



RESEARCH
PROGRAM ON
Fish
Led by WorldFish



April, 2021

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

February – November 2020

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Citation

This publication should be cited as: Lucinda Middleton, Mohammad Ilyas, A.K.M. Abdul Wadud, Jacqueline Shieh, Leah Rosen, Saadiah Ghazali, Goutam Dhar, Ben Belton, Bianca Haas. 2021. Impacts of COVID-19 on Aquatic Food Supply Chains in Bangladesh. Penang, Malaysia: CGIAR Research Program on Fish Agri-Food Systems. Program Report.

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.

Acknowledgments

This work was undertaken as part of, and funded by, the CGIAR Research Program on Fish Agri-Food Systems (FISH) led by WorldFish. The program is supported by contributors to the CGIAR Trust Fund.

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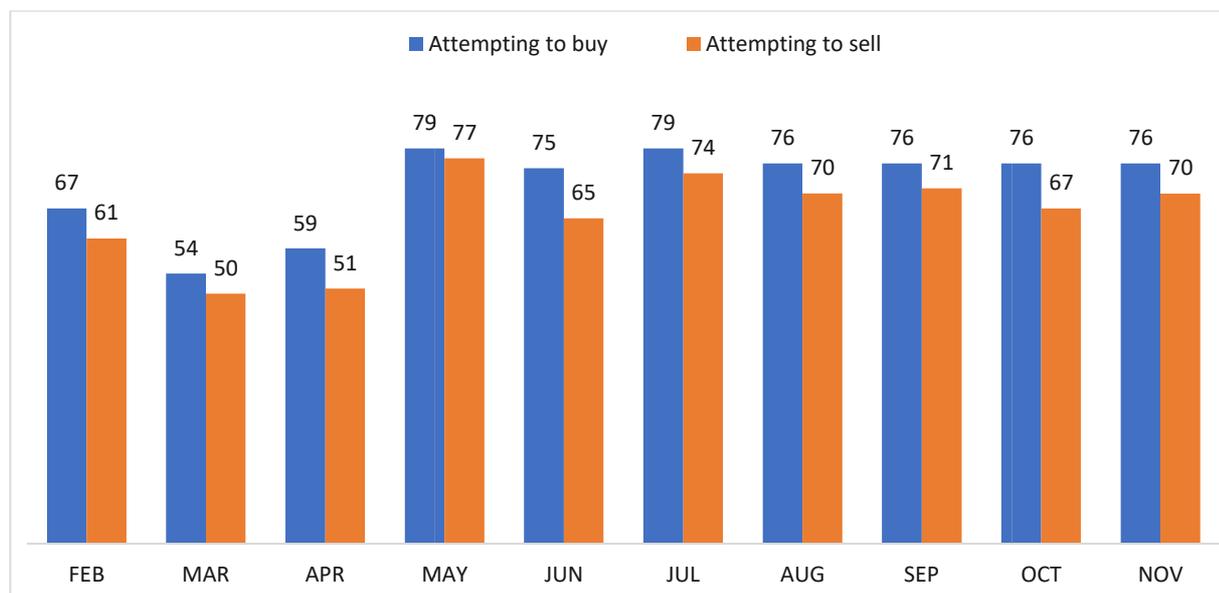
1. Overview

We conducted a monthly phone survey with fish supply chain actors in Bangladesh to assess the 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 105 respondents, comprised of the following: feed mills (3), feed sellers (14), fish hatcheries (10), fish farmers (25), fishers (24), traders (10), processors (8) and retailers (11). The areas covered included Khulna (22%), Chittagong (23%), Barisal (18%), Rajshahi (13%), Dhaka (7%), Mymensingh (6%), Sylhet (6%), Rangpur (3%), Pabna (2%), Noakhali (1%). A complete summary of survey results can be accessed [here](#).

