



RESEARCH
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Qualitative assessment of COVID-19 impacts on aquatic food value chains in Bangladesh

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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.

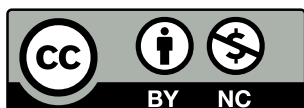
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1. Introduction

The COVID-19 pandemic has disrupted food systems globally, resulting in significant impacts on economic and food security. In Bangladesh, aquatic food value chains make up a large part of the country's food system. WorldFish is conducting [longitudinal phone surveys](#) to analyze the impacts of COVID-19 on aquatic food value chains, but these do not capture nuanced details of the context in which observed trends are embedded. To this end, this qualitative study aims to explore in greater depth the pathways by which aquatic food supply chain actors in Bangladesh are affected by COVID-19.

2. Methods

Telephone interviews were conducted in May 2020. 44 participants were purposively sampled to capture diversity in geographic location, actor type, and actor size. A list of possible participants that met the study eligibility criteria was generated based on the prior contacts of the research team. Participants from this list were then recruited over the phone. Participants covered all eight divisions of Bangladesh and a variety of actor types (Table 1 and Table 2).

	N	%
Actor Type		
Hatchery	7	16
Feed mill	2	5
Feed retailer	3	7
Farmer	7	16
Fisher	4	9
Fish retailer	3	7
Wholesaler	3	7
Fishing laborer*	3	7
Fish processor	5	11
Fry trader (<i>patilwala</i>)	3	7
Driver/transport worker	3	7
Homemaker	1	2

*NOTE: Members of netting teams employed to harvest fishponds and workers on fishing boats

Table 1. Participant characteristics by value chain segment.

	N	%
Division		
Barisal	1	2
Chittagong	20	45
Dhaka	4	9
Khulna	6	14
Mymensingh	4	9
Rajshahi	1	2
Rangpur	1	2
Sylhet	2	5
Gender		
Male	39	89
Female	5	11

Table 2. Participant characteristics by division and gender.

A semi-structured interview guide was designed, which consisted of ten sets of open-ended questions on how COVID-19 had impacted participants' occupations, businesses or livelihoods, and their adaptations to these changes, impacts on their food consumption, and the nature of any assistance or support received. Consent was obtained from each participant prior to interview.

3. Results

Our findings are presented in the following sections: (1) impacts on input suppliers; (2) impacts on producers, (3) impacts on retailers and wholesalers (4) impacts on consumers; (5) experiences and perceptions of aid and assistance. We group hatcheries, feed mills, feed retailers/sellers, and *patilwala* (itinerant fish seed traders) together for analysis as input suppliers. Responses from farmers, fishers, fish processors, fish harvesting workers, other laborers, and transport workers are grouped together for analysis under the heading 'producers'.

For suppliers, producers, and retailers/wholesalers, we present analysis on supply side shocks (changes in input prices, availability, and accessibility); demand side shocks (changes in demand for marketed products, sales prices and volume); and responses (business adaptations and/or coping mechanisms, including changes in quantities of production).

3.1 Input suppliers

The main challenges described by hatcheries and feed mills amid the COVID-19 pandemic included increased input prices, decreased input availability and accessibility, decreased demand and sales volume, and lower sales prices. Higher labor wages and transportation costs were particularly salient impacts for most input suppliers.

3.1.1 Increases in input costs

Carp hatcheries were mainly affected by increased input costs for pituitary gland hormone (a natural hormone used for breeding carp). Pituitary gland hormone is mostly imported from India and imports were halted from the last week of March. Demand for pituitary gland hormone was high at this time as March onward is the peak season for carp breeding. Low supply and high demand for pituitary gland hormone therefore exacerbated the situation, causing the price to increase to 2-3 times that of the pre-COVID-19 price. Shrimp hatcheries reported higher input prices for imported bio-products (e.g. probiotics and prebiotics), which incurred a reported 20-30% additional cost.

