

Socio-economic Impact of Covid-19's Pandemic on Fish Farmers of Uttarakhand

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Abstract: In response to the COVID-19 pandemic, an investigation was launched to capture the effects and impacts of the pandemic on fisheries, aquaculture, and allied businesses. The survey was conducted online; data was collected directly from the fish farmers of Uttarakhand State. Eighty-two fish farmers were contacted via telephone interviews. They belonged to 2 districts of Uttarakhand; Tehri Garhwal (Hill district) and Haridwar (Gangetic Plain district). The districts were selected by considering the geographical differences between plain and hilly terrain. The majority of respondents to the survey have indicated that their fish culture and related activities have been impacted by the lockdown enacted due to COVID-19. Responses to the survey revealed that the activities like sales and marketing of products, labour management, seed procurement and production dynamics are affected appreciably. The effects are likely to have long-term implications for the aquaculture industry.

Keywords: COVID-19, Lockdown, Fisheries, Farmers, Impact.

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1 Introduction

Early in December 2019, the Chinese province of Wuhan announced the first case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)-caused coronavirus illness. On March 11, 2020, the World Health Organisation (WHO) later proclaimed it a pandemic after receiving reports of more than 4.3 million cases and more than 291,000 fatalities worldwide (Bai et al., 2020; WHO, 2020). Around the world, the pandemic caused a severe socioeconomic upheaval. Authorities reacted well, putting travel restrictions, lockdowns, occupational hazard control, facility closures, and the suggested preventive measures of washing hands, using face masks, and maintaining social distancing. On January 30, 2020, India announced the first COVID-19 case in Kerala. During March, transmissions gradually escalated, and several persons tested positive. Our honourable Prime Minister issued the first statewide lockdown order for 21 days on March 3, 2020, to stop the spread. Until May 31, 2020, four lockdowns have been executed in varying stages.

Further, from June 1, 2020, the country initiated a step-by-step unlock procedure by easing control measures (Gettleman and Schultz, 2020). With all the stringent restrictions around the globe, a significant impact is to be seen on the world economy. The term 'The Great Lockdown' is given by economists to the current economic situation due to Corona Virus outbreak. The downfall in the world economy is one of the most crucial aspects to emphasize. The World Economic Forum forecasted a 6.0% global economic decline in 2020, with a 1.2% average reduction (World Economic Forum, 2020). 2020's global growth is predicted to be -4.9%, and the COVID-19 pandemic has had a more detrimental effect than expected. India's Gross Domestic Product (GDP) has dropped to -11.8 per cent during this period (The Hindu, 2020). Where agriculture, forestry and fisheries contribute a significant share to the country's GDP, a large segment has been splintered due to this pandemic. The country's fisheries sector contributes about 1.1 per cent to the overall GDP and 5.23 per cent to the Agricultural Gross Value Added (GVA) (NFDB, 2018).

The Indian fisheries industry is surrounded by a distinctive and varied collection of resources, from the vast Indian Ocean to the pure rivers from the Himalayas. With 13.34 million metric tonnes of production in 2018–19 and a 6.56 per cent share of worldwide production, India is the second-largest fish producer in the world. (Handbook of Fisheries Statistics, 2018). Millions of people rely on the fisheries biodiversity of the nation, which includes a wide range of physical and biological elements. In India, over 16.0 million people work in the fishing industry and related fields, and it has been calculated that approximately 60% of the country's population eats fish (Shyam, 2016). Although Covid-19 does not directly harm fish, the industry has been negatively impacted by shifting customer desires, market access issues, logistical issues, and border limitations. All of this will significantly influence fish farmers' and fishermen's livelihoods. Due to the widespread misunderstanding that seafood might transmit viruses, prices for fish and fish products fell suddenly.

Fast-moving rivers and their tributaries, high and low-altitude natural lakes, constructed reservoirs, ponds, and diggies are only a few of Uttarakhand's fisheries. The 725 km of the 2686 km total length of the stream is suitable for food and game fish. The high highland areas of Uttarakhand offer an ecosystem favourable for trout farming and fishing. In contrast, some hilly locations, particularly plain ones, are ideal for growing carp and other warm-water fish. In addition to having a large number of village society ponds, Haridwar and Udham Singh Nagar districts both promote fish cultivation. In 2018–19, Uttarakhand in northern India produced 4.32 thousand metric tonnes of fish, a marginal increase of roughly 20 tonnes over the previous year. Over the past ten years, the State's production volume has gradually expanded from roughly 3000 tonnes in 2009 (Statista, 2020). Despite the active coronavirus cases, like the whole country, the State also faced the complete four lockdowns and later slow unlocking in transition stages. During this tragic period, many problems were faced by the region's fish farmers. Considering the above situation faced by the farmers, a study was conducted to analyze the socioeconomic impact of the lockdown during this disastrous time with possible solutions that can help stabilize their source of income. A survey was conducted

by formulating a digital questionnaire, and The responses were broken down into parts to assess how the national lockdown might affect this dynamic industry. The chapter is sectioned into the area of study, data collection and analysis, significant challenges faced during the period and holistic approach to further cope with Covid-19.

