and 100% resumed operations from September to November.

The main feeds procured by surveyed farmers were rice bran, oil cake and pelleted feeds. The average procurement price for rice bran and oil cake fluctuated slightly from month to month throughout the surveyed period, though remaining quite stable overall at approximately MMK 260/kg and MMK 800/kg, respectively. The quantity of feed procured by surveyed farms was low in February and March, at around 650 t, but quickly rose to around 2,500 t in April and May with the onset of the growing season, before falling back to approximately 1,200 t in June and July. The quantity procured plummeted in August, falling by 982 t and continued to decline, with only 75 t sold in October, before rebounding somewhat to 291 t in November.

July was the peak month for procuring fish seed (1.4 million pieces) up from 128,900 pieces in February, and 260,000 pieces in April. The quantities of fish seed procured in August and September were marginal and the lowest over the survey period (31,000 and 69,000, respectively). No fish seed was procured in May, June, October, and November.

The total quantity of fish sold by surveyed farmers fluctuated from month to month over the survey period. Sales were low in February, June, and August (269 t, 289 t, 206 t respectively) and highest in March, May and July (ranging from 1164 t in May to 860 t in July). Fish sales then plummeted to 7 t in September, the lowest over the survey period, before rising slightly to 85 t in November (Figure 5). The average farmgate price received also fluctuated considerably during this period, decreasing from MMK 1922/kg in February to MMK 1389/kg in April, before rising to MMK 1806/kg in May and declining again to MMK 1389 in July, with the following months following the same pattern equating to a decline of 31% from February to October. Rohu accounted for the majority of fish sales between February and July.

Figure 5. Total quantity (t) of farmed fish sold by farmers, by month



Fishers

Almost all fishers surveyed in Myanmar operated in inland waters, fishing in rivers and other natural water bodies. 96% of fishers fished with boats, averaging 6 meters in length. 88% of boats had engines, averaging 7HP in size.

Fishing activity fell sharply between February, when 88% of fishers reported fishing, and May/June, when only 12% fished, increasing to 52% in August. From September onwards, all fishers resumed activities. The average number of days fished per month fell from 20 days in February to a low of 2 days in June, before increasing to 15 days in September and the months thereafter. The number of hours fished per trip remained relatively stable at 4-6 hours over this period. The main reason cited by fishers for the sudden drop-in fishing activity between May and July was the closed season for inland fisheries.

Despite only 20% of fishers operating, the greatest quantity of fish was landed and sold in July, totaling 1.4 t, resulting in a spike in fishers' total income in that month. The total quantity landed fell from 1.12 t in February to 0.34 t in May, while the quantity sold dropped from 1.07 t to 0.33 t

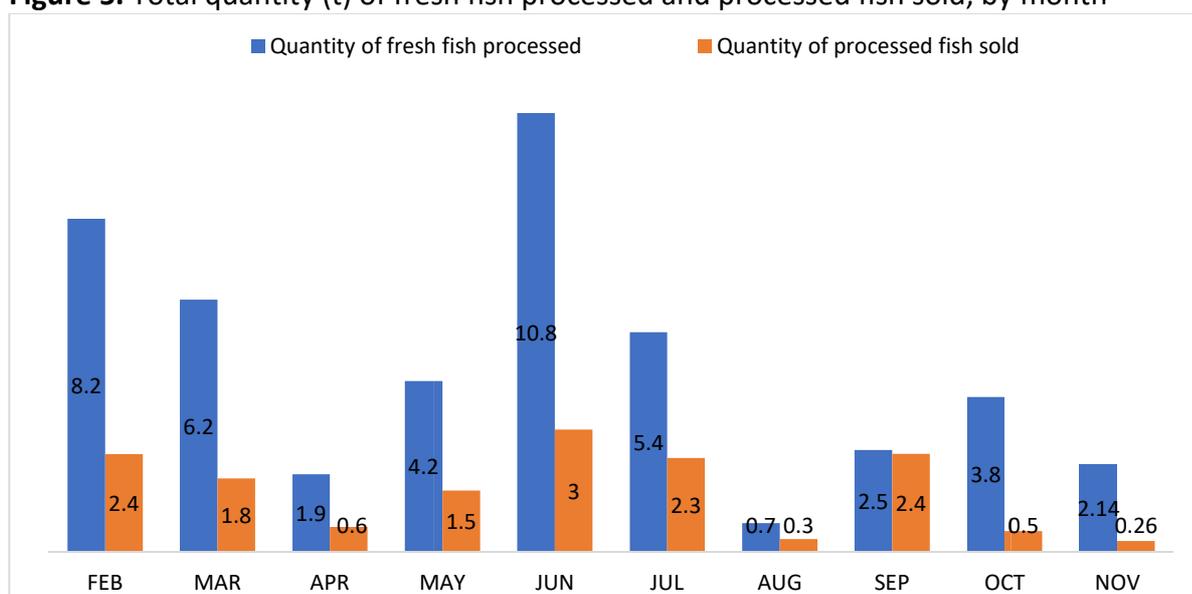
respectively, before recovering in July, remaining stable until September. In October, the quantity landed and sold dropped to 0.6 t before recovering somewhat in November to 0.9 t and 0.8 t, respectively.