To cope with the high costs of pituitary gland hormone, many carp hatcheries switched to synthetic hormones. However, hatcheries explained that synthetic hormones are an inferior alternative to pituitary gland hormone, resulting in lower ovulation and higher rates of hatchling mortality.

Compared to small input suppliers, large input suppliers were able to adapt to high input costs by capitalizing on their relationships with local leaders or those in positions of power. For example, higher labor costs were partly attributed to movement restrictions during lockdown. By speaking with local leaders, one large fish hatchery was able to resolve this issue. Similar to the large hatcheries, one large feed mill was able to cope with higher transportation costs by capitalizing on their existing relationships with influential actors. This respondent explained how other small entrepreneurs had to pay more for transport,

but because they are “well connected and formed trustworthy links with the other stakeholders, that [kept them] in [a] safer zone in terms of price negotiation.”

3.1.2 Decreases in input availability and accessibility

Input availability and accessibility were also reported as challenges. Fish hatcheries cited limited availability of oxygen cylinders used to provide aeration for fish seed prior to delivery to customers, while shrimp hatcheries noted limited availability of imported bio-products and feed. Some hatcheries also described accessibility issues due to movement restrictions. For feed companies, labor shortages were the primary challenge.

To adapt to uncertainties in the availability of oxygen cylinders, one large fish hatchery stocked extra oxygen cylinders in advance. This hatchery also addressed accessibility issues by leveraging existing relationships with suppliers; after negotiations, their regular suppliers were willing to come to their shop to supply the required inputs.

Shrimp hatcheries coped with the limited availability of imported bio-products and feed by using alternatives from local sources. For example, some local entrepreneurs have begun producing bio-products themselves and selling them at a lower price than imported products, but no studies have been conducted to evaluate their quality.

3.1.3 Decline in seed and feed demand, sales volumes and safe prices

Hatcheries, feed mills, *patilwala*, and feed sellers all reported declines in demand and sales volumes. Feed sellers reported reductions in sales from 900 tonnes during March-April 2019 to 300 tonnes in the same period of 2020 because of low demand. Additionally, one feed seller explained how declining sales have resulted in a loss of feed quality, as feed was kept in storage for longer than usual. Hatcheries and feed mills attributed the low demand for their products to low farmgate prices for fish and transport restrictions. Because of low farmgate prices, farmers delayed harvesting their ponds and consequently did not purchase new seed or feed, as feeding rates were reduced. Transport disruptions also prevented buyers from reaching hatcheries. Furthermore, many *patilwala* purchased half the volume of fish seed they had bought during the same period in 2019 year, as many villages restricted their movements.

To cope with lower demand for seed and feed, *patilwala* and feed sellers had to sell their products at lower prices. One feed seller described adapting to low demand by delivering feed to farmers, resulting in additional out of pocket expenses.

3.1.4 Financial losses and lower production

Because of these challenges, many hatcheries, feed mills, and feed sellers reported experiencing substantial financial losses. Feed sellers and *patilwala* described losing work and income. Hatcheries and feed mills reported lowering production, reducing or halting business operations, and laying-off or hiring fewer temporary workers to cope with financial strains. One shrimp hatchery resorted to a tactic referred to as “force selling” - selling shrimp post-larvae (PL) at very low prices, pushing farmers to buy as much as possible, and supplying PL to farmers in the form of in-kind credit to be repaid after

harvesting. During the initial shock of COVID-19, one fish hatchery reported being forced to drain ponds containing fish seed because they did not have enough resources to maintain this volume of seed.

A tilapia hatchery owner reported that tilapia seed production was particularly severely affected by COVID-19, as farmers postponed stocking tilapia due to uncertainties around input availability and price, and false rumors linking tilapia to COVID-19 infection. Ultimately, sales to farmers were seen to be the key factor in offsetting losses experienced by hatcheries, as one shrimp hatchery owner describes in the following quote:

“I am truly concern about the marginal farmers. If they don't get good price of their fish it will impact the recovery of seed loans and I guess half of the hatcheries will not run next year”