2 The vulnerability in the fisheries and aquaculture sector

Fish and fish products must be transported from the point of production to the final customer through a series of intricately interrelated processes. Value chains encompass all markets, including local, regional, and global ones. Fishing, aquaculture production, processing, input transit, distribution, wholesale marketing, and retail marketing are essential processes in a fisheries or aquaculture supply chain (Figure 1). Since the performance of the supply chain depends on the effectiveness of each of these operations, the chain's many stages are vulnerable to disruption or interruption due to COVID-19-related effects. Any of these buyer-seller linkages that are broken by the disease or containment efforts eventually have an impact on the economy.

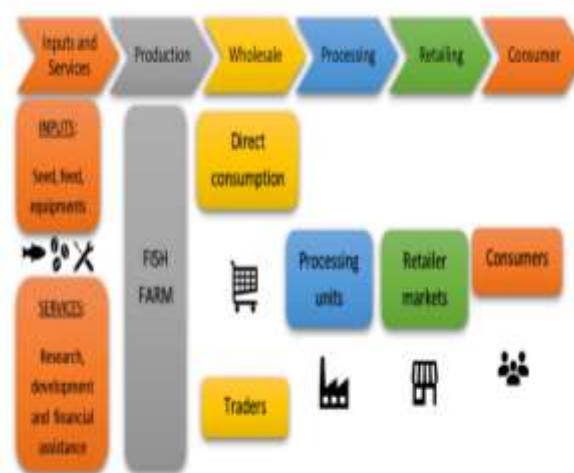


Figure 1: Aquaculture production value chain

Production, processing, and distribution are impacted by the decrease in consumer demand brought on by containment measures (such as the closure of food services and tourist attractions, etc.). Both domestic and international supply systems are disrupted by it. 45% of fish ingested is live, fresh, or chilled fish. Because these fish are very perishable, the supply chain has significant logistical issues.

When a business is in financial trouble, it may lower wages and work hours or even lay off employees. In essence, a slowdown occurs everywhere when a flow is disrupted somewhere. Protecting the buyer-seller relationships at each supply chain step can ensure that the order is successfully completed from production to the consumer's location. Therefore, it is crucial to offer every stage of the fisheries and aquaculture food chain the protection it needs to ensure its smooth operation and lessen its susceptibility.

3 Area of Study

The area of study (Figure 2) was broadly sectioned into fish farmers owning farms in the plain area and the hilly area of the Uttarakhand state. Due to the complications during the lockdown period, most data was collected from the Uttarakhand state's Haridwar and Tehri Garhwal districts. Some survey data were also procured from nearby districts like Chamoli, Dehradun and Pauri Garhwal. Fish farmers from various blocks and Tehsils of these five districts contributed to giving information to conduct this survey. A significant contribution was from these districts' Roorkee, Narsan, Laksar, Tehri and Pauri tehsils/blocks.



Fig 2: Map showing data collection from various districts

4 Data Collection

The study was conducted and was built on primary and secondary data sources. Primary data was collected using various qualitative tools, such as individual interviews with knowledgeable persons and telephonic interviews with fish farmers. These tools assist in conducting the study smoothly and cost-effectively during the lockdown period. Primary data were collected via a semi-structured questionnaire formulated via the

Google Forms platform. The questionnaires were initially pilot-tested with a small sample of respondents. With a few improvements and modifications in the final questionnaire, these were circulated via online messaging mode, "Whatsapp", to the fish farmers. Those facing trouble filling out the form were contacted individually via telephone, and their responses were collected. The final survey asked questions about the respondents' socioeconomic backgrounds, opinions about the COVID-19 epidemic, its effects on fishing, fish transportation, and fish preservation, the State of aquaculture input, market and consumer demand, the most impacted population groups, and government responses. The sample size resulted in 82 individual interviews of fish farmers, whose responses were compiled. Besides, some individual interviews were conducted with key informants from various sectors, such as government officials, NGO personnel and local entrepreneurs, to assemble and verify necessary information. Secondary data on Covid-19 was collected from the website of the Department of Medical Health and Family Welfare, Government of Uttarakhand. This data comprised an overview of the State of Uttarakhand, lockdown status, number of confirmed, recovered and death cases. Data was also collected from other sources, such as scientific articles, technical reports and newspaper reports.

