



Constraints Perceived by Farmers in Fish Farming: A Review Analysis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The adoption of scientific fish farming faces multiple constraints encompassing economic, infrastructural, technological, marketing, societal, and extension-related challenges. Economically, the substantial upfront investment required for infrastructure and operational costs deters potential fish farmers, especially small-scale operators. Inadequate access to financing further exacerbates this issue. Insufficient infrastructure, including poor transportation networks and processing facilities, hampers the efficient distribution and marketing of fish products. Limited access to scientific farming technology and disease management techniques hinders the adoption of advanced practices, while price fluctuations and a lack of organised markets pose marketing-related challenges. Cultural norms and societal dynamics can influence fish farming practices, sometimes hindering the adoption of sustainable farming. To overcome these constraints, collaborative efforts among the government departments, institutes, banks, NGOs etc. are essential. Strategies include providing financial support mechanisms, infrastructure development,

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dissemination of latest technical know how and training, establishing market chain, and respecting local social norms. Addressing these issues collectively could unlock the full potential of fish farming, promoting food security, livelihood enhancement and sustainable development.

Keywords: Adoption; challenges; constraints; fish farming; production.

1. INTRODUCTION

In India during the Green Revolution, cereal production played a vital role in nation's food security. However, nutrition security remained a big challenge forcing a change in animal-based food production. The main focus has now shifted from food production to animal-based farming. Recently, animal-based food production and fish farming have been the major drivers of sustainable agriculture. The agriculture sector has been gradually diversified in favour of high-value enterprises like fisheries Dhage et al. [1]. Fish farming is the fastest-growing sector of animal-based farming. This is due to extension agencies giving a boost to fish production during the Blue Revolution and widening the agricultural base as well as increasing the income level of farmers thereby improving their living standard.

Blue Revolution in India was initiated in 2015 as a comprehensive effort to promote sustainable growth in the fisheries sector, focusing on increasing fish production, improving infrastructure, and encouraging the adoption of modern technologies to meet the rising demand for protein-rich food. It encompasses various strategies and policies to enhance the productivity and sustainability of aquatic resources in the country. Fish is not only a rich source of protein and nutritious foods that offer nutritional security, but it also provides a source of income to millions of rural farmers. Hence, fishery plays a major role in improving food, income, and nutritional security at household level as well as at national level Muddassir et al. [2].

The total fish production in 2015-16 was 10.79 MMT and it increased to 16.25 MMT during the year 2021-22 which means about 50 percent increase in the production in the last 6 years [3]. Till 2000, marine fish production dominated India's total fish production. However due to the practice of science-based fisheries, Inland fisheries in India has seen a turnaround and presently contribute about 70 percent of total fish production [3]. The national average productivity of inland fisheries of India is 2900 Kg/ha. which is very low compared to other states like West

Bengal, Andhra Pradesh and Haryana etc [4]. So, there is a need to increase the adoption rate of scientific fish farming by analysing the factors that are responsible non-adoption of scientific fish farming methods.

2. CONSTRAINTS IN THE ADOPTION OF SCIENTIFIC FISH FARMING

Improved scientific fish production technologies are not fully adopted by farmers. Some problems are being faced resulting in partial and non-adoption of improved technologies. Higher fish production can be achieved by adopting all recommended technologies by farmers necessitating channel efforts to increase the yield, which is possible by identifying the problems and constraints being faced by the fish farmers.

2.1 Technology-Related Constraints

A wide gap in yield potential and yield obtained is responsible for low yield. Most of the farmers are not aware of proper and adequate technologies of fish production. Niangti et al. [5] stated that complexity of technology and non-availability of technologies were the most severe constraints in the adoption of scientific fish farming. Similar results were obtained by Singh et al. [6]; Khuman and Singh [7]; Pandey et al. (2014), Mithun et al. [8]; Salam et al. [9] that lack of knowledge about technology and complexity of information were the major constraints related to technology faced by the farmers respectively. While, Uttej et al. [10] also reported that lack of value addition for enhancing profit margin was one of major technology related constraints in adoption scientific methods of fish farming. To overcome the technology related constraints prioritiz capacity-building and training programs for fish farmers, promoting of research and development for locally suitable technologies, and facilitate access to government initiatives and resources are needed.