- Male respondent, shrimp hatchery, Cox's Bazar

3.2 Producers

3.2.1 Decreases in input affordability, availability, and accessibility

The main input challenge faced by both small- and large-scale fishers was the limited supply of ice, with many fishers explaining that ice shortages reduced the number of days they could fish. Farmers highlighted increased input costs for seed, feed, transportation, and temporary labor. Shrimp farmers described low availability and high prices for wild shrimp PL. One female shrimp farmer explained how she was unable to purchase shrimp PL because of the high prices of wild seed along with a lack of money to invest. Due to low farmgate prices, she did not sell her existing shrimp, prawn and finfish, hindering her ability to generate money needed to purchase the next batch of seed. To cope with limited availability and high costs of wild PL, some shrimp farmers stocked their *gher* with hatchery produced PL instead, despite hatchery PL being less preferred because of their perceived inferior quality.

While shrimp farmers experienced challenges with seed, fish and crab farmers experienced higher costs and lower availability of feed. Because of low supply and high demand, between this year and last the price of non-pelleted feed increased from BDT 1100 to 1400 per 50 kilograms for rice bran, BDT 1600 to 2000 per 60 kilograms for mustard oil cake, and BDT 1400 to 1800 per 50 kilograms for wheat bran.

Crab farmers described increased prices for small-sized tilapia (which they use for crab feed) from BDT 50/kg pre-COVID-19 to BDT 90/kg due to poor supply, during March-April 2020 due to COVID-19. Fish farmers attributed limited access to feed to movement restrictions. They adapted to disruptions in feed supply by stocking more feed in advance and supplementing their usual feed with alternative types of feed. For example, some farmers substituted non-pelleted feed for pelleted feed due to the lower cost of non-pelleted feeds, and pressures to invest less during COVID-19-related uncertainties. One crab farmer reported stocking tilapia fry in his pond to minimize feed costs.

Additionally, crab farmers described deterioration in the quality of their crabs due to the inaccessibility of transport, as they had to resort to using autorickshaws instead of faster pick-up vans. This increased transport times from farms to processing plants, resulting in lower muscle quality and sometimes even crab mortality.

3.2.2 Low sales prices and volumes

The majority of fishers and farmers highlighted receiving lower sales prices for fish than they had done in the same period during the previous year. Crab farmers, for example, reported that the price of soft-shell crab had dropped from BDT 700/kg in 2019 to BDT 450/kg at the time of the survey. Additionally, uncertainties around exports because of low demand in international markets amid COVID-19 meant they were unable to sell crabs. As described below, exports were considered a major challenge for crab farmers:

“The government as well the international organizations should take some initiative on this export-oriented business. If the export agents are able to export product regularly we will get a good price”

- Male respondent, crab farmer, Khulna

3.2.3 Decreased harvests and impacts on livelihoods

These challenges negatively affected the livelihoods of farmers and fishers, and actors such as transporters, harvesters, and laborers. Many fish, shrimp, and crab farmers delayed their harvests to cope with low market prices, resulting in reduced demand for harvesting labor and transport services. Likewise, small-scale fishers reduced fishing effort or fishing entirely. The reduction in fishing days and hours resulted in a significant loss of income for both small- and large-scale fishers.

Among drivers transporting fish production inputs and products, working hours declined by 30-40% and incomes decreased by nearly 70% due to lower fish and shrimp landings and movement restrictions. The following quote describes the uncertainties and anxieties faced by fish transporters amid COVID-19:

“The COVID-19 pandemic has extremely changed the livelihoods of drivers. I am wondering what will happen if it continues for days”

- Male respondent, fish transporter, Mymensingh

Fish harvesters and fishing laborers experienced a similarly drastic reduction in working hours. Fishing laborers also described loss of income due to low catch volumes and low prices for fish in local markets. Many laborers employed in drying fish lost their jobs. While activities in the dried fish industry such as fish collection, sorting, drying, and processing remained active, downstream activities such as transportation and marketing were disrupted. For fish cutters (workers in retail markets who earn a living by cleaning fish

purchased by consumers), volumes of fish processed declined and incomes were reduced by at least 20%.