Across the survey period, 50% or less of surveyed fishers reported consuming their own catch, with the exception of April, where 59% reported doing so, and September where 100% of fishers did not consume their own catch. Quantities consumed were small and fell from 1.92 kg/household in February to 0.42 kg/household in August. In November, however, households consumed 2.4 kg of fish, the highest in the survey period.

Processors

The activities of fish processors who are mainly involved in fish drying are linked closely to those of fishers. A smaller number of surveyed processors also engaged in smoking farmed fish, but did so only in February and May. Increasing numbers of processors suspended operations between May and September, due to the closed season for inland fisheries and in later months due to COVID-19 and transport restrictions. In October and November, operations returned to similar levels as February. Between 25% and 55% of processors were not operating between February and November, citing input suppliers out of stock, low demand, and travel restrictions as the main causes.

Figure 5. Total quantity (t) of fresh fish processed and processed fish sold, by month



The total quantity of fresh fish processed and sold followed a ‘U shape’ curve between February and June but fluctuated over the entire survey period (Figure 5). The total income generated followed the same trend. The total quantity of fresh fish processed dropped from 8.2 t to 1.9 t between February and April, before climbing sharply to 10.8 t in June, then shrinking to 0.7 t in August. The quantity of fish processed rose gradually, reaching 3.8 t in October before falling to 2.14 t in November. The quantity of processed fish sold followed the same trend, falling from 2.4 t to 0.6 t between February and April, then climbing to 3 t in June, before falling to 0.3 t in August, rising back to 2.4 t in September, where almost 50% of the fish that was processed was sold, before shrinking to 0.25 t in November. The quantity of processed fish sold was less than the

quantity of fresh fish procured, because several kilograms of fresh fish are used to produce one kilogram of dried fish.

Traders

Most surveyed fish traders operated throughout the period from February to July, with only 8% in-operational in April (during the first lockdown), and 18% in-operational during June-August. Traders who ceased operating in April cited suspending operations due to COVID-19, while those closing in June-August mentioned the closure of the fishing season as the main cause. The highest share of fish traders paused operations in October (30%), falling back to the June-August levels by November. The average number of days operated per month varied between 18 and 28 days over the survey period, with the greatest number of days of operation occurring in February, March and May and August consistent with the share of respondents operating (100%).

Farmed fish, freshwater capture fish and marine capture fish were traded in all months, while shrimp was not traded in April-May and September-October. Total farmed fish sales by surveyed traders fluctuated over the survey period and were low, but stable, from February to April (roughly 1700 t), before dropping to only 274 t in May. Sales peaked in June (6241 t) and August (7195 t), dropping in July and September to 2748 t and 1895 t respectively, dropping further in October and November. Rohu and pangasius accounted for the largest share of farmed fish sold by traders across all months. Sales prices for rohu increased from MMK1875/kg in February to MMK 2050/kg in April during lockdown, but subsequently declined to about MMK 1385/kg in October (around 26% below February levels).