2.2 Finance-Related Constraints

Finance constraints refer to limitations and challenges related to financial resources, market conditions, and operational costs that can impact

the profitability and sustainability of fish farming activities. Khuman and Singh [7] reported that the high cost of inputs and lack of financial assistance were the most severe constraints among finance-related constraints encountered by fish farmers. Similar observations were also reported by Patil and Sharma [11]; Salam et al. [9]; Mithun et al. [8]; Pandey et al. (2014) that inadequate finance and high cost of inputs as major constraints. While Borah et al. [12] identified poor economic conditions as serious problem in adoption of scientific fish farming. Governments and financial institutions should offer targeted subsidies, low-interest loans, and grants to fish farmers to overcome finance-related constraints. Additionally, promoting financial literacy and encouraging the formation of cooperatives could help the fish farmers to save, invest, and collectively access resources for sustainable and technology-driven aquaculture practices.

2.3 Infrastructural-Related Constraints

Infrastructural-related constraints refer to limitations stemming from inadequate or insufficient physical facilities which can impede the efficient operation and growth of fish farming. Niangti et al. [5] found that lack of transport facilities were most serious constraints among infrastructural related constraints faced by farmers. While, Surendran et al. [13]; Dutta et al. [14]; Singh et al. (2020) and Debnath et al. [15] identified poor water quality and low-quality seedlings as major constraints encountered by farmers. To overcome infrastructural-related constraints in fish farming, investment in the development of essential infrastructure, including transportation networks, water supply, and processing facilities, while fostering public-private partnerships to ensure sustainable and efficient operations is need of the hours.

2.4 Marketing-Related Constraints

Marketing-related constraints of fish farming refer to obstacles and challenges arising from issues such as inadequate access to markets, price fluctuations, and insufficient marketing infrastructure that can impact the sale and distribution of fish products. The study conducted by Singh et al. [6]; Dutta et al. [14] concluded that lack of suitable organised market and lack of proper distribution channel were the constraints faced by fish farmers respectively. Vishwakarma et al. ([16]), Chittem and Kunda [17]; Mithun et al. [8] identified market information, storage and

transportation as most severe constraints related to marketing aspect of fish farming while Pandey([18] identified marketing constraints less serious than other constraints faced by farmers. Price fluctuation and lower price of fishes were the serious constraint studied by Uttej et al. [10]; Patil and Sharma [11]; Pandey and Dewan [19]. To overcome marketing-related constraints of fish farming, establish better market linkages, support value-added processing and branding, and develop efficient marketing channels to ensure timely and profitable sale of fish products.

2.5 Society-Related Constraints

Society-related constraints of fish farming refer to the various social, cultural, and ethical factors that impact the practice and development of fish farming, including issues related to environmental sustainability, community acceptance, and ethical treatment of fish species. Theft or poaching of fish are the major constraint reported by Uttej et al. [10]; Mithun et al. [8]; Pandey et al. (2014), and Pandey and Dewan [19]. While, Dutta et al. [14]; Khuman and Singh [7]; Tshering [20]; Salam et al. [9] reported that problem of poaching and poisoning of pond were not serious issues among other constraints encountered by fish farmers. To overcome the problem of poaching and poisoning in fish farming, implement security measures such as fencing and surveillance, monitor water quality to detect potential contamination, and collaborate with local authorities to enforce regulations.

2.6 Extension-Related Constraints

Extension-related constraints of fish farming refer to challenges arising from the dissemination of information, training, and technical support to fish farmers, including issues related to access, communication, and the effectiveness of extension services. Niangti et al. [5]; Dutta et al. [14] found that lack of site visit by extension worker and limited number of publications were the major problems faced by farmers. On the other hand, Surendran and Alex (2022) and Vishwakarma et al. [16] reported that lack of proper training is also a major serious issue affecting the adoption of fish farming by farmers. Pandey [18] during his study found that lack of participatory approaches in extension activities is one of the main problems faced by fish farmers. To overcome extension-related constraints in fish farming, enhance the accessibility of information and training through digital platforms, strengthen local extension services, and tailor outreach

efforts to meet the specific needs of diverse fish farming communities [21,22].

3. CONCLUSION

The adoption of fish farming, while a promising avenue for economic growth, faces multifaceted constraints that encompass economic, infrastructural, technological, marketing, societal, and extension-related challenges. These constraints often intersect and hinder the widespread adoption of scientific fish farming practices. To overcome these obstacles and promote sustainable and profitable fish farming, comprehensive strategies are necessary. This includes facilitating access to affordable financing, investing in crucial infrastructure, enhancing technology dissemination and training, establishing robust market linkages, respecting and addressing societal norms and values, and strengthening extension services. By addressing these constraints collectively, stakeholders can support the growth of the fish farming sector, boost food security, create livelihood opportunities, and contribute to the broader goal of sustainable development.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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