3.3 Retailers and wholesalers

Fish wholesalers and retailers described drastic reductions in the supply of fish. One fish wholesaler reported a 50% drop in supply, from 20 tonnes per day to 10 tonnes in March-

April. Increased transportation costs were also a challenge for retailers, with one retailer resorting to using their own van to reduce transport costs.

Wholesalers and retailers reported reductions in price of nearly 30% across all species compared to the previous year, due to lower demand. The main reasons for lower demand were the lockdown and transportation disruptions as well as closures of restaurants and hotels, which represent their biggest customers. One retailer described a decline in total sales volume from 50kg of fish per day to 25 kg/day. Dried fish retailers described lower sales prices because of a 20-30% drop in demand. A respondent from a large seafood export company reported that about 299 consignments of seafood from Bangladesh had already been cancelled by international buyers, resulting in a dramatic drop in demand for large shrimp.

Due to these challenges, retailers reported decreases in volumes traded, business closures, and significant financial losses. A large seafood export company estimated a financial loss of about BDT 4 billion, while also anticipating a 60% reduction shrimp production in Bangladesh in the coming year compared to the current year. Additionally, dried fish retailers reported a nearly 25% decrease in sales. Some fish retailers described coping with these losses by paying wages, transportation, and other business operating costs out of their own pockets.

3.4 Impacts on consumer behavior

Effects on consumer behavior differed among lower- and higher-income consumers. Participants with lower incomes, including smallholder farmers and fishers, *patilwala*, drivers, and laborers, described decreased dietary diversity and increased experiences of food insecurity. Reductions in household intake and purchasing of animal-sourced foods, particularly fish and meat, were commonly cited by these participants. For example, one farmer described how her family had not consumed meat for a single meal in a month during the COVID-19 outbreak, a decline from their usual consumption of four times per month prior to the pandemic. These declines in animal-sourced food consumption were mainly attributed to loss of income and livelihoods combined with the reportedly high prices of animal-sourced foods. At the same time, these respondents reported eating more affordable staple foods such as potatoes, lentils, and vegetables.

Largely due to loss of work and income, laborers and drivers also described skipping meals, eating less per meal, purchasing less nutritious foods, and/or purchasing fewer food items, suggesting that they are experiencing food insecurity. To cope with increasing food insecurity, one fishing laborer explained how his school-aged children had to start working at the landing center to supplement their declining household income.

However, some lower-income respondents were better able to adapt to COVID-related impacts on food access. Some respondents with home gardens or were involved in subsistence farming reported being able to maintain normal levels of food consumption. Similarly, dried fish processors and retailers highlighted that they were able to save dried fish or dry fish themselves for household consumption. A female dry fish retailer, for

example, explained how her household was still able to consume fresh fish and dry fish from fishing as well as vegetables from a small vegetable farm in her agricultural land.

On the other hand, participants with higher incomes, including large hatcheries and feed mills as well as employees of international export companies, reported being able to switch to mobile applications for grocery shopping and delivery. They also described eating more high-quality, nutritious foods such fruits and those rich in vitamin C with the intent of boosting the immune systems. These participants also partook in food safety and hygiene practices such as soaking their vegetables and fruits in saltwater before consumption.

3.5 Impacts on consumer behavior

3.5.1 Social Capital and debt

In the context of economic and food insecurity brought on by COVID-19, participants with lower incomes described leveraging social capital with friends, relatives, and/or wealthier actors to support their families. For example, one driver explained how his local grocery shop allowed him to delay payment for his groceries. Respondents operating larger businesses often reported providing food and financial assistance to their workers, neighbors, and other small-scale actors. To support its workers, one shrimp hatchery gave an extra one-month's salary to each worker.

