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Socioeconomic status and effect of the COVID-19 pandemic on fish farmers of Janjgir-Champa district, Chhattisgarh, India

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Abstract

In this study period, the largest fish farm size was 33.99 ha, and the lowest was 0.14 ha recorded. Most of the fish farmers had less than 5 ha of area for fish farming. In this study, it was observed that 93.66% were male fish farmers. It was observed that the maximum number of farmers who were included in this survey were educated up to the Graduation level (44%), followed by 12th, 10th, 8th, illiterate, and 5th. Most of the farmers lie in the age group of 31 to 40 (37.77%), followed by 41 to 50 (31.11%), 51 to 60 (20%), 20 to 30 (6.66), and 60 to 70 (4.44). In this study, most of the fishermen belong to Obc (80%), followed by SC (9%), ST (7%), and Gen (4%). The majority (95.55%) of fish farmers were undertaking fish farming as their primary occupation, and only (4.44%) were undertaking fish farming as a secondary occupation. Most of the farmers were farming Indian major carp (Catla, Rohu, Mrigal), followed by farmers who were farming Exotic carp along with Indian major carp, while only 2.22% of farmers were farming Tilapia. COVID-19 had directly impacted the livelihood of 82.22% of fish farmers who participated in this survey. COVID-19 does not affect feed availability, as most of the farmers were using farm-made feeds (87%). In the study, 82.22% of farmers confessed that they were facing problems procuring seeds. Hatcheries operated in Janjgir did not face any problems regarding the operation of hatcheries and the production of seeds; they were able to achieve their production target. Even after the end of the lockdown and restrictions, 77.77% of farmers are still struggling to properly market their fish. By leveraging the insights gleaned from this study, policymakers, practitioners, and stakeholders can develop evidence-based strategies to foster sustainable development and ensure the well-being of fish farmers in the Janjgir-Champa district. This survey has been conducted to know the socioeconomic status and effects of COVID-19 on the Fish farmers of Janjgir-Champa district, Chhattisgarh, by selecting the regions from nine blocks in Janjgir-Champa.

Keywords: Socioeconomic, fish, farming, Janjgir-Champa, COVID-19

Introduction

Globally, there are an estimated 32 million directly employed as small-scale fishers, an additional 76 million employed in post-harvest jobs, and 81% of the catch is used for local human consumption (Kelleher *et al.*, 2012) [3]. The fisheries sector occupies a very important place in the socio-economic development of the country, as it contributes to economic growth and human welfare. The fisheries sector has been recognised as a powerful income and employment generator for the poor people of rural areas (Thakur, 2018) [9]. The Chhattisgarh state is located in the heart of India and shares its borders with six states of India, and is the 10th largest with an area of 135,190 Sq km (DAHDF, 2017). However, Chhattisgarh is a landlocked state but has abundant lentic freshwater bodies varying in size, such as village ponds, irrigation tanks, and small, medium, and large reservoirs. Chhattisgarh is one of the largest states in India, blessed with a number of natural resources, including productive water in the form of rivers, tanks, reservoirs, ponds, etc (Kumar *et al.*, 2023; Kumar *et al.*, 2013) [15]. A major part of Chhattisgarh lies in the catchments of the Mahanadi and Godavari river systems. Fishery production in the state is primarily dependent on fish caught from the