5 Data analysis

In MS Excel (Version 2016), descriptive statistics in frequencies and percentages were used to analyze quantitative data. The examination of qualitative data involved text analysis. After the qualitative data transcription, the contents were examined, and pertinent themes were created. To generate graphical representations of the data, graphs and tables were used to show the data.

6 Overview of the fish farmers' community of Uttarakhand

Along with geographical diversity, there is a diversity in culturing fish species in north India. A significant share of culture comes from the warm-water carp culture and coldwater trout culture; other species cultures, such as catfish culture (*Pangasianodon hypophthalmus* and *Clarias batrachus*), also contribute to fish

production. In the survey, 64% indulged in carp fish culture, 22% in trout fish culture and 14% in catfish culture (Figure 3). The area under culture ranged from 0.5 to 2.5 acres, involved in traditional (62.2%) and semi-traditional (32.9%) farming practices. Among the respondents, 9.8% were women fish entrepreneurs who contributed to conducting this survey.

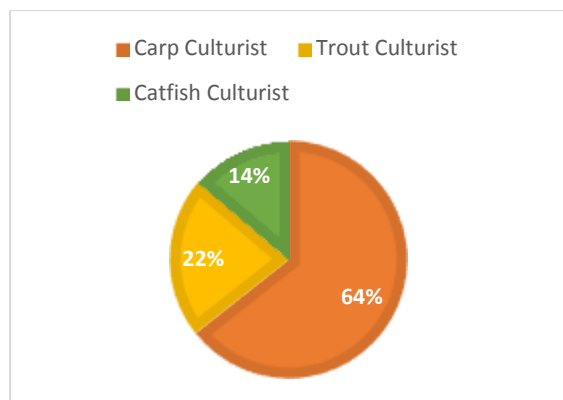


Fig 3: Major respondents of this survey

7 Challenges faced during the COVID-19 lockdown

Farmers are expected to continue caring for their fish, neither giving them away as presents nor discarding them, as fish production is widely regarded as an essential activity supporting household resilience, income, and food security. While markets, supplies of production inputs (such as seeds and feeds), and access to credit were all suspended or considerably limited as a result of the lockout and economic slowdown, it is possible that the sector struggled to maintain its activities or maintain its planned production cycles. (Bennett et al., 2020). During the present investigation, the respondents faced significant bottlenecks in the three stages of production, harvesting and marketing, regarding the decline in the market, labour layoffs, logistics and transport immobility and nonavailability of the inputs such as seed and feed (Figure 4).

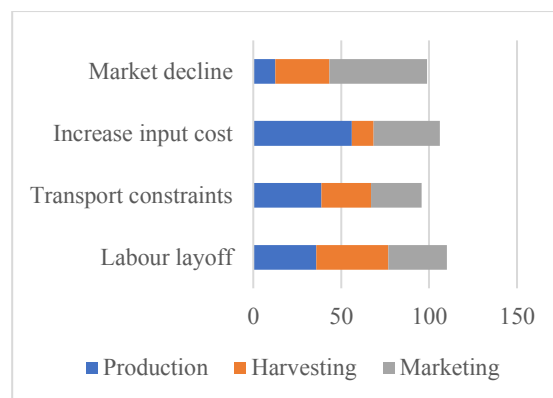


Fig 4: Challenges faced during the COVID-19 lockdown

With the peak season around the clock, fish producers and business owners claimed that transporting fish, fingerling, feed, and other inputs was the most significant issue. Additionally, more than 50% of fish farmers stated that they could not sell mature fish because of difficult transportation and weak market demand. As a result, a sizable number of adult fish went unsold, and the farmers used the additional funds to feed the fish, which decreased family income and increased spending. Around 58.1% of the fish farmers faced tremendous losses during this period. Labour layoffs increased due to short-term confinement measures, financial or cash flow issues faced by the farmers, and for seasonal or migrant workers, the travel barriers. As shown in Figure 3, all the stages faced quite a wholesome amount of challenge by labour layoff. Although our country regulated the free movement of personnel during the COVID-19 epidemic by establishing guidelines and exempting the aquaculture industry from lockdown procedures, 26.3 per cent of respondents faced the problems of labour layoff.

