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Impacts of COVID-19 on aquatic food supply chains in Assam, 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

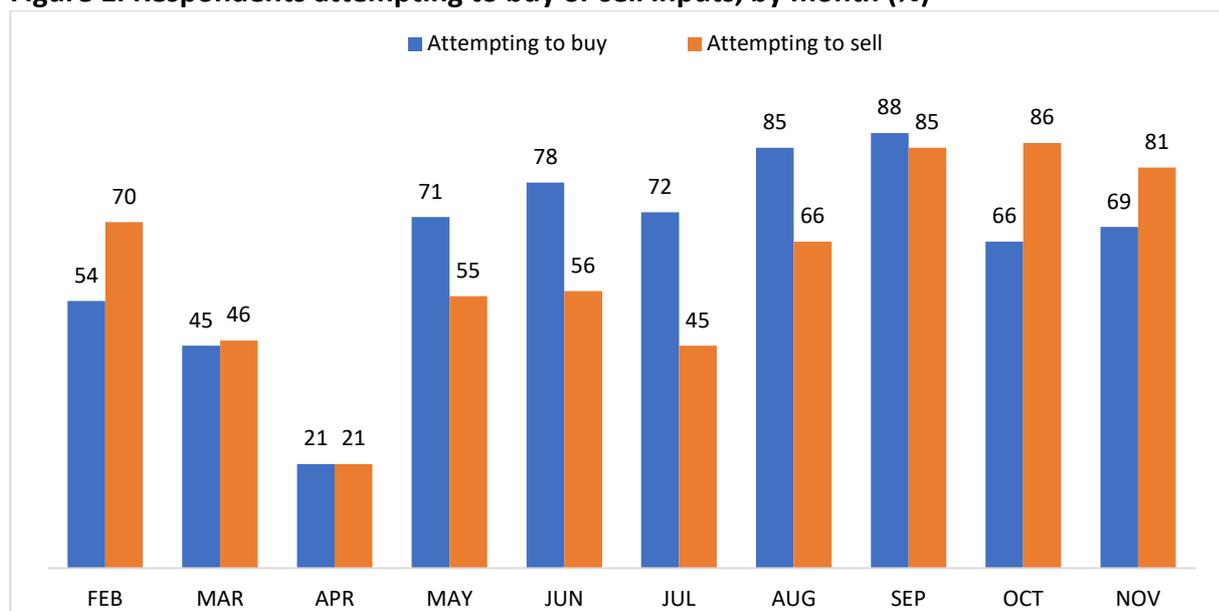
We conducted a monthly phone survey with fish supply chain actors in Assam to assess impacts of COVID-19 on the availability and price of aquatic foods and production inputs. Respondents answered questions about their activity between the months of February and November 2020. The sample totaled 108 respondents, comprised of the following: feed mills (5), feed sellers (14), fish hatcheries (11), fish farmers (26), fishers (25), fish traders (10), processors (5), and retailers (11).

The areas covered included Lower Assam (32%), Upper Assam (29%), Barak Valley (15%), Hills and Central Assam (15%) and North Assam (8%). Districts with the most respondents were Kamrup Rural (9%), Nagaon (8%), Cachar (8%), Jorhat (8%), Morigaon (7%), Nalbari (7%), Lakhimpur (7%), Sonitpur (6%), Majuli (6%), Goalpara (5%) and Guwahati (Kamrup Metro) (5%). A complete overview of survey results can be accessed [here](#).

2. Key Findings

Between February and April 2020, due to COVID-19, there were steep declines in the share of respondents attempting to buy inputs or sell products. The share of respondents trying to buy inputs went down from 54% to 21% between February and April, while the share of businesses attempting to sell products fell even more sharply, from 70% to 21% (Figure 1). The share of respondents attempting to buy inputs recovered in May, jumping to 71%, and remained above this level in June and July. From July onwards, the share of respondents attempting to buy inputs continued to increase, peaking at 88% in September, before falling to 69% in November. The share of businesses attempting to sell products grew more slowly, to around 55% in May and June, before declining slightly to 45% in July, suggesting that demand remained sluggish. However, the share of respondents attempting to sell products climbed from 66% in August to 86% in October, before slightly dropping to 81% in November. In October, the share of businesses attempting to sell products greatly exceeded those attempting to purchase products for the first time since February.