lentic waterbodies, apart from wild-caught fish from the Mahanadi river system (Anand *et al.*, 2020) [2]. Apart from direct self-employment opportunities from fish farming, pond fish farming offers diverse livelihood opportunities for operators, farming employees of hatcheries and seed nurseries and for seed traders and other intermediaries. State fisheries are mostly dominated by culture-based fisheries in which the most cultivable species are rohu (*Labeo rohita*), catla (*Catla catla*), mrigal (*Cirrhinus mrigala*), grass carp (*Ctenopharyngodon idellus*), common carp (*Cyprinus carpio*), and silver carp (*Hypophthalmichthys molitrix*). In recent years, attempts have been made to develop the culture of fish like Pangassius, Climbing perch (*Anabas testudineus*), and Murrels (*Channa sp.*). The other species cultured is monosex tilapia (a hybrid of *O. hornorum* with *O. mossambicus* or *O. niloticus*) (Bhendarkar *et al.*, 2017). At present, more than 2.10 lakh fish farmers in the state depend on fisheries and aquaculture for their livelihood (Sharma and Singh, 2018) [8, 13]. The Kevat, Dhiwar, Mallah, Manjhi, and Navik are the main fishing communities in Chhattisgarh, which are engaged in fishing and fish processing activities (Jakhar *et al.*, 2020). Chhattisgarh is now the sixth-largest producer of inland fish and the fifth-

largest producer of fish seed in India (GoCG, 2016). Chhattisgarh has a live fish market of 50 tonnes/day and produces seeds in surplus. Out of the total fish production of Chhattisgarh, a significant portion is contributed by the district Janjgir.

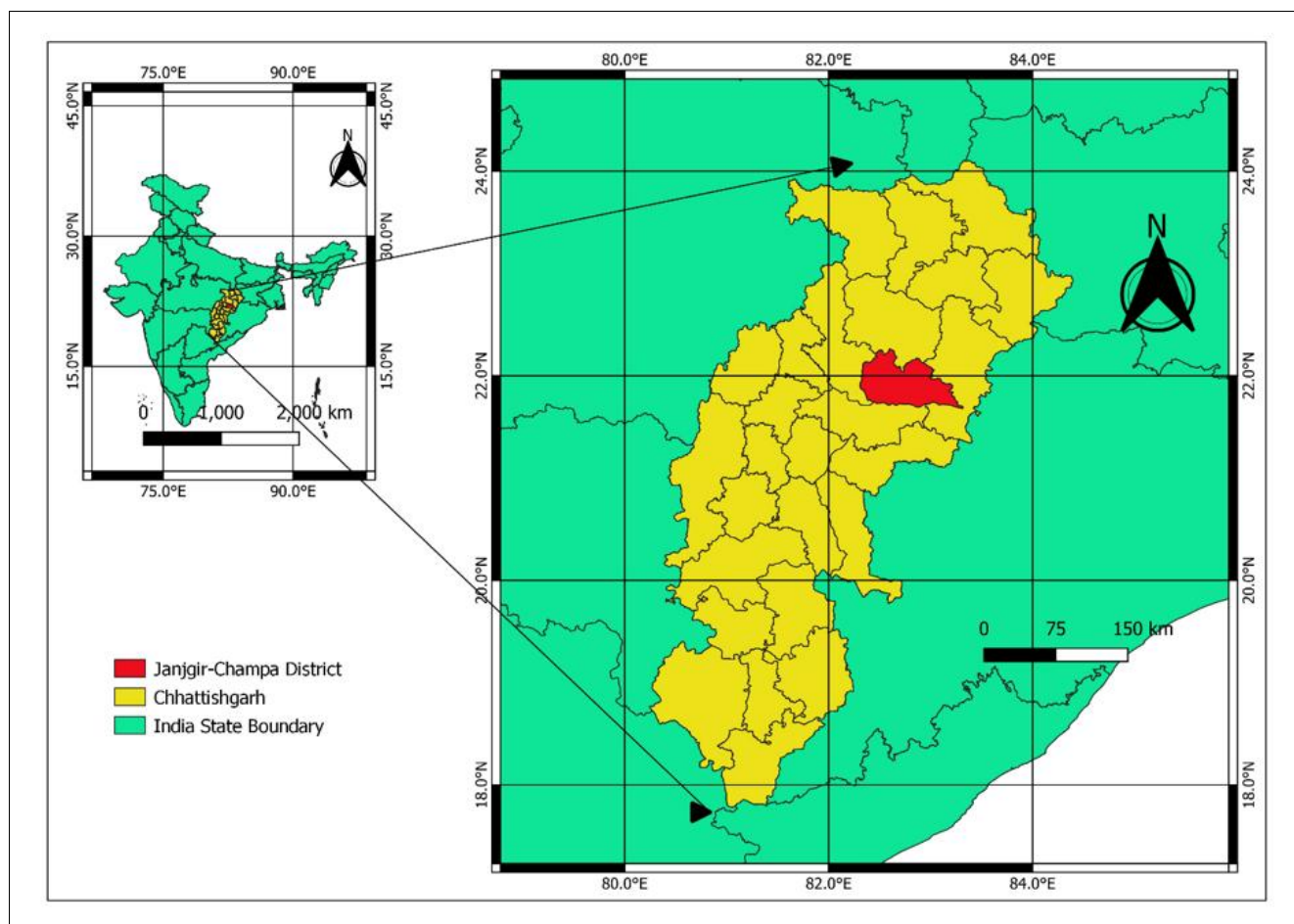
The COVID-19 pandemic has rapidly spread around the world with extensive social and economic effects (Bennett *et al.*, 2020). During lockdown periods, large portions of society have been isolated, reducing the regional and global movements of people (Askita *et al.*, 2020) and altering the trade and distribution of goods (Baldwin and Tomiura, 2020). Moreover, the economic status of many individuals and communities has changed rapidly with COVID-19 (Cooke *et al.*, 2021). Although there is currently no evidence that SARS-CoV-2 can infect aquatic food animals (e.g., finfish, crustaceans, molluscs, amphibians), these animals therefore do not play an epidemiological role in spreading COVID-19 to humans. (Bondad *et al.*, 2020). It has severely affected the fisheries and aquaculture food system like no other shock before. The preventive measures that have been taken by governments to contain the spread

