



RESEARCH
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Impacts of COVID-19 on aquatic food supply chains in Andhra Pradesh, India

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.

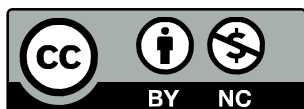
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1. Overview

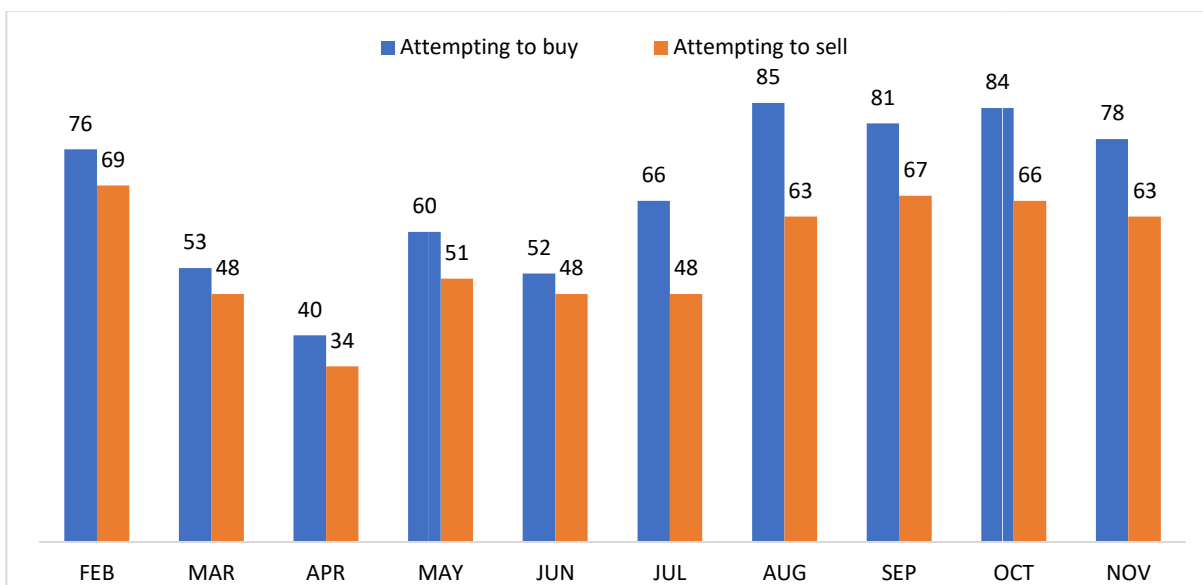
We conducted a monthly phone survey with fish supply chain actors in Andhra Pradesh to assess the impacts of COVID-19 on the availability and price of aquatic foods and production inputs. Respondents answered questions about their activity between the months of February and November 2020. The sample totaled 137 respondents, comprised of the following: feed mills (1), feed sellers (18), fish hatcheries (10), fish and shrimp farmers (51), fishers (18), traders (21) and retailers (9). The areas covered included the districts of Nellore (32%), West Godavari (32%), Guntur (14%), Krishna (9%), Prakasam (9%) and East Godavari (4%). A complete overview of survey results can be accessed [here](#).

2. Key findings

Between February and April there were steep declines in the share of respondents attempting to buy inputs and sell products, likely caused by COVID-19. The share of respondents attempting to buy inputs dropped from 76% to 40% between February and April, while the share attempting to sell products followed the same pattern and dropped from 69% to 34%, in the same period (Figure 1).

The share of respondents attempting to buy inputs gradually recovered to 85% in August and remained stable until November, at slightly higher levels than before the beginning of the outbreak in February. Following the same but less pronounced pattern, those attempting to sell products, climbed to 51% in May, and remained stable in June and July at 48% before rising and staying between 63% and 67% from August to November, suggesting that demand remained slightly lower than in the pre-pandemic period.