2. Key findings

The share of respondents attempting to buy inputs fell from 67% to 54% between February and March, slowly climbing up and remaining stable at between 75% and 79% between May and November, suggesting the demand for inputs recovered and remained stable after the COVID-19 related ‘holiday’ measures were lifted. Following the same trend, the percentage of respondents attempting to sell products dropped by 10 percentage points from 61% to 51% between February and April, before rising to 77% in May and remaining stable between 65% and 74% from July onwards (Figure 1). This suggests that once movement restrictions were lifted in May, purchasing power and demand increased.

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

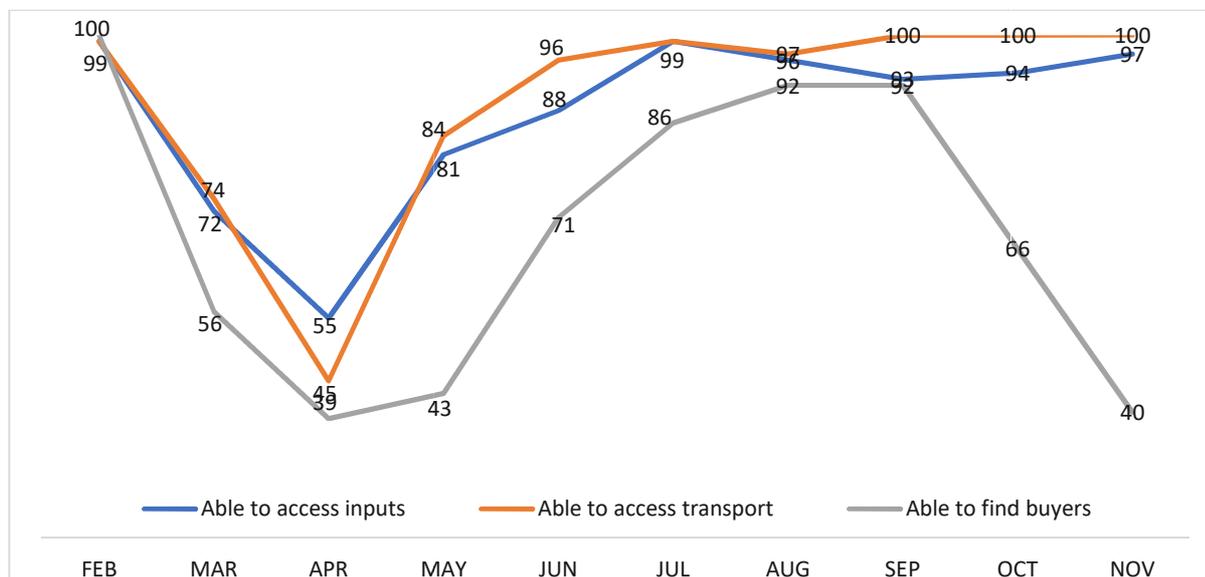


Access to inputs and transport followed a pronounced ‘V shaped’ curve between February and July and remained stable afterwards (Figure 2). The percentage of respondents able to access inputs and transport dropped from around 100% in February to 55% and 45%, respectively, in April but rebounded to 99% in July. The share of respondents able to access transport remained at close to 100% thereafter, while the share able to access inputs when needed remained well over 90%.

The share of respondents able to find buyers recovered more slowly, following a ‘U shaped’ curve, dropping from 100% in February to 46% in May, increasing to 92% in August and remained stable

in September before falling sharply in October and November, down to 40%. These declines suggest a slowing of input supply during COVID-19 ‘holiday’ measures enforced between March and May, and as well as a lagged slowing of demand.