of disease, while necessary, have impacted each and every step of the fish seed and fish supply chain, from aquaculture production, transport, wholesale and retail marketing. Yet, in this period of a global pandemic, fish remains an essential source of animal proteins, micronutrients, and omega-3 fatty acids. The purpose of the present study is to recognise the socioeconomic status and the effect of COVID-19 on the fishermen of the Janjgir-Champa district, Chhattisgarh [1, 4, 5, 6].

Materials and methods

Study area

The study was conducted from August 2020 to December 2020 in the Janjgir-Champa district, Chhattisgarh, situated between a Longitude of 21.6 degrees to 22.4 degrees towards the north and a latitude of 82.3 degrees to 83.2 degrees towards the east, with a total area of 4,466.74 km². It has 9 tehsils, i.e., Nawagarh, Akaltara, Baloda, Champa, Sakti, Jaijapur, Malkharoda, Dabhara, and Pamgarh. From each tehsil, a total of 5 fish farmers were randomly selected and interviewed.



Methodology: The study was based on primary data. This study was conducted by personal visits to various fish farmers of the tehsils and various questions regarding the

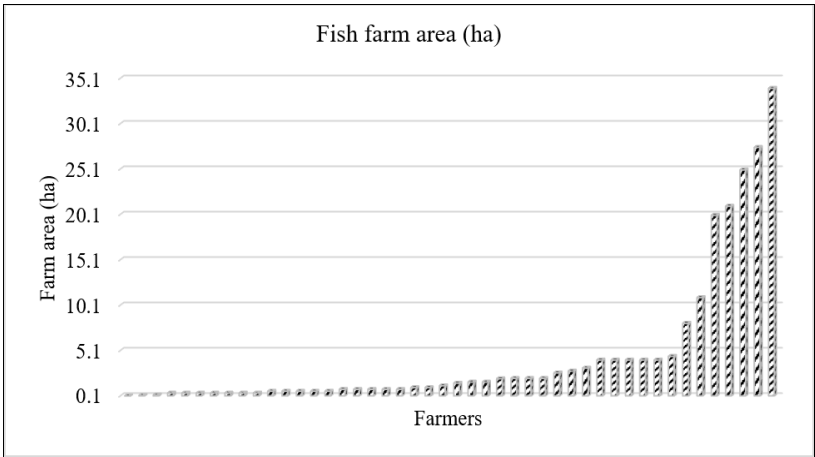
effect of COVID-19 on their fisheries and aquaculture activities through surveys, personal interviews, and contact through phone calls.