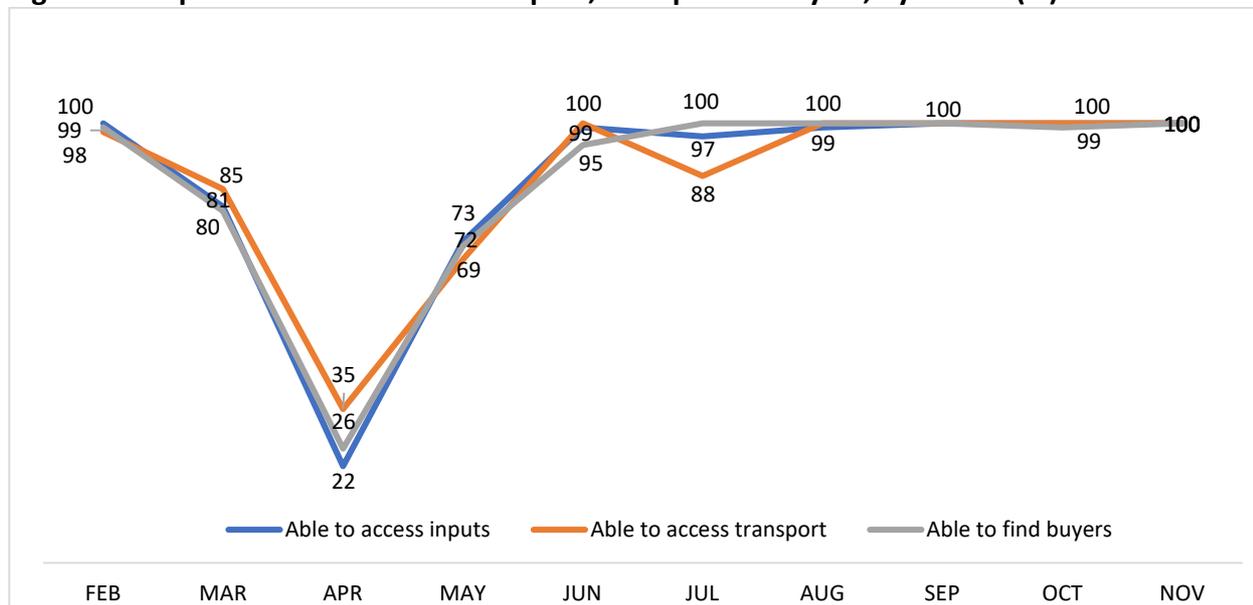
Figure 1. Respondents attempting to buy or sell inputs, by month (%)



Among respondents who attempted to buy or sell products, the share of respondents who were able to access inputs, transport, or buyers followed a similar, but even more pronounced ‘V shaped’