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

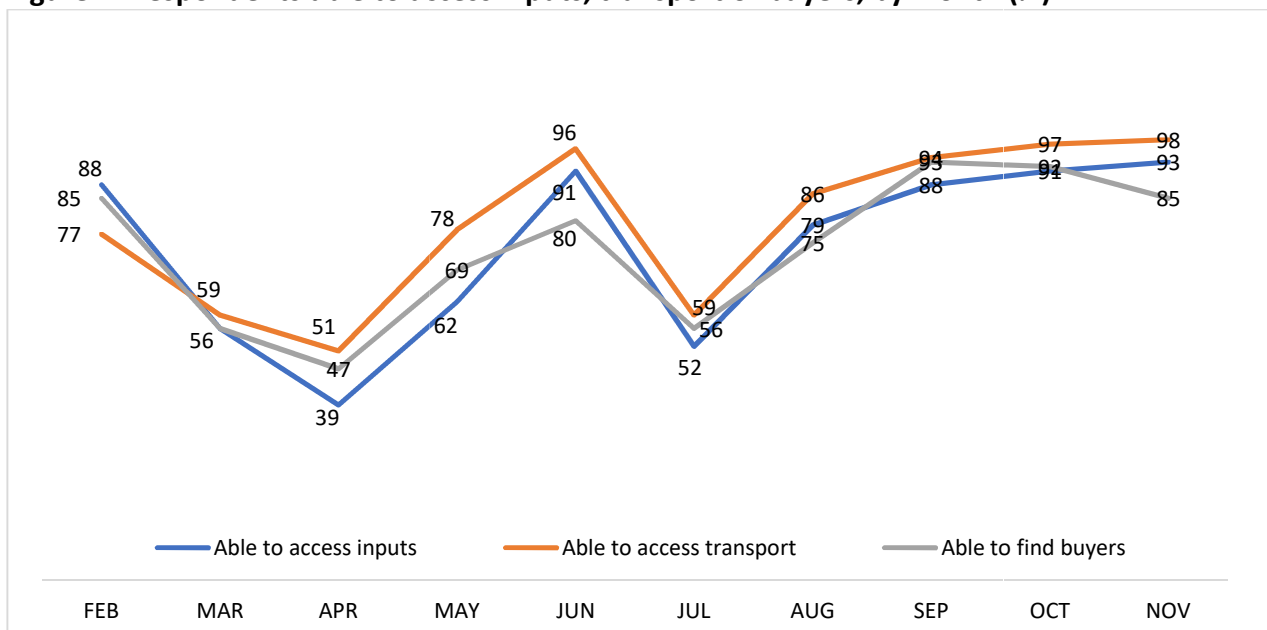


The share of respondents able to access inputs, or transport, or to find buyers followed a pronounced ‘W shaped’ curve and fluctuated over the survey period (Figure 2). The percentage of respondents able to access inputs on all occasions required fell from 88% to 39% between

February and April. This figure jumped to 91% in June, fell back to just over half in July, but recovered to 91% by October.

Following a similar trend, the share able to find buyers and access transport on all occasions required dropped from 85% and 77% to 47% and 51% between February and April before rebounding in June only to fall to 56% and 59% respectively in July, both recovering to 93% and 97% respectively, in October. These results reflect the easing of the national lockdown from June 8th, prompting enterprises to work hard to recover for lost business. Unfortunately, the recovery was not maintained in July, however, after the recovering in August, business was sustained to levels greater than the beginning of the survey period.