Results

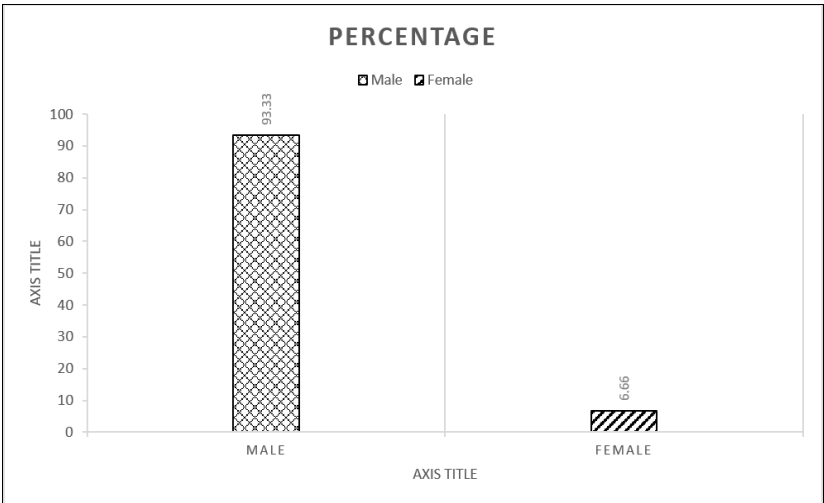
Farm area: In this study, the largest fish farm size was

33.99 ha, and the lowest was 0.14 ha. Most of the fish farmers had less than 5 ha of area for fish farming.

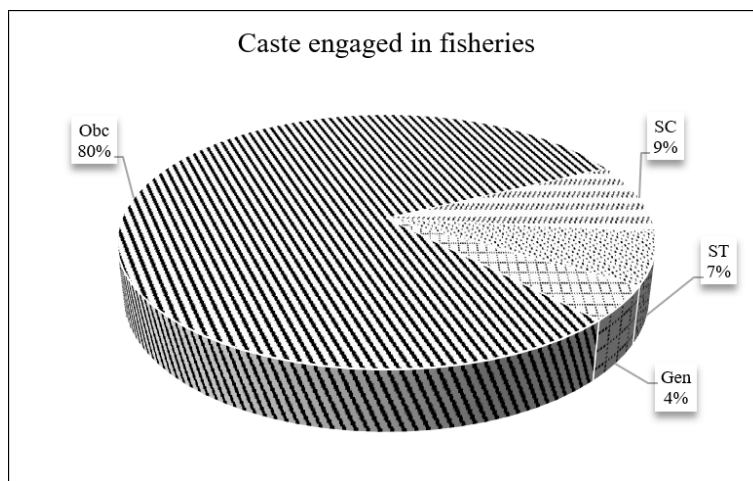


Gender: In this study, it was observed that male (93.66%) farmers were significantly higher than female farmers; the

complexity of the work, improper response while applying for loans, and low literacy rate might be the reasons.