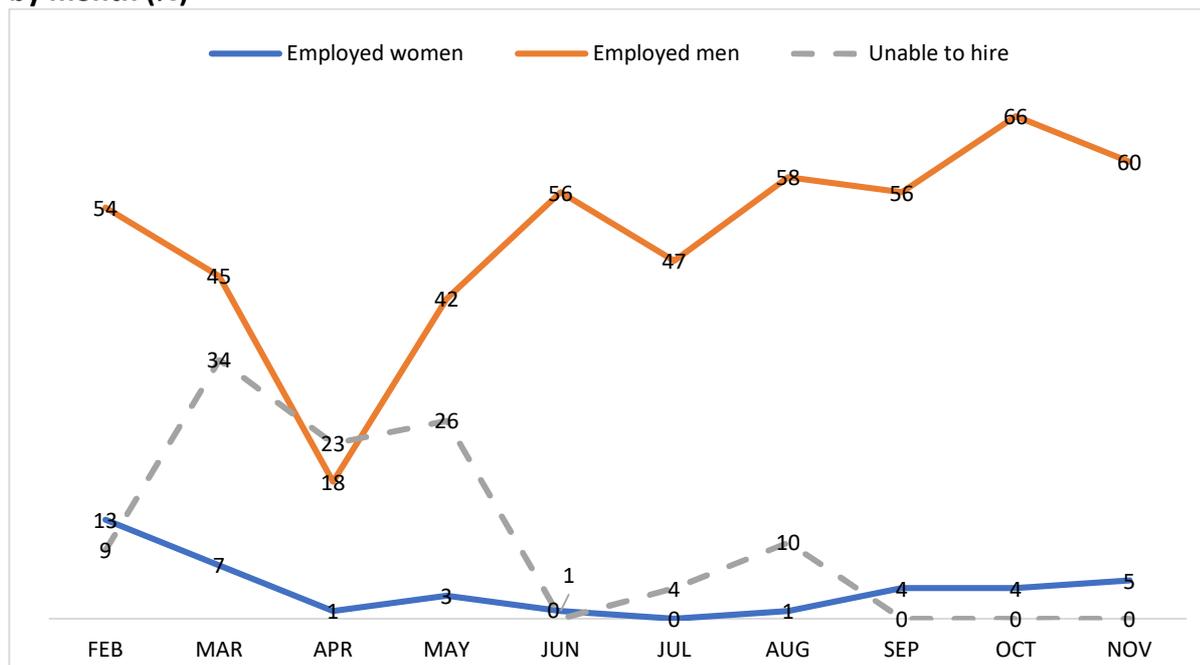
pattern between February and June (Figure 2). The percentage of respondents able to access inputs plunged from 100% in February to 22% in April, but rose again quickly to 98% in June, and remained close to this level from July to November. Respondents' ability to access transport and find buyers followed a similar trend.

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



Employment also followed a somewhat similar pattern. The percentage of respondents employing male casual workers dropped from 54% in February to 18% in April, rising back to 56% in June before declining again to 47% in July. Between August and November, however, the share of respondents employing men followed a general upward trend. In contrast, the share of respondents employing women daily laborers fell from 13% in February to 1% in April and remained around this level until November, suggesting differential impacts of COVID-19 on women's and men's access to paid work (Figure 3). Between one-quarter and one-third of respondents were unable to hire casual workers during the months of March, April and May, suggesting that movement restrictions impacted both businesses' ability to find workers, and workers' ability to find employment. However, labor access returned to normal in June as well as between September-November, following a slight increase in respondents unable to hire workers in August.

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 used or experienced a reduction in the quantity of products sold, as compared with their usual expectations. 69% and 56% of respondents, respectively, reported that they had experienced delays in accessing inputs or used fewer inputs than usual in May. This number fell to around 6% in June and remained at a similar level through August, suggesting improved input access and availability, consistent with the trends in Figure 1 and 2. A similar pattern was reported by respondents regarding delayed sales and reduced sales volumes, though the share of respondents reporting difficulties increased slightly between June and July from ~5% to ~15%, indicating slowing demand, and remaining at this level until November.

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. Both these indicators improved from May to June and remained unchanged in July. The percentage of respondents with sufficient weekly income grew from 55% to 84% over this period, normalizing to 91% from August to November. 41% of respondents reported purchasing less food than usual in May, suggesting that the COVID-19 crisis negatively affected respondent's food security, but these effects lessened somewhat in June and July, when they were reported by 7% and 1% of respondents, respectively. Between August and November, food purchasing behaviors returned to normal among all respondents.

From May onward, we asked respondents whether they had travelled more than one mile from home during the past month (an indicator of the severity of any movement restrictions). Almost 100% of the respondents travelled more than one mile from their homes, suggesting that their movement was not affected by 'lockdown' measures during these months.

We also asked whether respondents had received any form of assistance and, if so, the source of the assistance, from May onward. 14% of respondents received assistance in May, with government reported as the source in 93% of cases, but only 1-2% received any assistance in June and July, and

none received any assistance from August to November. Fishers accounted for most of the respondents who received assistance. Few farmers and almost no actors in other segments of the value chain reported receiving support during the period.