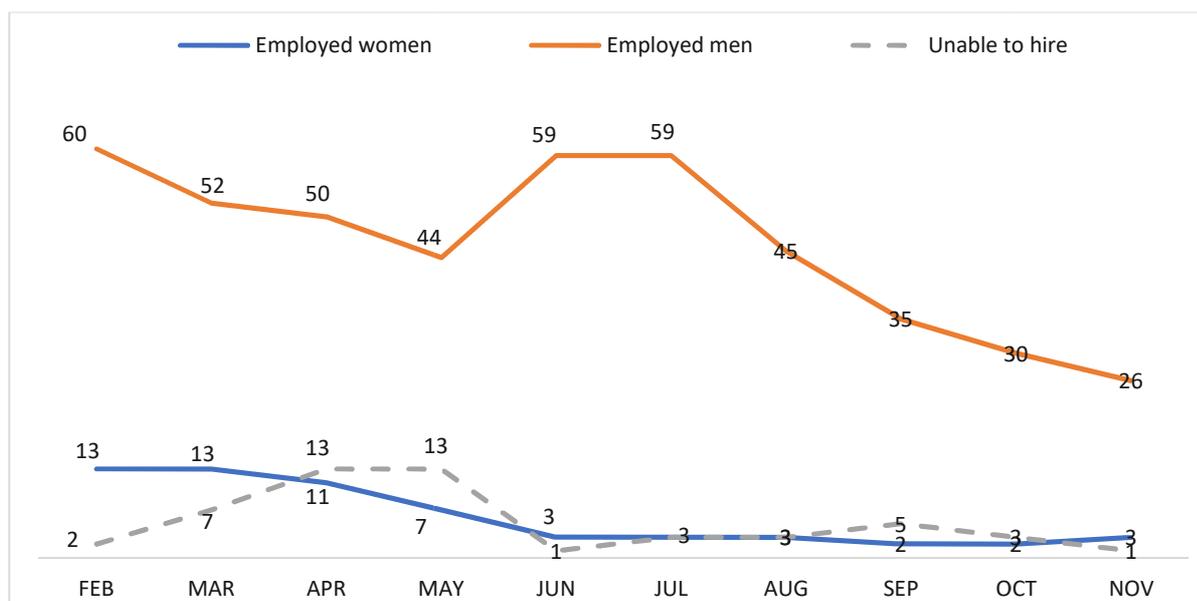
Figure 2. Respondents able to access inputs, transportation or buyers, by month (%)



The number of businesses employing male casual workers declined from 60% in February to 44% in May, before recovering to 59% in June and July. After July, the share of businesses employing men declined again, down to only 26% in November, the lowest level over the survey period. In contrast, the share of respondents employing female casual workers declined steadily from 13% in February and March to around 2% in June, and remained at this level thereafter, suggesting somewhat differentiated impacts of COVID-19 on access to paid work for men and women (Figure 3).

The percentage of respondents that reported being unable to hire labor was initially low in February at 2%, but climbed to 13% in May, the highest level over this period, before falling to 1% in June and briefly rising to 5% in September before falling again. This suggests that restrictions on movement and fear of infection may have impacted businesses’ ability to employ workers from March to May, as well as workers’ ability to find employment, but recovered thereafter once restrictions were lifted.

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



In May, we began asking respondents whether they had experienced delays in accessing inputs or selling products, and whether they had reduced the quantity of inputs used or experienced any reduction in the quantity of products sold, as compared with their usual expectations. 20% and 32% of respondents, respectively, reported that they had experienced delays in accessing inputs and had reduced the quantity of inputs used in May. These numbers gradually fell to 1% and 10% by July and both indicators remained below 3% in the following months.

The share of respondents experiencing delays in selling products or selling less products than usual followed a similar pattern, falling from 30% and 56% in May respectively, to 9% and 8% in July, suggesting increasing demand that mirrors the trends in Figure 1 and 2. The percentage of respondents experiencing delays in selling products and selling less than usual continued to fall, reaching 2% and 3% respectively in September. The situation reversed in the following months increasing to 40% each, suggesting a slowing demand.