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

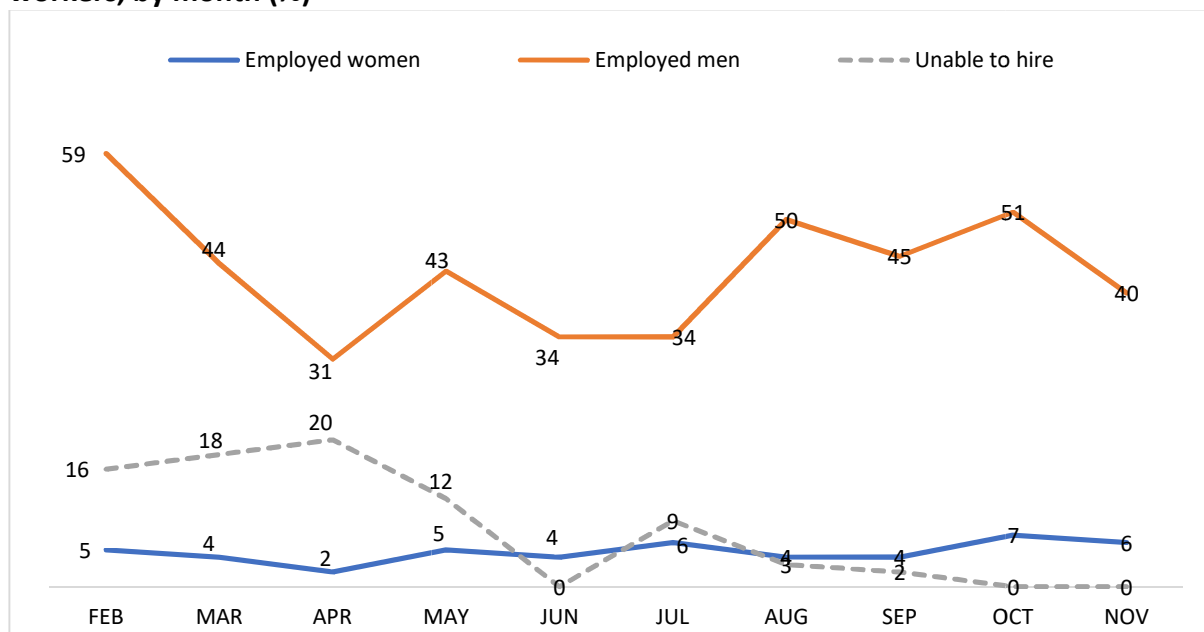


Employment followed a similar, less pronounced pattern to that in Figure 2. The share of respondents employing male casual workers, or reporting being unable to hire labor fluctuated over this period (Figure 3). The share of businesses employing male casual workers sharply trended downward between February and April, from 59% to 31%, before climbing in May to 43%, falling again and remaining stable in June and July at 34%. Male employment climbed again to 50% in August, remaining fairly consistent until October, before falling somewhat in November to 40% (Figure 3).

In contrast, employment of female casual workers remained relatively stable, but low, over the survey period, employed by between 2% and 6% for surveyed businesses from May to September, with the greatest share of female labor employed in October (7%). These results suggest that COVID-19 negatively impacted access to paid work for male workers in aquatic food supply chains, while women’s access to paid work was consistently lower than that of men.

The share of respondents unable to hire labor for their business peaked at 20% in April, before falling to zero in June, increasing again in July, before gradually falling back to zero in October and November. These results suggest COVID-19 negatively impacted businesses’ ability to find workers for a relatively short time, while workers’ ability to find employment was affected for longer.

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, or if they had reduced the quantity of inputs purchased or products sold as compared to their usual expectations. Results for all four indicators mirrored the trends reported above, improving significantly from May to June, before worsening again in July. For example, the share of respondents experiencing delays accessing inputs dropped from 64% in May to 13% in June, but then increased again to 54% in July. Other indicators followed a similar pattern. Between July and November all indicators improved and trended downward, with 12% experiencing reductions in the quantity of product sold and inputs purchased, and 10% experiencing delays in selling products and accessing inputs.

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. The percentage of respondents with sufficient weekly income grew sharply from 38% to 77% between May and June, but fell back somewhat in July to 69%, before rebounding and remaining between 82% and 86% from August onwards.

Following a similar but more pronounced trend, 64% of respondents purchased the same amount of food as usual in May which continued to climb over this period, reaching 96% by October but falling back to 90% in November, suggesting that the negative effects of COVID-19 on food security over this period lessened initially before intensifying slightly again. The share of respondents receiving a sufficient weekly income to cover living expenses jumped from 38% to 77% between May and June, dipped slightly in July, but remained at around 85% thereafter, suggesting that once COVID-19 lockdown and restriction measures were lifted, respondent's ability to earn an income and access to food quickly improved.