Sales of freshwater capture fish also fluctuated over the survey period and were higher in February to April than in May to July, averaging around 380 t in the first three months, and about 150 t in the following quarter. Sales subsequently climbed slowly from 13 t in August to 186 t in November. The sales price also fluctuated and was approximately twice as high during the first half of this period as during the second, likely reflecting changing species composition as well as changing prices per species. Hilsa accounted for the majority freshwater fish sales between February and May, while mixed small freshwater fish accounted for almost all fish sold in June. Sales of marine fish stayed low throughout the survey period, between 25 t and 665 t, except for an apex in May when 8,893 t were sold.

Retailers

Between 20% and 47% of fish retailers were in-operative between February and November. In the earlier months reduced demand was reported as the main cause, while in later months the closed fishing season and COVID-19 were cited as the main reasons. The number of days retailers operated remained relatively stable over this period, and consistent with an increase in the share operating, the greatest number of days operated occurred in February (20 days) and November (23 days).

Farmed fish accounted for the largest share of reported sales. The total quantity of farmed fish sold by surveyed retailers was highest in May (958 t) and September (1861 t), but between 200-300 t in almost all the other months. Upward trends were observed between July (590 t) and August (790 t), while the lowest quantity was sold in October (130 t). Rohu accounted for most of the farmed fish sold over the survey period. The average retail sales price of rohu fell 15% approximately from MMK 2,178/kg in February and May to MMK 1,855/kg, a decline that was

likely linked to the first lockdown. The price continued to fall in subsequent months, reaching MMK 1351/kg in November, a 38% drop from February.

In contrast, freshwater capture fish sales were highest between March and May, hovering around the 50 t mark, before dwindling to almost nothing from July to September due to seasonal effects. Sales then grew only marginally to 6.4 t in October, dwindling back to 2 t in November. Marine fish sales fell from 123 t in February to 16 t in April, before peaking at 398 t in May. Consistent with the closed season for fishing, no marine fish was sold between June and August, with around 10 t sold from September onwards. Marine and freshwater capture fish prices tended to decline over time, although this could reflect seasonal changes in species composition as well as demand/supply interactions. Shrimp sales remained relatively steady between 13 t and 22 t between February and July, with peak sales occurring in June and July (22t). Sales then remained low between August and October (less than 1.3 t), before skyrocketing back to 25 t in November.

4. Recommendations

- Keeping wet markets open and operating safely is key to maintaining demand and keeping the supply chain functioning.
- Safeguarding access to transport services and ensuring the free movement of merchandise is also essential.
- Few supply chain actors have received any targeted assistance to support COVID-19 recovery to date. Enterprises that have lost substantial amounts of revenue or face cash flow problems may need financial support to facilitate their continued operation.
- Consider the possibility of formal credit schemes with associated insurance for licenced operators with a track record of using Best Management Practices and or Hazard Analysis and Critical Control Point (HACCP) management systems in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards.
- Ensure that fish farmers are aware of the benefits from the production of fast-growing fish such as some of the Small Indigenous fish Species (SIS) e.g. the Mola carplet (*Amblypharyngodon mola*), or Genetically Improved Farmed Tilapia (GIFT). Shorter production cycles can increase turnover and cashflow and help ensure fish are consistently available for sale and consumption.
- A number of virtual extension applications are now in use in Myanmar including Greenway, Village Link and most recently Golden Fish by Single Spark. These Apps can be used to disseminate information on COVID-19 safe production systems and post-harvest activities.



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About FISH

The CGIAR Research Program on Fish Agri-Food Systems (FISH) is a multidisciplinary research program. Designed in collaboration with research partners, beneficiaries and stakeholders, FISH develops and implements research innovations that optimize the individual and joint contributions of aquaculture and small-scale fisheries to reducing poverty, improving food and nutrition security and sustaining the underlying natural resources and ecosystems services upon which both depend. The program is led by WorldFish, a member of the CGIAR Consortium. CGIAR is a global research partnership for a food secure future.

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