From May onwards, we asked respondents whether they had sufficient income to pay for their family’s weekly expenses, and how the quantity of food purchased by the household during the past month compared to usual. During the entire survey period, the percentage of respondents that reported earning a sufficient income stayed between 52% and 63%, except for July, when the highest share of sufficient incomes (71%) was reported.

Following a similar pattern, the share of respondents who purchased less food remained between 36% and 49% in all months other than July (28%). This suggests that respondent’s food security was negatively impacted during the COVID-19 lockdown, and even though these effects appear to lessen in July, respondent’s food security continued to be affected in September and October. Beside May, August was the month where respondent’s income and food security was worst affected, suggesting prolonged negative impacts of the pandemic.

From May onwards, we also asked respondents whether they had received any form of assistance during the past month, and whether they had travelled more than one mile from home (as an indicator of the severity of movement restrictions). Between 2% and 12% of respondents received assistance between May and November, with the exception of August and November when no one received aid. The greatest share received assistance in October (12%), with the government

cited as the main source in over 82% of cases over the survey period. Fishers were the main recipients of aid.

The share of respondents travelling more than one mile remained stable between May and July, whilst marginally increasing from 77% to 83% in this period, before increasing sharply and remaining above 90% from August onwards, reflecting the relaxation of movement restriction measures in May.

Hatcheries

70% of surveyed hatcheries did not operate in February, citing the off-season for seed production as the main cause. Between March and July, all surveyed hatcheries were operational, except in April where one business suspended operations for reasons related to COVID-19. An increasing share of hatchery businesses suspended operations from August to October, 63%, 75% and 88% respectively, with reducing demand cited as the main cause in August and 'other' as the main cause in September and October. In November, hatchery operations recovered somewhat, but only half were operating. The average number of days hatcheries operated per month increased from 9 days in February to 27 in March and remained stable between 23 and 29 days until July. Consistent with the rise in businesses' suspending operations, the average number of days hatcheries operated fell in September and remained between 3-7days/month in the months following.

Total hatchling production in surveyed businesses remained stable between March (998 kg) and May (1067 kg) before plummeting to 20 kg in September, with the sharpest decline occurring between May and June (-599 kg). No hatchlings were produced in October, and although production resumed in November, only 75 kg of hatchlings were produced. Catla and rohu accounted for most of the hatchlings produced between February and November. Following the same trend, the total quantity of hatchlings sold fell from 698 kg in May to 20 kg in September, with only 75 kg sold in November. Both fry and fingerling sales were greatest in the month of May. Fry sales increased from 500kg in March to 875 kg in May before quickly dropping to 160kg in July, with 46 million fry sold in August, before plummeting in October. No fry were sold in September and November. While fingerling sales followed an even more pronounced climb, rising from 47 kg in April to 1180 kg in May before plummeting to 270 kg in June and remaining relatively stable in July. No fingerling sales occurred from August onwards. This pattern reflects the seasonality of production, with carp seed being produced and stocked primarily during the early monsoon season.

Feed mills

All surveyed feed mills were operational between February to November, with the average number of days feed mill businesses operated remaining stable between 23 and 26 days/month. Feed ingredient prices followed a 'U-shaped' pattern during the first three months of the survey period, falling from BDT 69,564/t in February to BDT 36,015/t, before jumping again in April (BDT 58,470/t). Prices remained quite consistent in the months thereafter at around BDT 28,000/t. Prices of rice bran – one of the main raw materials used to manufacture feed – remained stable throughout this period, at around BDT 19,000/t. Fish meal procurement prices declined slightly over the period from BDT 126,000/t to BDT 120,000/t. Prices for maize, soy meal and mustard oilcake also changed little.