From May onwards, we also asked respondents if they had received any form of assistance and whether they had travelled for more than one mile from home during the past month (as an indicator of the severity of movement restrictions). The share of respondents travelling more than one mile from home remained stable around 84% between May and July, before jumping to 93%

in August and remaining stable until November, reflecting the lifting of lockdown and movement restriction measures.

Following a similar trend, the share of respondents receiving any form of assistance remained stable between 27% and 30% from May to July, before there was a sharp increase to just under 50% in August. The share of respondents who received assistance remained at this level until October, but rose to 72% in November, suggesting the roll out of the national economic assistance plan.

Hatcheries

An increasing number of surveyed hatcheries stopped operations, rising from 10% in February to 90% in May, before falling slightly to 80% in June and dropping back to 10% in July. All hatcheries operated in August, but a few suspended operations in September (20%) to November (10%). Respondents cited temporary suspension of operations due to COVID-19 and having sufficient stock as the main causes for halting operations during this period. Accordingly, the average number of days hatcheries operated fell from 18 days to 2 between February and May, before rising to 22 days in July, and remained above 16 days until November.

Fish fry sales by surveyed hatcheries trended upwards but remained modest in June, July, and November (the only months sales were made), while fingerlings sales followed the same trend and were only sold in June, July and October. Total monthly fry sales climbed from 20,000 to 80,000 between June and July, and returned to 80,000 in October following no sales in August and September. 20,000 fingerlings were sold in June, doubling to 40,000 by July, before climbing significantly to 170,000 sold in October.

Feed mills

One feed mill was surveyed and operated between February and November, working 21 days per month on average between February and July, before increasing to working an average of 25 days in later months.

The total quantity of feed manufactured was stable and stood between 700 t and 800 t in all months except April, October, and November. The quantity manufactured trended downwards between February and April, falling from 800 t to 372 t, where the average sales value remained stable at INR 76,000/t. The quantity manufactured quickly rebounded to 800 t in May and remained stable until September, before sharply falling to 170 t in October and 200 t in November, the smallest amount manufactured over the survey period.

In May we began asking about the quantity of feed sold in the past month. 160 t of feed was sold in May, increasing to 720 t in June and July, consistent with the increase in seed production by hatcheries during the same period. Sales fell by 170 t between July and August, increasing slightly in September, before steeply decreasing in October (165 t) and November (130 t). The average sales price increased slightly from INR 77,000/t in May and remained between INR 79000/t and INR 83000/t for the following months.

Feed sellers

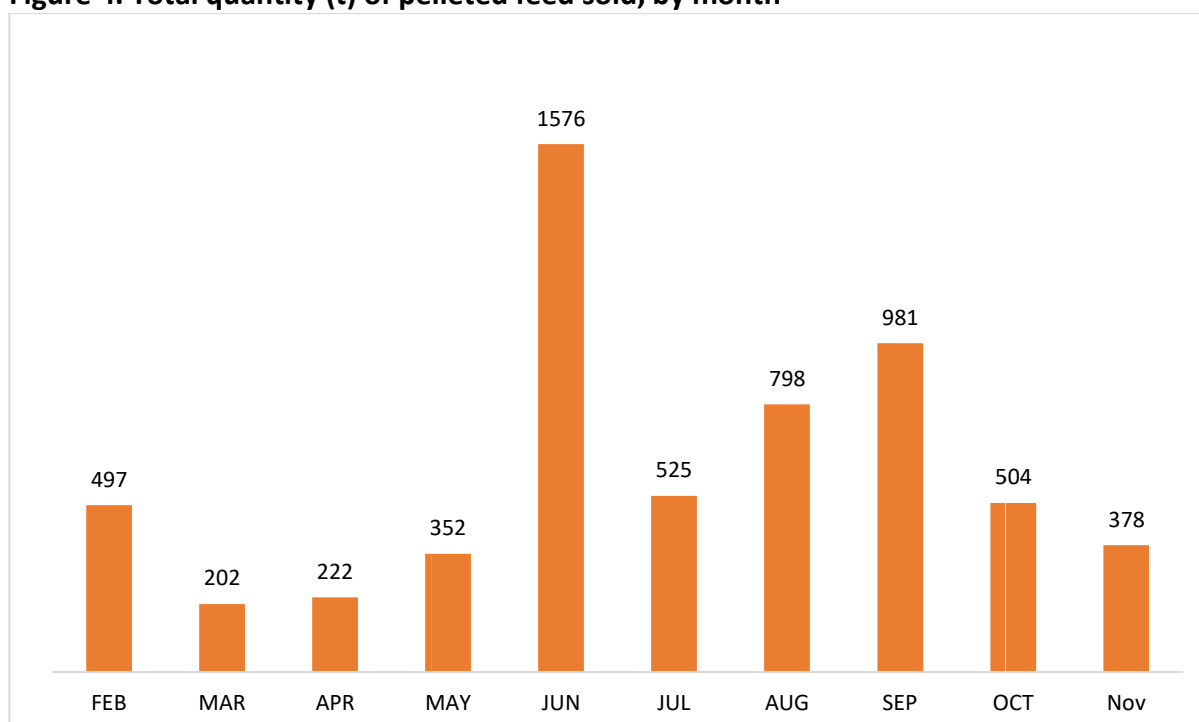
We surveyed two sets of feed trading businesses; pelleted feed sellers, and non-pelleted feed sellers. The main non-pelleted feeds sold included rice bran and peanut oil cake. The main feeds