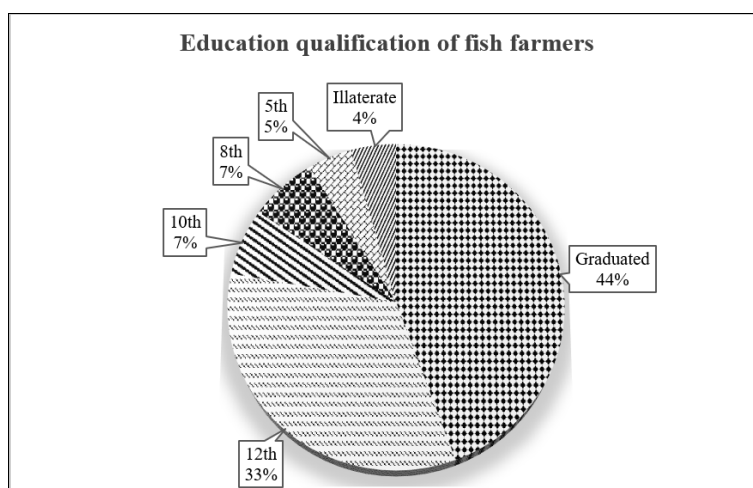


Caste: In this study, most of the fishermen belong to Obc (80%), followed by SC (9%), ST (7%), and Gen (4%).



Education: It was observed that the maximum number of farmers who were included in this survey were educated up

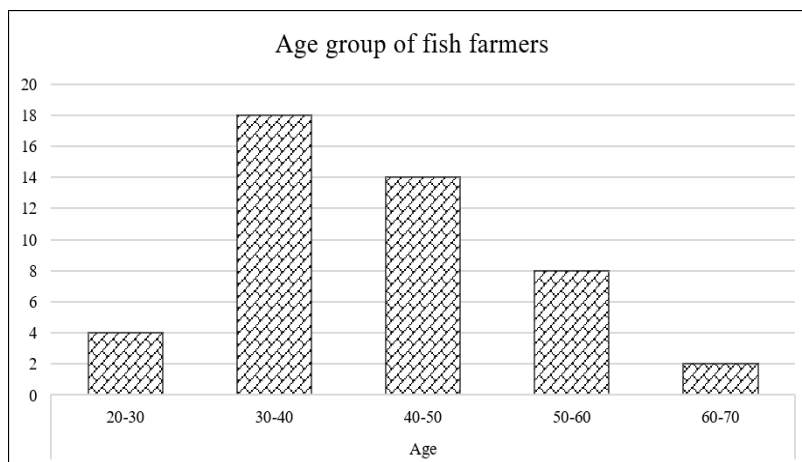
to the Graduation level, followed by 12th, 10th, 8th, illiterate, and 5th.



Age

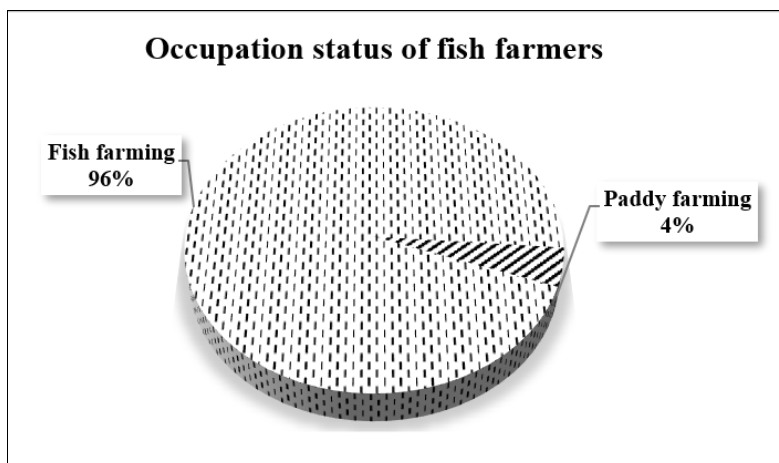
Most of the farmers lie in the age group of 31 to 40 (37.77%), followed by 41 to 50 (31.11%), 51 to 60 (20%), 20 to 30 (6.66), and 60 to 70 (4.44). Pandey and Upadhyay

(2012)^[17] also find a similar trend: 57.50% of fish farmers belong to the middle age group, followed by the young age group (32.50%), and only 10% of fish farmers belong to the old age group.