The total quantity of raw materials purchased by feed mills climbed from 665 t to 3,718 t between February and April, before sharply falling to 1,440 t in May. Between May and July, the amount of raw materials procured gradually trended upwards, reaching 1,970 t in July. However, the quantity subsequently fell by 51% (975 t) before rising to 1430 t in September, only to fall and remain low from October to November at 646 t and 601 t respectively. The total quantity of feed manufactured by surveyed feed mills followed a similar pattern in fluctuating over the nine-month period, climbing from February to April, plummeting to its lowest in May (1,601 t), rebounding in June (10,850 t) before falling again to 1,475 t in August and remaining low until November (559 t).

In May, we began asking respondents about the quantity of feed sold in the past month. Consistent with the quantity of feed manufactured, there was a steep rise in the quantity of feed sold from 1,438 t in May to 8,780 t in June, dipping slightly to 7,474 t in July. However, sales quickly plummeted to 1,424 t in August and continued to decline, standing at 489 t in November. The average reported sales value increased from BDT 38,307/t to BDT 44,829/t between May and June, remaining stable in July. From August onwards the price gradually fell, standing at BDT 40,726/t in November.

Feed sellers

We surveyed two sets of feed trading businesses; pelleted feed sellers, and non-pelleted feed sellers. Non-pelleted feeds sold include maize, rice bran and mustard oil cake. Pelleted feed sellers sell floating and sinking feeds.

Almost all pelleted feed sellers surveyed remained operating between February and November. Only one feed seller was inoperational between February and June, citing the inability to obtain credit to purchase inputs as the main cause for most months, along with other COVID-19 related reasons in March and April. In contrast, 50% of non-pelleted feed sellers suspended operations in March and April, citing logistical problems, high market prices, and input suppliers being out of stock or closed as the main causes, all indicative of COVID-19 related impacts. All non-pelleted feed sellers operated in February and May-November.

The procurement price for non-pelleted feed and pelleted feeds remained quite stable between May and July, at approximately BDT 30,000 and BDT 42,000/t respectively (we did not capture information on feed procurement for February-April). The total quantity of non-pelleted feed procured fell from 42 t in May to 26 t in June. From July onwards, the amount of non-pelleted feed procured followed a 'W shaped' curve, falling to 4t in August, climbing in September to the same levels as June, then dropping again to 10 t in October before rising to 17 t in November. In contrast, the quantity of feed procured by pelleted feed sellers remained relatively stable over the seven-month period, between 500 t and 570 t, except in June, when the quantity purchased dropped to 478 t, and November when the quantity purchased dropped to its lowest at 313 t.

Sales of non-pelleted feed dropped from 81 t in February to 14 t in April, rising to 27 t in May and remaining stable for the remainder of the survey period, with the exception of August and October, where only 4 t and 10 t were sold, respectively. Pelleted feed sales, on the other hand, gradually increased from 376 t in February to 614 t May, when sales peaked, before dropping to 464 t in June and climbing to 562 t in July. Sales fluctuated in subsequent months, before falling to 311 t in November (the lowest sales over the survey period). Mustard oil cake was the main non-pelleted feed ingredient procured and sold. The average sales price of non-pelleted feed trended slightly upward between February and May, where the average price rose by 24% to around BDT 34,000/t, before falling back slightly in June and remained stable from July to October. In

November, however, prices surged to BDT 37,793/ton, the highest over the survey period. The average sales price of most categories of pelleted feed remained fairly stable over this period.

Farmers

Almost all surveyed farmers were operational between February and November, with only 8-12% suspending operations during to the 'off-season' between February and April. The share of farmers procuring inputs rose from 73% in February to 100% in May and stayed high for the subsequent months. The quantity of inputs procured increased gradually from 71 t in February to 139 t in May, in line with rising temperatures, but dropped sharply in June, before rebounding to 131 t in July. The quantity procured fluctuated at around this level between July and September, but declined thereafter to 94 t in November. The average procurement price stayed between BDT 3,800/t and BDT 4,200/t over the ten-month period.