Hatcheries

Seasonality played a major role in determining the timing of hatchery operations. No hatcheries operated in February and few (9%) opened in March. The number of operational hatcheries increased gradually from 64% in April to 91% in July. Hatcheries that closed between April and June did so for reasons related to COVID-19, including inability to access inputs or transport. Between July and August, all closures were due to hatcheries having adequate stock to sell, perhaps suggesting that demand was low. The number of inoperational hatcheries increased in September until all hatcheries were no longer operating in October and November. The average number of hatchery operating days per month followed a similar temporal trend, rising from zero in February to 16 in July. This may suggest that full production capacity was not reached during these months. However, average business operating days fell back down between July and September to only seven days per month.

In February and March, none of the surveyed hatcheries produced or sold hatchlings. Hatchling production increased sharply from April (when surveyed respondents produced 156 million hatchlings) to May (520 million hatchlings), before falling to 238 million in July. Indian major carps (rohu and mirgal) accounted for the bulk of hatchlings produced by hatcheries in the sample. As no surveyed hatcheries were operating from September to November, no hatchlings were produced or sold.

Feed Mills

Surveyed feed mills went from being fully operational in February and March, to completely inoperational in April. The number of operating mills increased gradually in May (60%) and June (80%), and all were operational again by July (100%). This fell slightly to 80% from August to October, but returned to 100% in November. The average number of days that mills operated by each month followed a similar pattern, dropping from 29 days in February to zero in April, before climbing to 14 days in May and 26 in July. Closures related to COVID-19, were the most common causes for pausing operations in April and May. These reasons included input suppliers being out of stock, reduced rail and road transport preventing movement of inputs, and inability to hire transportation.

Raw material prices increased gradually over the survey period. Between February and March, the average procurement price of raw materials increased from INR 14,927/t to INR 19,407/t (+30%). Procurement prices remained stable in May and November, despite a slight hike in July to INR 22,036/t (a further 14% increase over May prices). The quantity of raw materials procured by mills fell from 259 t in February to zero in April as mills closed, before surging to 448 t in May, following the easing of lockdown measures. Reported procurement fell to zero again in June, before climbing to 220 t the following month. Between September and October, procurement rose from zero to 164 t before falling to 108 in November.

The total amount of feed manufactured fell slightly between February (173 t) and March (155 t), dipping drastically in May (64 t) and plateauing at this level through November. Despite the average feed sales value remaining relatively stable between May and June (INR 25,923/t), the amount of feed sold fell from 52 t to 12 t (-77%) while the total value of feed sold experienced similar declines from INR 1,240,000 to INR 336,000 (-73%). Between June and July, the total amount of feed sold

surged up to 64 t, an 81% increase, maintaining these levels from August to October. However, feed sales fell back down to 50 t in November.

Feed sellers

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

Almost all non-pelleted feed sellers operated in all months, apart from April when all the operations stopped. Reasons reported for pausing business operations were all related to COVID-19 in some way, and included restrictions on movement by road, out of stock input suppliers, low demand, and inability to hire transport. A similar pattern of business closures and operations was reported by respondents selling pelleted feed, but with 20% remaining shut in March and May.

The procurement price for non-pelleted feed ingredients was fairly consistent throughout the survey period. Although the average procurement price of non-pelleted feed ingredients decreased from INR 23,324/t to INR 20,142/t (-14%) between May and July, prices remained around this level from August onward. From May to November, procurement remained stable at an average of 172 t, except for the months of June (88 t) and October (72 t) when the lowest amounts of ingredients were procured, and July (508t) when the highest amount of feed was also sold (344 t). The lowest amounts of feed sales also occurred in June (44 t) and October (61 t).

The price of non-pelleted feed sold by surveyed mills increased gradually from February to October, likely reflecting rising input prices. The sales value per ton of non-pelleted feed was INR 20,231 in February. Prices steadily rose to INR 26,188/t in October before falling back slightly to INR 24,342 in November (17% higher than in February).

The procurement price for pelleted feed ingredients remained relatively stable between July and September at around INR 55,382/t, falling by 30% in October (INR 38,400/t) before bouncing back in November (INR 50,202/t). Like non-pelleted feed, the highest quantity of feed procured occurred in July (160 t). However, this fell by 54% between July and August (from 160 t to 73 t), dropping even further to 25 t in October, before rising to 60 t in November (62% lower than July). The main non-pelleted feed ingredient procured and sold was mustard oilcake.