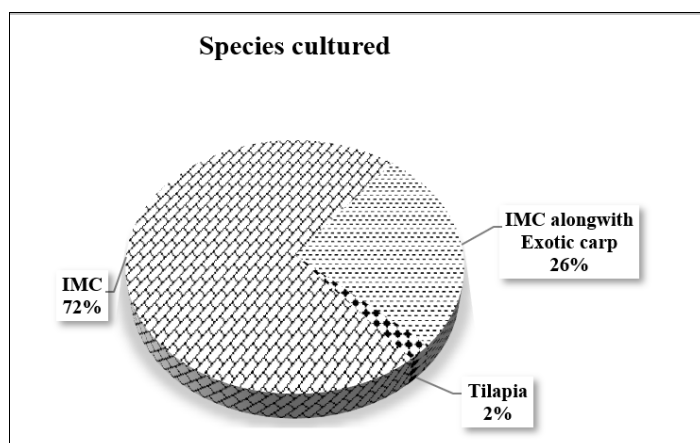
Occupation Status: The present study revealed that the majority (95.55%) of fish farmers were undertaking fish

farming as their primary occupation, and only (4.44%) were undertaking fish farming as a secondary occupation.



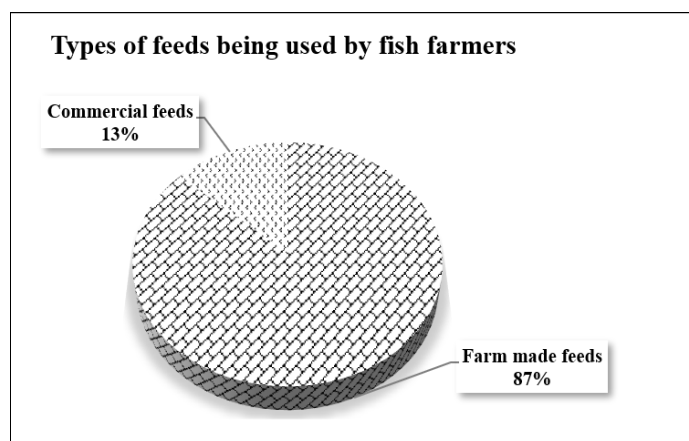
Species Culture: Most of the farmers were farming Indian major carp (Catla, Rohu, Mrigal), followed by farmers who were farming Common carp, Silver carp, and Grass carp, along with Indian major carp, while only 2.22% of farmers were farming Tilapia. Farming of the three Indian major

carps (IMC), viz., catla, rohu, and mrigal, and the three exotic carps, viz., silver carp, grass carp, and common carp, under the composite culture system, is in vogue in the South Asian countries, and the same is true in India (Das and Mishra, 2016)^[14].



Effect of the COVID-19 pandemic on the availability of feed: Feeding is very important in the modern aquaculture industry as it helps farmers to get overall better growth of fish. In this survey, it was found that COVID-19 does not affect feed availability, as most of the farmers were using

farm-made feeds (87%) made from rice bran, mustard oil cake, and groundnut oil cake, which are easily available in their nearby locality, while those who were using commercial feeds (13%) do not consider availability of feed as a problem during COVID-19.



Effect of the COVID-19 pandemic on the availability and Price of Seed: In the survey, 82.22% of farmers confessed that they were facing problems procuring seeds.

Most of the farmers of Nawagarh (60%) were importing seeds from Kolkata (Howrah) via trains, but due to lockdown restrictions on train movement, they started importing seeds

from pickup vans, which cost them 100 to 150 Rs extra per/kg.

