Review Article

Constraints Perceived by Farmers in Fish Farming: A ReviewAnalysis

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 modern fish farming technology and disease management tools hinders the adoption of advanced practices, while price fluctuations and a lack of reliable markets pose marketing-related challenges. Cultural norms and societal dynamics can influence fish farming practices, sometimes hindering the adoption of sustainable methods.To overcome these constraints, collaborative efforts among governments, NGOs, and agricultural agencies are essential. Strategies include providing financial support mechanisms, developing critical infrastructure, improving technology dissemination and training, establishing strong market linkages, and respecting local social norms. Addressing these issues collectively can unlock the full potential of fish farming, promoting food security, livelihood enhancement, and sustainabledevelopment.

Keywords: Adoption, Challenges, Constraints, Fish Farming, Productionetc.

Comment [u1]: No need etc

Introduction

In India during the Green Revolution, cereal production played a role in the nation's food security. However, nutritionsecurity remained a bigchallenge forcing a changein animal-basedfood production. The main focus has now shifted from food production to animal-based farming. Recently, animal-based food production and fish farming cultivation have been the major drivers of sustainable agriculture.The agriculture sector has been seen to gradually diversify in favour of high-value enterprises like fisheries(Dhage*et al.*, 2012).Fish farming is a type of aquaculture in which fish are raised and cultivated in enclosures for consumption as food. Fish farmingis the fastest-growing sector of animal-based farming. This is dueto extension agencies giving a boost to fish production during the Blue Revolution and widening the agricultural base aswell as increasing the income level of farmers thereby improving their standard of living.

The Blue Revolution in India was initiated in 2015 as a comprehensive effort to promote sustainable growth in the fisheries and aquaculture 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.The socioeconomic situation of India's rural population is significantly influenced by the production of fish.It is not only a rich source of protein and nutritious foods that offer nutritional security, but it is also widely known that it is a significant source of income for millions of rural farmers.Hence, fisheryplays amajor role in improving food, income, and nutritionalsecurity at household level as well as at national level.(Muddassir *et al.*, 2019).

The total fish production in 2015-16 was 10.79 MMT and it increased to 16.25MMT during the year 2021-22 which means about 50 percent increase in the production in the last 6 years. 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 contributeabout 70 percent of total fish production. 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. (DADF, 2019). 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.

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 allrecommended technologies by farmersnecessitating channel efforts to increase the yield, which is possible by identifying the problems and constraints the fish farmers face.

Comment [u2]: For me it will have more acceptance if you add some reference under this sub topic and relatively compare with other authors' investigation.

1. **Technology-related constraints of fish farming**

A wide gap in yield potential and yield obtained is responsible for low yield. Most of the farmers are not aware of improved varieties with fish production technology probably lack of proper and adequate technology. Niangti*et al.* (2020) stated thatcomplexity 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.* (2018), Khuman and Singh (2019), Pandey*et al.* (2014), Mithun*et al.* (2020)and Salam*et al.* (2020) 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.* (2022) 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 constraintsprioritize capacity-building and training programs for fish farmers, promote research and development for locally suitable technologies, and facilitate access to government initiatives and resources.

2. **Finance-relatedconstraints of fish farming**

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 (2019) found that the high cost of inputs and lack of financial assistance were the most severe constraints among finance-related constraints encountered by fish farmers. The familiar results were also reported by Patil and Sharma (2021)Salam*et al.* (2020), Mithun *et al.* (2020) and Pandey*et al.* (2014)that inadequate finance and high cost of inputs as major constraints. While Borah *et al.* (2019)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 can help fish farmers save, invest, and collectively access resources for sustainable and technology-driven aquaculture practices.

3. Infrastructural-related constraints of fish farming

Infrastructural-related constraints in fish farming refer to limitations stemming from inadequate or insufficient physical facilitieswhich can impede the efficient operation and growth of fish farming.Niangti*et al.* (2020) found that limited availability of fish seedlings and lack of transport facilities were most serious constraints among infrastructural related constraints faced by farmers. While, Surendran*et al.* (2023),Dutta*et al.* (2022), Singh*et al.* (2020) and Debnath*et al.* (2017) identified poor water quality and low-quality seedlings as major constraints encountered by farmers. The shortage of labour during peak season was recognised as major problems by farmers in the study conducted by Vishwakarma*et al.* (2017) in Chhattisgarh, India. To overcome infrastructural-related constraints in fish farming, invest 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.

4. Marketing-related constraints of fish farming

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.* (2018) and Dutta*et al.* (2022) concluded that lack of suitable organised market and lackofproperdistributionchannel were severe constraints faced by fish farmers respectively. Vishwakarma*et al.* (2017), Chittem and Kunda (2018) and Mithun*et al.*(2020) identified market information, storage and transportation as most severe constraints related to marketing aspect of fish farming while Pandey (2009) identified marketing constraints less serious than other constraints faced by farmers. While, low price for the fish market was found to be serious constraints in the study carried out by Uttej*et al.* (2022), and Patiland Sharma (2021), and Pandey and Dewan (2006). 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.

5. Society-related constraints of fish farming

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. Uttej*et al.* (2022), Mithun*et al.* (2020), Pandey*et al.* (2014), andPandey and Dewan (2006) during their studies concluded that theft or poaching of fish from is serious concern in fish farming. While,Dutta*et al.* (2022), Khuman and Singh (2019), Tshering (2023) andSalam*et al.* (2020) reported that problem of poaching and poisoning of pond were not serious issuesamong 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.

6. Extension-related constraints of fish farming

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.* (2020) and Dutta*et al.* (2022)found that lack of site visit by extension worker and limited number of publications were of major problems faced by farmers. On the other hand, Surendran and Alex (2022),and Vishwakarma*et al.* (2017) reported that lack of proper training is also a major serious issue affecting the adoption of fish farming by farmers.Pandey (2009) 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.

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 sustainabledevelopment.

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