The total quantity of fish seed procured from farmers spiked between March and April (the main month for stocking), rising from 0.48 million to 5.3 million, falling back to 0.08 million in May and edging up to 0.86 million in July, before dropping again in August and stayed fairly stable until October before dropping off in November

Total sales of fish by surveyed farms climbed from just over 30 t in February and March to around 50 t in April and May, falling to 11 t in June and rebounding to 35 t in July before jumping to 76 t in September (the greatest quantity of fish sold over the period). In the months following, sales declined, dropping to 48 t in November. Average farmgate prices received remained fairly consistent between February and April at approximately BDT 120/kg before increasing to approximately BDT 150/kg in May-July (an increase of around 25%). From August onwards, farmgate prices trended downwards to BDT 112/kg in October, the lowest price over the nine-month period, rising slightly to BDT 122/kg in November. Indian major carp, most importantly rohu, as well as tilapia accounted for the bulk of fish sold by surveyed farmers. Surveyed farmers sold no shrimp in March-April and October-November and very little was sold in May. The total quantity sold varied from approximately 0.5 t to 1.6 t in other months.

Fishers

Most surveyed fishers fished in natural inland water bodies (e.g. *beel*) and rivers. More than half (58%) fished with boats, averaging 11m in length, most of which had engines, averaging 24 hp in size.

The share of fishers not operating fluctuated from 46% in February, to 79% in March, and falling slightly to 54% in April. Most respondents cited the closed fishing season as the reason for not fishing in these months. Between May and November, approximately 70-80% of fishers fished. Those who did not operate cited the closed fishing season, temporarily pausing operations due to COVID-19 and 'other' reasons. Following a similar pattern, the average number of days fishers fished per month dropped from 11 in February and 2 in March then rising gradually back to 13 days in September, before dropping again to 6 days in November.

By far the highest landings of any month were reported in February, with a total of 17.3 t landed. Nearly all of this catch (17.2 t) was sold. Total catch fell sharply in March to 0.22 t, reflecting in part the low number of fishers who continued operating. The total quantity of fish landed trended gradually upward after March, climbing from 0.92 t in April to 5 t in September before falling to

1.7 t in November. The quantity of fish sold followed a very similar pattern, as did fisher incomes, with over half of the fish landed sold each month.

The amount of fish consumed per household ranged from 3.5 kg/month to 6.75 kg/month between February and July, before rising to 15 kg in September (the greatest amount consumed by households). Fish consumption fell after September by 47%, standing at 5 kg in November. Most fishers consumed part of their catch in all months. The share of total catch consumed was lowest in February (when landings were highest), at 0.9%, and highest in March (38%) when catches were lowest, dropping to 12% in April/May, and remained around 7% for the following months, with the exception of July, when only 4% of catch was consumed. These patterns suggest that the quantity of fish consumed is positively correlated with the quantity harvested. Households consumed more catch in relative terms in months when it was difficult to sell, or when other sources of income were not available (March to May).

Fish processors

Surveyed fish processors were all involved in drying fish. Although fishing and drying activities are closely linked, the share of fish processors operating followed a different trend to that described for fishers above. This is because the surveyed fish driers mainly process marine fish during the dry season, whereas surveyed fishers mainly fish for freshwater fish. All fish dryers were operating in February, yet this number fell steadily from March onwards. The share of fish processors suspending operations grew and followed an 'inverted U' shaped curve between March and November. 38% and 63% suspending operations in April and May, with processors citing COVID-19 and the inability to obtain inputs as the main causes. This number grew in June and July, with 100% suspending operations, mainly due to the closed fishing season. From August onwards, between 14% and 29% stopped operating, citing a range of issues including COVID-19, before all resumed activities in November. Mirroring the pattern to the number of processors operating, the average number of days operated per month gradually fell from 29 days in February to nothing in June and July (peak monsoon season), before rebounding to 30 days in November.