sold by pelleted feed sellers are shrimp feeds, followed by floating feeds and a smaller quantity of sinking pellets.

All pelleted feed sellers were operating in February, falling to 58% in March and April, with respondents citing COVID-19 as the main cause for suspending operations. 91% of surveyed pelleted feed sellers operated from May to July, with 100% resuming operations from August onwards. Following a similar pattern, 100% of non-pelleted feed sellers were operating in February, falling to 67% in March and 50% in May, with respondents citing temporary suspension of business due to COVID-19 as the main cause for pausing operations. Around 80% of non-pelleted feed sellers were operating again in June and July, with all resuming operations from August onwards. The average number of days non-pelleted feed sellers and pelleted feed sellers operated followed a similar trend, falling from around 23 days in February to between 14 and 17 days in July before jumping back up between 21 and 24 days from September to November.

The total quantity of pelleted feed sold by surveyed businesses more than halved between February and April (falling from 497t to 222 t), recovering in May and trending sharply upwards until June to reach its highest point (1576 t), before falling to 525 t in July (Figure 4). Sales then followed an 'inverted U' shaped curve, building to 981 t between July and September, before decreasing to 378 t in November.

Figure 4. Total quantity (t) of pelleted feed sold, by month



The quantity of non-pelleted feed sold by surveyed businesses followed a very similar pattern to pelleted feed. The amount sold dropped tenfold between February and April from 80 t to 8t, trending upwards to 157 t in June, before falling sharply again to 55 t in August; a pattern observed across the supply chain, and visible in Figure 1 and 2. Sales peaked at 217 t in September, the greatest quantity of non-pelleted feed sold over this time period, before declining again by 43% in November to 123 t.

The average price of pelleted feed sold climbed gradually but steadily between May and July from INR 63,305/t to INR 83,091/t (an increase of 31%), before declining by to INR 59,828/t in October.

The average sales value of non-pelleted feeds followed a similar upward trend, rising gradually from INR 19,444/t to INR 25,257/t between February and October (up 30%), falling back down slightly to INR 23,286/t in November.

Farmers

Most farmers remained in operation between February and July. 18% were not operational in February which rose to 35% in April, with farmers citing the off season and COVID-19 among the main causes for suspending operations. Between 20% and 30% of farms were not operating from May to July before falling slightly, with between 7% and 13% suspending operations, citing reasons linked to COVID-19 as the main causes for halting operations.

The main feeds purchased by surveyed farmers were sinking feed, floating feed, rice bran and oilcake. Average feed prices (all feeds combined) fluctuated over the survey period, and were lowest in April (INR 36,261/t) and highest in May (INR 63,708/t). July was the peak month for provision of feed. Purchases of feed fell between February and April from 227t to 150 t, before climbing steeply to 1875 t in July. Provision of feed then plummeted to 563 t in August and continued to decline for the remainder of the survey period, standing at 412 t in November. July was also the peak month for the procurement of fish seed and shrimp post-larvae, with most seed purchased between May and July. Following the same trend as the procurement of feed, the quantity of fish seed purchased by farmers dropped in August and continued to fall.