The average sales price of pelleted feeds was fairly consistent over the period February-November, although was relatively low in October. The amount of pelleted feed sold climbed from 115 t to 220 t between February and March, but dropped drastically in April to only 65 t. Pelleted feed sales remained around this level from May to September, before experiencing another plunge in October (25 t), when the sales price was at its lowest.

Farmers

Unlike other actors surveyed, all farmers remained operational from February to November. The share of farms procuring inputs dwindled from 35% in February to 15% in April. There was a peak in input purchases in May (reported by 60% of farms), but the share of farmers who reported buying inputs subsequently declined to 24% in June, and then fell further to just 4% from July. Another peak in input purchasing occurred in August (reported by 58% of farms) before falling and rising again from 16% to 32% between September and October.

The main feeds purchased were mustard oilcake, rice bran and sinking feed. Average feed prices remained steady at around INR 23,400/t from February to November, except in May when prices peaked INR 46580/t. May was also the peak month for procuring fish seed, when 40% of farms reported buying. The vast majority of fish seed purchases by surveyed farms were made at this time.

The peak period of fish sales by surveyed farms was in May (17 t) and June (6 t), up from 3 t in February and 1 t in April. Fish sales fell to 3 t in August and remained low through September (1 t) and October (2 t). No fish sales were reported in March or July. Farmgate prices of fish remained stable from February to June at around INR 240/kg, dipping slightly to INR 220/kg in May, when sales were highest. Fish farmgate prices were lowest in August (INR 198/kg), but rose somewhat in September (INR 220/kg) and October (INR 214/kg). Indian or Chinese major carps accounted for all the fish reported as sold during the period.

Fishers

76% of surveyed fishers were operating in February, but none of them went fishing in March and April due to the inability to hire transport (20%), temporary suspension of activities linked to COVID-19 (22%), restrictions on transport preventing movement (22%) and seasonality/fishing ban (19%). Between May and July, no fishers went fishing due to the seasonal fishing ban. As a result, no sales were recorded between March and July, while fishers sold a total 0.69 tons of fish in February.

Fishing resumed in August, when 40% of surveyed fishers were operating, and all fishers resumed activities in October. The total amount of fish landed and sold surged by 88%, from less than a ton in August to 2 t in October, falling slightly to 1.5 t in November. All surveyed fishers reported consuming their own catch, with the average amount of fish consumed by fishers' households increasing from less than 1kg/month to 4 kg/month.

Processors

The activities of fish processors (who are mainly involved in drying fish) are linked closely to those of fishers. Accordingly, nearly all surveyed processors stopped operating in March and April. Reasons for doing so included COVID-19 (13%), raw material prices being too high (25%), the fishing ban (25%), and seasonality (25%). From May to July, all processors stopped operating completely, due the enforcement of the annual fishing ban. A 42% decrease in the quantity of fish processed/sold and a 46% decrease in revenues was reported between February and March.

As fishers began operating again between August and November, most fish processors (80% of respondents) likewise resumed activities during these months. The volume of fish processed steadily rose from 0 t in August to 5 t in November. Although processed fish sales experienced a similar increase from August (0 t) to October (4 t), this fell slightly to 3 t in November. Similarly, processed fish revenues climbed from INR 12,000 to INR 621,400 before dipping somewhat to INR 494,000.

Traders

All fish traders were operating in February and March, but temporarily suspended operations in April for reasons related to COVID-19, including restrictions on road transport and inability to hire transport. By June, 70% of traders were operating again, falling to 30% in July, before all traders were operating again between August and November. The average number of business operating days for traders also remained low from May and July, at around seven days per month (down from

an average of 28 days in February), but returning to 26 days from September to November. The main cause of trading business closures reported in June and July were 'other' unspecified reasons, but likely reflected the impacts of the seasonal fishing ban.