In line with the closure of businesses in June and July, the total quantity of fresh fish dried by surveyed fish processors trended downward and dropped gradually from 36.7 t in February to 3 t in May, while the quantity of dried fish sold fell from 13.7 t to 1.3 t in the same period. Between August and October, the quantity of fish processed and sold followed the same pattern as previous months. After two months of no activity, the quantity jumped to 42 t processed and 14.6 t sold in August, before trending downward to 13 t processed and 5 t sold in October. However, both quantities skyrocketed in November (when all processors were operating again) to 68 t processed and 28 t sold.

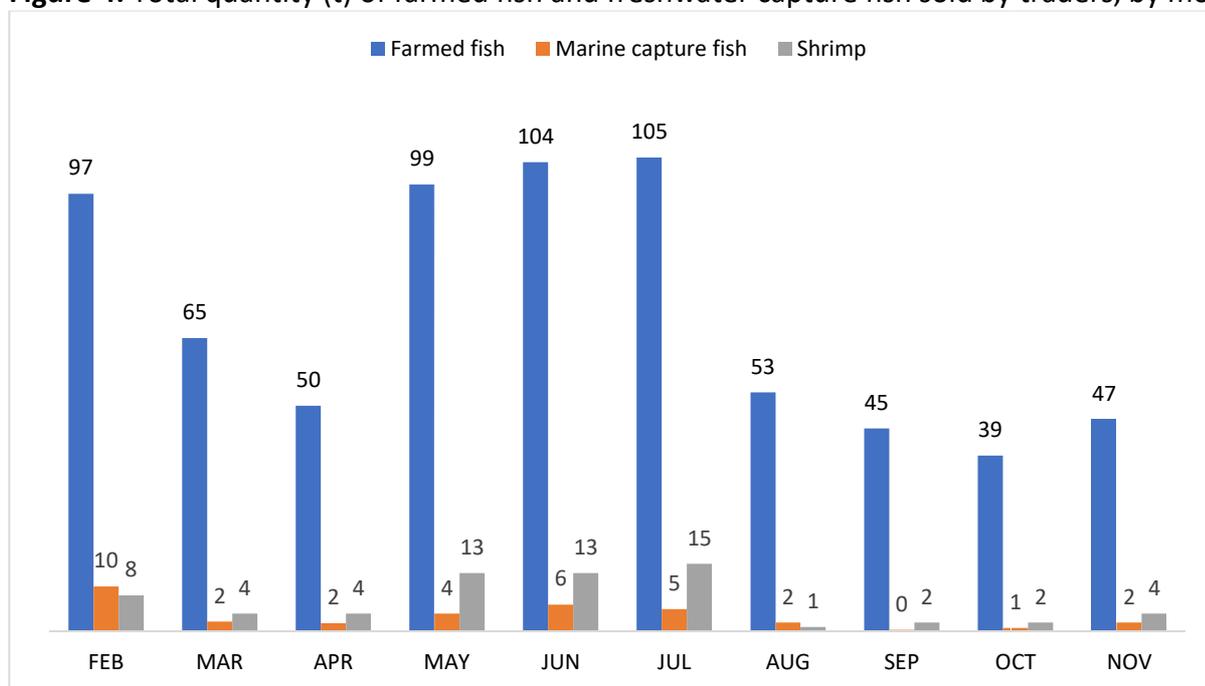
Traders

Almost all surveyed fish traders were operating between February and November, with the exception of two traders who suspended operations in March and April due to the closed fishing season, restrictions on road transport, input suppliers not operating, and temporary cessation of activities due to COVID-19; and one trader who halted operations in September and October. The average number of trading days per month for operational businesses dropped from 29 in February to 20 in April, before climbing again to 30 days in May and remaining at a similar level thereafter, before falling to 19 days in October and recovering to 30 days in November.

The total quantity and value of farmed fish, marine fish and shrimp sold by surveyed traders all followed a similar pattern. Farmed fish sales trended downward from 97 t in February to 50 t in April, before recovering to 99 t in May and remaining at a similar level until July. Farmed fish sales subsequently fell steeply to 53 t in August and stayed low (between 39 t and 47 t) in the following months (Figure 4).