The amount of fish sold by surveyed farmers fluctuated over the survey period, dropping from 74 t to 2.3 t between February and April, with no sales made in May. Sales surged to 162 t in June, before trending downward again, with 53 t sold in August. The following months followed the same trend, climbing by 94 t between August and September, before falling once more in October, a pattern seen across multiple supply chain segments.

Pacu and pangasius accounted for most of the fish sales made by surveyed farms between June and November, with some limited sales of rohu, mrigal and catla from February-April. While the sales fell between February and April, the average sales price rose from INR 121/kg to INR 150/kg, but remained stable between INR 82/kg and INR 93/kg from July onwards.

The total quantity of shrimp sold by surveyed farmers fell from 10 t in February to almost nothing in March, before jumping from 9 t in April to 416 t in May and remaining stable in June. Following the same pattern as farmed fish sales, shrimp sales plummeted again in July to 192 t, before climbing to 283 t in August and continued to fall downward in the following months, with 69 t sold in October. The average sales value of shrimp also fluctuated over the survey period and was lowest at INR 160/kg in March and, in line with the rise in sales, was highest in June at INR 288/kg.

Fishers

Most surveyed fishers fished in the sea, most commonly in nearshore waters, but also offshore. Approximately one quarter of respondents fished inland in rivers. All fished with boats, averaging 8-9 meters in length. 89% of boats had engines, averaging 17HP in size.

100% of fishers were operating in February. This share dropped to 50% in March, and just 6% in April. 63% of fishers operated in May, falling to 53% in June and July. Most fishers who paused operations in March cited reasons related to COVID-19. In April about half of non-fishing respondents cited reasons related to COVID-19 and half cited to the closed or off-season for

fishing, rising to 78% in May. From August and November, an increasing share of fishers resumed operations. Between 16% and 26% suspended fishing activities during these months citing bad weather as the main reason. Accordingly, the average number of days fishers operated per month, fell from 25 days in February to 1 day in April, and ranged from 7 to 15 days per month thereafter.

The quantity of fish landed and sold plunged between February and March and sales only grew from August onwards. Landings and sales dropped from 82 t to 1.5 t between February and March. No fish were landed or sold during the month of April. This decline may be attributed to a number of events, including seasonal closure of mechanized boat fishing from April 15 to May 31 on the east coast of India, COVID-19 lockdown restrictions and lack of access to ice, and the impact of Cyclone Amphan in May. The quantity of fish landed and sold remained below 1.6 t between May and July, before jumping to 63 t landed and 62 t sold in August. Sales fluctuated between August and November, falling by 10 t in September, rising by 16 t in October, before dropping to 42 t in November.

Over 80% of fishers consumed their own catch in February, which increased to 100% in March and April among those who remained operational. From May onwards, an increasing share of fishers, between 19% and 50%, stopped consuming their own catch. In February the average quantity of own catch consumed each month by surveyed fishers and their households was 7kg, which gradually dropped to 5 kg in March, before jumping to 9kg in June, the greatest amount of fish consumed per household over the survey period. The quantity consumed fell to 3kg in August and remained beneath 4.6kg from there onwards.

Traders

An increasing number of surveyed fish traders halted operations over the survey period, rising from 14% in February to 44% in July, then falling to less than 25% from August onwards. Respondents cited the off-season or closed season for fishing as the main cause in February, travel restrictions as the main cause in April and other reasons related to COVID-19 as the main cause for suspending operations in all other months. Accordingly, the average number of days fish traders operated dropped from 19 days in February to 8 days in July, before rebounding to 14 days from August and the months thereafter.