Farmed fish were traded throughout the entire survey period, except in April when all businesses closed. No respondents reported trading marine or freshwater capture fish or shrimp from April to July, but trading of freshwater capture fish resumed from August to November. Farmed fish dominated total sales, accounting for 85% in February (356 t) and nearly all sales in November (450 t). Sales of freshwater capture fish and shrimp stood at around 30 t each in February, with marine capture fish sales amounting to just 1.5 t. While freshwater capture fish trading began again from August to November, sales were much lower than February, with only 2 t being sold in November.

The quantity of fish sold dropped sharply from February to March, irrespective of source. Sales of farmed fish and freshwater capture fish declined by around 43% while shrimp and marine capture fish sales fell by 20% and 25%, respectively. Although trade in farmed fish resumed in May and June, it was at a much lower level than previously (just 6 t in May, and 14 t in June). In November, however, sales bounced back up by 97% to 450 t.

Average prices of farmed fish and freshwater capture fish both declined by around 10% between February and March (from INR 170/kg to INR 148/kg) and (from INR 178/kg to INR 160/kg), respectively. Rohu was hit particularly hard with a 40% decrease (from INR 174/kg to 104/kg). As a result of the drop in sales and prices, traders' gross income from farmed and freshwater fish fell by approximately 50% in March with income from rohu falling by 84%. The average sales price of farmed fish subsequently climbed by approximately 50% in May and June to around INR 223/kg, likely reflecting constrained supply, but in November returned to a similar price as March (INR 156/kg). The sale prices of freshwater capture fish likewise experienced a drastic surge between March and November (from INR 160/kg to INR 475/kg) when trading resumed.

Retailers

The operation of fish retail businesses followed a similar pattern to that of fish traders. All retailers operated in February and March but stopped operating in April. 79% suspended their activity temporarily due to COVID-19, while related transport and movement restrictions accounted for the other closures. Most retailers began operating again in May and June, but only 18% remained operational in July. Reasons for business closures in July related to restrictions on movement, access to transport and closure of suppliers, while about one-third of respondents cited 'other' unspecified reasons. Between August and November, all fish retailers were operating again.

The average number of days in which operational businesses traded followed a similar pattern, falling from 28 days/month in February to zero in April, rising again to 19 days in June and then falling again to 4 days/month in July. From August to November, business operation days returned to February-like levels at 26 days/month.

All operational retailers sold farmed fish in all months from February to July except April. The average price of farmed fish sold remained quite constant at around INR 300/kg from February to July. Details of fish sales were not reported after August, although they are presumed to have continued. Rohu, catla and mrigal contributed most sales of farmed fish in all months. Shrimp and freshwater capture fish were only sold in February and March.

3. Recommendations

- During the COVID-19 pandemic the government has supported uninterrupted transport and inter-state and intra-state movement of critical inputs for fisheries and aquaculture such as fish seed and feed and raw materials, as well as the movement of fish for sale to the markets. However, in practice there were restrictions for transport. Hence there is need to safeguard access to transportation and movement of merchandise.
- Keeping markets open safely is key to safeguarding demand and keeping the supply chain functioning adequately. Though the Government of Assam has taken all steps to support the marketing of fish to meet the demand, consumer access was restricted and there is need to explore other avenues like direct procurement and marketing through hygienic market outlets and online marketing
- As most stakeholders in the fish value chain were affected by the pandemic, there is an urgent need to provide financial support to actors of supply chain who have lost substantial amounts of revenue during these testing times.
- 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.
- Most hatcheries faced difficulties in seed marketing but lacked sufficient space to retain and nurse surplus seed. This means that there may be inadequate quantities of seed available for sale when demand picks up again. Support may be required to help overcome seed shortages and ensure that demand for seed can be met.
- Feed is becoming a major input for aquaculture production and the fish feed supply chain including the raw material supply, feed distribution needs to be strengthened so that shortages do not affect the overall fish production. Establishing more decentralized small-scale feed mills and encouraging production of farm made feeds could help to improve this situation.
- The livelihoods of fishers depending on the inland capture fishery were very severely impacted by the COVID 19 pandemic, followed immediately by the fishing ban, and there is a special need to extend welfare support to these vulnerable communities dependent on capture fisheries.
- Making institutional credit more widely available for stakeholders involved in fisheries and aquaculture could provide vital support during current circumstances, while insurance programmes could help buffer against future shocks.



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