The time came for the new stocking to be done for the onset of the next production cycle. Fish farmers faced many problems during that time, especially in procuring seeds. According to the survey, most farmers procured seeds from the government hatchery and private hatcheries in other states. With constraints of mobility within and in-between states due to the Covid-19 pandemic lockdown, around 76.2 per cent of the respondents had problems procuring the seed. More exacerbated tailbacks relied upon transporting services, as many hatchery farmers and broodstock traders were unavailable to

deliver their seed produced. Traders claimed that factors preventing the movement of fish seed within states included police harassment, virus fear, a workforce shortage, and a lack of trucks (Economic Times, 2020). The farmers have also had a lower hand as 53.7 per cent of them have already paid in advance for the seed. Fish cultivation was disrupted due to a shortage of aquaculture inputs such as good-quality fry, lime, aqua chemicals and feed. With inadequate food supply day after day, about 47% of respondents reported gradual fish weight loss.

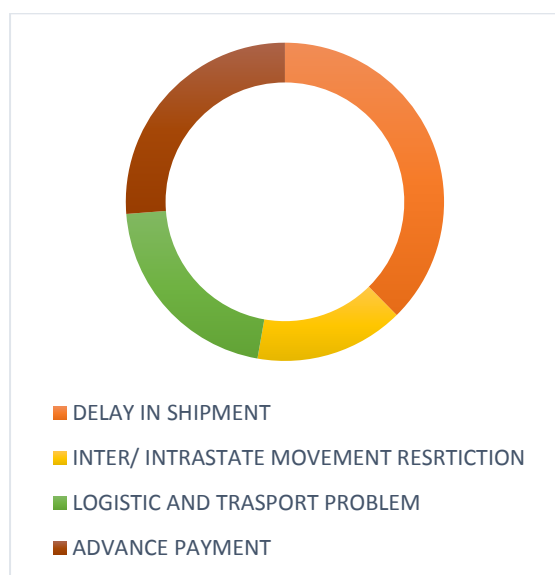


Fig 5: Challenges faced during procurement of seed

The main issue at the moment is the low market demand. Consumer demand fell due to numerous myths regarding the disease's potential to spread through seafood. People are not buying the fish out of concern of being negatively impacted, according to our respondents (71%), which has decreased market demand. The closure of various eateries and retail stores, reduced demand, and transportation restrictions will significantly impact suppliers and producers. The export of fish was also hampered in this period; much of the stock could be delivered at the desired time, which affected the farmer economically. Decreased customer demand, lower supplies, and disruptions in supply networks will immediately impact the people working in the industry. According to estimates, 80% of India's employment is informal or semi-formal, with little social networks or savings. Before COVID-19, rural agricultural labour wage

growth was weak in nominal and actual terms (Dev and Sengupta, 2020).

8 Coping with this pandemic

Numerous studies have suggested that this epidemic will change individuals' lives; rather than fighting the illness, one should learn how to cope. Regions have improved the morale of the people under lockdown with the great news of recovering patients and a decline in the hotspot, but also, the new case outbreak caused by immigration has brought back fear. Fisheries and the marine food sector were spared from the coronavirus disease (COVID-19) shutdown on April 11, 2020, by the Union government because they are a part of the farm-to-fork supply chain. The transit of fish and fish products and their cold storage, sale, marketing, and hatcheries were notable exceptions. Every action must adhere to the lockdown measures' specifications for preserving social distance and proper hygiene, as was already mentioned. Many regulations have been developed in the last several months, with our government's attention focused on this industry due to its potential. Budget 2020 saw the implementation of the first national fisheries policy, which cost Rs. 45,000 crores and focused on aquaculture and mariculture, among other things. For the general development of the fisheries, the centre has developed programmes under the "Blue Revolution Scheme" banner. In order to empower this sector over the next five years, the ministry has also created the Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme for the federal and State governments. The government should ensure that suitable sanitation measures are taken and that those working in this field are aware of them along with all these policies to enhance the industry and reduce loss.

Further training sessions held by organizations in the many sectors of this industry, such as farms, marketplaces, processing, etc., could enhance comprehension. Promoting new technological developments and the government's support for the necessary infrastructure in this industry creates new opportunities. It encourages local producers to increase output in order to meet market demand and cut down on imports.

9 Conclusion

The survey analysis concluded that the Covid-19 lockdown significantly impacted the socioeconomic status of fish farmers of Uttarakhand state. The effects are likely to bring long-term implications for the aquaculture industry. However, with aid from governmental organizations and fisheries communities, the impact can be lessened for marginal farmers. A collaborative approach of higher authorities and the local farmers can help us cope with this outbreak and bring new avenues for better efficient working.

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