The total amount of freshwater capture fish sold by surveyed traders sharply increased from a low of 1 t in February to a peak of 62 t in May, shrinking again to 15 t in June. From June to November, freshwater fish sales followed an ‘inverted U’ curve, rising to 26 t in August before falling to 5 t in November, the lowest amount since February. Marine fish sales followed a slightly similar pattern, dropping from 10 t to 1.9 t between February and April but rising slightly to 4.9 t in July, before dropping to 2 t and 0.4 t in August and September. Shrimp sales halved between February and April (from 8 t to 4 t), rebounding to 13 t in May and remaining at a similar level before plateauing at around 1 t from August onwards.

Figure 4: Total quantity (t) of farmed fish and freshwater capture fish sold by traders, by month



The sales price of farmed fish sold by traders dropped from around BDT 155/kg in February to a low of around BDT 140/kg in May and June, climbing back to BDT 155/kg in August, before falling again to around BDT 140/kg in October and November. The average sales value of freshwater fish declined over the survey period, falling from BDT 1200/kg to BDT 480 in August and plateauing at around this price in the subsequent months. Such wide price variation suggest a shift in the species composition of the catch over this period.

Retailers

Most surveyed fish retailers continued operating between February and July. 18% suspended operations in March and April citing temporary closure linked to COVID-19 and transport restrictions as the main causes. In June and from August until November, between 11% and 38% suspended operations, citing a range of reasons, including reducing their own demand, input suppliers being out of stock, and ‘other’ reasons. The average number of days fish retailers

operated followed a similar pattern, falling from 25 days in February and to 18 days in April, before increasing to 30 days in May and dropping gradually 15 days in November.

The total quantity of farmed fish sold by surveyed retailers remained quite steady between February and July, standing between 11 t and 14 t, with sales at the lower end of this distribution occurring in March and April. Sales grew to 21 t in August, then trended downward to 3.3 t in October, the lowest quantity sold over the survey period (a similar pattern to that reported by traders), before rebounding to 8 t in November. Rohu, tilapia and catla contributed most retail sales of farmed fish in all months. The average sales value of farmed fish also remained quite steady, fluctuating from roughly BDT 125-160 per month over this period.

Retail sales of freshwater fish were stable at 7 t in February and March, before sharply dropping to less than one ton in April, remaining under 0.6 until October, with the exception of September, where sales climbed slightly to 1 t. However, like farmed fish, sales rose somewhat in November to 2 t. The total quantity of shrimp sold by surveyed traders trended steadily downward between February and October, dropping from 2.6 t to nearly zero tons. The sales value from freshwater capture fish and shrimp fluctuated over the survey period. The price of shrimp was lowest in February at BDT 434/kg and highest in September at BDT 1300/kg. While the price of freshwater capture fish was lowest at BDT 105/kg in October and peaked at BDT 371/kg in April. Little marine fish was sold by surveyed retailers, with sales occurring in June and July only.

3. Recommendations

- Support supply chain actors during the fishing closed season through access to social-protection programs such as food and/or cash for work.
- Explore and evaluate ways of integrating fresh and dried fish into safety net packages to deliver nutritious foods to vulnerable consumers and create demand for aquatic food products to support producers and other supply chain actors.
- Provide financial support and access to affordable credit for supply chain actors who have lost substantial amounts of revenue.
- Women's ability to find work in fish supply chains during the survey period has been more severely impacted than men's employment. Further research is needed to understand and address the reasons for this trend.
- 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. 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.
- Conduct research on how COVID-19 may transfer through fish market practices and ways to mitigate this and promote safe working practices for markets and logistics services.
- Continue to safeguard the ability to access transportation, movement of merchandise, and connections between supply chain actors to ensure essential supplies are transported.



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