Many lower-income participants were able to obtain loans from friends and family to cope with losses of income or livelihood activities. Fishers and fish harvesters in particular often took loans from fishers and farmers, on the condition of working for them in the following year (*dadon*). In addition, some operators of larger businesses explained how they intended to provide *dadon*. This may be due to perceptions that the production and sell of fish is integral in offsetting the COVID-19 impacts on the aquatic food system, as described in the subsequent quote:

“Coronavirus is currently a threat for the whole world. There is no way to avoid this risk. As a wholesaler it's my main duty to encourage and help the farmers for farming more fish. If they (farmers) exist in this problem we (wholesalers) will also exist”

- Male respondent, fish wholesaler, Khulna

However, most recipients of *dadon* described anxieties, fears, and pressures around paying back these loans, which were amplified by the uncertainties surrounding COVID-19.

3.5.2 Government and non-governmental support

Respondents described a number of government interventions that could help support them during COVID-19. Respondents from fish and shrimp hatcheries, feed mills, and seafood export companies explained that economic stimulus funds from the government would be helpful and that they are currently waiting to receive this type of support. However, a few noted that these funds may be difficult to obtain and challenges around accessing these funds should be addressed by working closely with government policymakers.

Most respondents reported that they had not yet received any financial, food, or cash aid from government or non-governmental organizations, although a few respondents had received BDT 1500 in financial assistance from the NGO BRAC. Some respondents explained that they are still waiting to receive government food rations.

A few respondents attributed increased transportations costs to confusion around the enforcement of movement restrictions, as fish and shrimp transportation are reportedly exempt from these restrictions. One participant also described how some drivers had to pay bribe money on return trips when their vehicles were empty (i.e. no fish or fish seed).

Some respondents explained that loans provided by the government or low interest bank loans would help to support their businesses, as noted in the following quote:

“If government arranges some loans then we will be able to recover this loss [from current high shrimp PL prices] somehow. If we able to stand, the fisheries sector will stand”

- Male respondent, shrimp farmer, Khulna

However, one respondent explained how bank loans were oftentimes distributed inequitably and should instead benefit those who need them most:

“Not sure what will happen in near future but the bank loan and benefit it’s always been for the musclemen of the society and less chance to reach to the real entrepreneurs”

- Male respondent, fish hatchery, Jashore

4. Conclusion

Aquatic food value chains in Bangladesh have been severely impacted by COVID-19. Input suppliers and producers are experiencing both supply- and demand-side shocks. While most of these actors have been able to adapt in the short-term, it is unclear how they will cope in the medium- to long-term, as many are experiencing large financial losses and describe unsustainable coping mechanisms.

Transportation and movement restrictions were cited as major barriers among all actors during the lockdown period. Clarification and awareness of transportation permits to move fish commodities might have helped to address these logistical bottlenecks, as one participant explained that aquatic food value chain actors were exempt from mobility restrictions by the Department of Fisheries, but that police were not aware of this. Ensuring that small- and large-scale actors have these permits and that health and sanitation measures are followed is essential.

Widely cited disruptions in production across input suppliers and producers also have the potential to negatively impact the availability and accessibility of fish, an important animal-sourced food and a vital source of micronutrients. The financial insecurity brought on by income and livelihood losses is likely to exacerbate the health consequences of reduced

animal-sourced food consumption. Disparities in food access and consumer behavior are already evident. Many respondents in lower income occupations highlighted experiences of economic, nutrition, and food insecurity, whereas wealthier respondents described minimal changes in food consumption and purchasing besides increased intake of healthful foods. Additionally, while many better-off actors noted following food safety and hygiene practices (suggesting awareness of their importance, especially during COVID-19), no low-income participants reported doing so. Our findings also highlight the importance of homestead food/fish production and food preservation practices in securing access to and availability of nutritious foods, particularly during economic shocks or food shortages.

Although leveraging social capital and informal networks to cope with financial and food insecurity has helped participants to cope with the challenges described, their responses reveal increasing anxieties around paying back loans. More sustainable solutions for alleviating financial burdens may therefore be necessary. For example, making government or bank loans more accessible, waiving of existing loan fees, and extension of repayment deadlines. As many of these actors have not yet received any formal support, economic and food assistance by government and non-governmental organizations may also be warranted.



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