Freshwater capture fish and shrimp were traded throughout the entire survey period, while farmed fish were not traded in November and marine capture fish were not traded in June and July. The total quantity of farmed fish traded fluctuated, trending slightly upwards between February (358 t) and March (488 t), before sales plunged to 145 t in April. Peak sales occurred in May (568 t), before quickly falling and remaining between 15 t and 53 t from July onwards. The average sales price of farmed fish followed a similar pattern, dropping from INR 274/kg in February to INR 103/kg in April. With the exception of May, when there was a slight increase, the price remained below INR 103/kg from April onwards.

Shrimp sales followed a trend similar to that which occurred in many supply chains segments over the survey period. The total quantity of shrimp sold fell between February (349 t) and March (214 t), before rising to 1367 t in June, the greatest quantity sold over this period, quickly dropping again in July (388 t). No sales were made in August, but quickly rose in September with 620 t sold, before falling in October and November to the same levels as July. The average sales value followed the same trend, peaking in June at INR 359/kg, up from around INR 200/kg in February-April. The sales value dropped to INR 255/kg in July and remained stable thereafter.

Freshwater capture fish sales remained fairly stable around 2.5 t between February and April, before falling to about 0.5 t in May (-80%), with sales staying below 1 t thereafter. As the sales dropped between April and May, the average sales value increased and remained stable around INR 165/kg. In contrast, peak marine capture fish sales occurred in May (20 t) after jumping from 0.09 t in April, with no sales reported in other months.

Retailers

Most fish retailers (88%) were operating in February. Numbers fell to 63% in March and 13% in April, before climbing to 50% in May and reaching 83% in June and July, and remained stable at this level for the remainder of the survey period. All retailers who closed in February cited the closed fishing season. From March onwards, reasons related to COVID-19, including inability to hire transport services, were the main reasons given for not operating. Accordingly, the average number of days operated by fish retailers each month dropped from 18 in February to a low of 2 in April, recovering to around 16 days from June onwards.

The quantity of farmed fish sold by surveyed retailers trended downwards between February and August, falling from 1.2 t to 0.1 t, with no sales at all made in April and May. Despite a small increase in September (0.5 t), fish sales remained around 0.1 t from July to October before jumping to 0.8 t in November. The average sales value, on the other hand, trended upward from February to October, rising from INR 97/kg to INR 185/kg. However, in October, sales prices fell by 28% to INR 133/kg. Catla accounted for the majority of farmed fish sales over the survey period.

No freshwater capture fish was sold from May to July, and sales plummeted from 5.5 t in February to 0.29 t in March and continued to decline in April. Though sales resumed between August and November, they stayed low and remained below 0.09 t. This may be due to the location of most survey respondents in coastal areas, as most freshwater capture fish are marketed inland in freshwater capture fishing areas. Following the same pattern as farmed fish, the sales value of freshwater capture fish rose over this period, from INR 101/kg to INR 200/kg.

Marine capture fish was sold in all months except April. Sales were highest in February at 28 t, falling to 8t in March, and remained below 1 t from May onwards, except for June, when sales reached 7 t. Mixed small marine fish accounted for most sales. The average sales value of marine capture fish surged during this period, increasing 93% between February and September (from INR 41/kg to INR 613/kg) – likely reflecting a change in the composition of the catch – before falling back to INR 448/kg in October and remaining at this level in the following month.

In contrast, shrimp sales gradually rose between February and October from 1 t to 10 t before skyrocketing to 55 t in November. No sales occurred in April and May. Shrimp sales prices remained at around INR 300/kg before falling to INR 182 in October, recovering again to INR 240 in November.

3. Recommendations

- Provide financial support and facilitate access to credit for supply chain actors who have lost substantial amounts of revenue and are facing cash flow problems.
- Safeguard the ability to access transportation, movement of merchandise, and connections between supply chain actors.

- Conduct research on how COVID-19 may transfer through fish market practices and ways to mitigate this.
- Provide health and insurance coverage for fishers and aquaculture farmers working under COVID-19 health risks.
- Prepare a government emergency response plan for aquaculture and fisheries, including provision for cold storage facilities operated by government or under public-private partnerships.
- Raise awareness and provide training on how to use digital channels to advertise and sell fish products and production inputs.



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