Effect of COVID-19 on Hatchery Operation

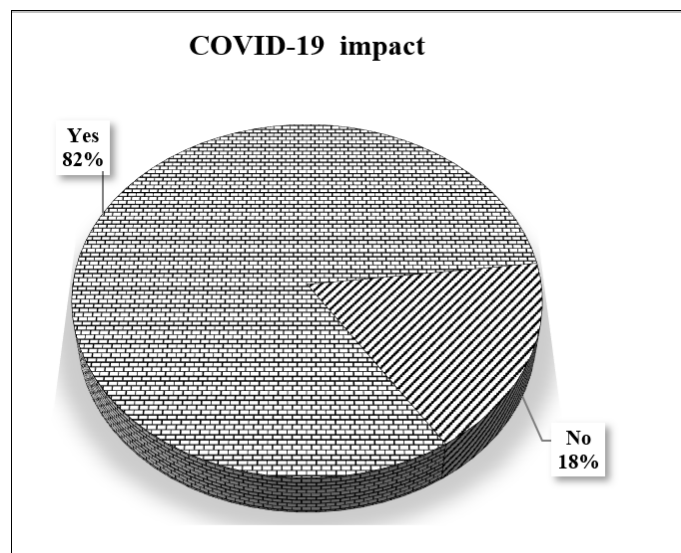
In district Janjgir-Champa, government hatcheries are being operated to produce seeds and supplies for the farmers. Hatcheries operated in Janjgir did not face any problems regarding the operation of hatcheries and the production of seeds; they were able to achieve their production target.

Effect of COVID-19 on the marketing of fish

Fish farmers growing their fishes they have to sell their fish

to the market of domestic as well as to market of different districts, and COVID-19 affected both of these, during lockdown most people were staying at home, and rumors regarding the spread of the COVID-19 virus through fish and fish-related food products might be the prime reason. Even after the end of the lockdown and restrictions, 77.77% of farmers are still struggling to properly market their fish

Effect of the COVID-19 pandemic on the livelihood of fish farmers: In the study, it was concluded that COVID-19 had a direct impact on the livelihood of 82.22% of fish farmers who participated in this survey.



Discussion

Smallholder aquaculture in Janjgir-Champa proved highly vulnerable to the COVID-19 shock. Lockdowns disrupted inputs (seed, and feed) and local markets, mirroring wider patterns seen in Asia (Sarker, 2022; Alam *et al.*, 2023). For example, Sarker (2022) reports that COVID-19 caused a shortage of inputs, an inability to sell and a lack of transportation for fish farmers. Similarly, Alam *et al.* (2023) found Bangladesh carp farmers' incomes fell nearly 50% in 2020, and Indian accounts describe empty harbours and widespread fish dumping during early lockdowns. Government actions - exempting fisheries from restrictions, subsidising inputs, and promoting local sales - aligned with FAO guidance to maintain aquaculture as an essential activity. The proposed adaptation measures (diversifying markets, multi-stakeholder support services, skills training, social protection, and strong producer cooperatives) reflect global best practices for resilience. In particular, studies show that organised cooperatives and local market channels greatly helped fishers adapt to COVID-19 disruptions. These combined strategies should strengthen the sector against future crises ^[18, 19].

Conclusion

COVID-19 dealt an unprecedented shock to Janjgir-Champa's aquaculture, exposing systemic weaknesses but also spurring reform. The crisis halted seed and feed supply chains and collapsed fish markets, imperilling 80%+ of farmers' incomes. Government relief (exemptions, subsidies, and credit schemes) and grassroots coping (local

selling, and DIY feeds) softened the blow. Crucially, the pandemic highlighted long-standing issues: gender inequities, thin safety nets, and overreliance on exports. Going forward, concerted action is needed. As ICAR and FAO note, COVID-19 has "significantly affected fisheries & aquaculture" value chains. Thus, recovery must integrate policies that strengthen local markets, invest in extension and insurance, and empower farmers' associations and women's groups. Targeted investments in infrastructure (hatcheries, and cold storage), digital marketing, and inclusive services (Research and Development, credit) can transform this crisis into an opportunity. The Janjgir-Champa case underscores that building resilient, equitable aquaculture systems requires bridging immediate relief with long-term, people-centred strategies ^[20].

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