IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Challenges Faced By Fish Farmers In Alappuzha, Kerala: A Statistical Assessment Of Key Issues

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Abstract

This study aims to understand the key challenges faced by fish farmers in Kerala, particularly in the Alappuzha district. Fish farmers in Kerala play a crucial role in sustaining the state's aquaculture sector, which significantly contributes to food security, rural income, and employment. Despite Kerala's natural advantages—such as abundant water resources and a long coastline—farmers encounter numerous obstacles. Unpredictable weather conditions, especially excessive rainfall and flooding, frequently damage farming infrastructure and lead to loss of fish stock. Rising input costs, limited access to affordable credit, lack of adequate insurance coverage, and insufficient institutional support further intensify the difficulties. Although various government schemes are in place, many farmers report challenges in accessing these benefits and question their effectiveness. Nevertheless, the sector demonstrates resilience and adaptability, with growing interest in sustainable practices and community-based fish farming cooperatives.

Keywords: Fish Farmer, Aquaculture, Input Cost, Flood Impact, Salinity Intrusion

Introduction

Aquaculture has emerged as a vital contributor to food security, rural livelihoods, and economic growth in Kerala, particularly in districts like Alappuzha, where fish farming plays a significant role in the agrarian economy. Despite its potential, the sector is grappling with numerous challenges that threaten its sustainability and profitability. Fish farmers are increasingly vulnerable to environmental, financial, and institutional risks, ranging from climate-induced floods and salinity intrusion to rising input costs and inadequate policy support.

The vulnerability of this sector has been further magnified by erratic climatic patterns, frequent flooding, and inconsistent government interventions. Reports of disease outbreaks, high mortality rates, and poor access to credit and insurance highlight the precarious nature of fish farming as a livelihood. Additionally, farmers face market fluctuations, lack of timely fingerling supply, and security concerns like theft, compounding their financial distress.

Given the critical role of fish farming in rural development and food production, it is essential to understand the specific issues confronting fish farmers on the ground. This study aims to identify and statistically assess the major problems encountered by fish farmers in Alappuzha using primary data and one-sample t-test analysis. By highlighting the intensity and significance of these challenges, the study seeks to provide evidence-based insights that can inform policy measures and support mechanisms for sustainable aquaculture development.

Objectives of the study

1. To identify and understand the major challenges faced by fish farmers in Alappuzha, Kerala.
2. To statistically assess the severity of these challenges of local fish farmers.

Methodology and Data Collection

This study employed a quantitative research design to assess the key problems faced by fish farmers in Alappuzha district, Kerala. Primary data was collected through a structured questionnaire, which included Likert scale items (1 = Strongly Disagree to 5 = Strongly Agree) measuring the perceived severity of specific issues affecting fish farming.

Sampling Techinique: A total of 134 fish farmers participated in the survey. The respondents were selected using convenience sampling, a non-probability sampling technique, due to the accessibility and willingness of participants to provide data. While this approach may introduce sampling bias, it was deemed practical for reaching a dispersed population within a limited timeframe.

The major challenges faced by fish farmers in Kerala, particularly in Alappuzha, include:

1. Price Hike: The rising costs of essential inputs in fish farming—namely fish feed, medicine, seed (fingerlings), and fuel—are significantly impacting the profitability and sustainability of aquaculture operations, particularly in regions like Kerala. The cost of essential inputs like fish feed has escalated, increasing from ₹30 to ₹40 per kg. This surge in operational costs, coupled with the influx of inferior-quality inland fish varieties from other states, has led to a significant drop in market prices for local fish. For instance, the price for carp varieties has plummeted from ₹300–₹400 per kg to just ₹90–₹100 per kg (Manoj, 2022), making it challenging for farmers to cover their expenses and repay loans.

2. Excess Rain and Flood Damage: Kerala's aquaculture sector is highly susceptible to extreme weather events. The 2018 floods inflicted losses amounting to ₹175 crore (Indian Express 2018), with over 587 lakh fish lost from domestic farms. Infrastructure such as protective bunds, sluices, pumps, and aerators were severely damaged, disrupting operations and leading to significant financial setbacks for farmers.

3. Salinity Intrusion: Coastal regions like Chellanam and Varapuzha have experienced increased salinity levels due to sea water intrusion, especially during high tides and floods. This salinity intrusion renders freshwater ponds unsuitable for fish farming, leading to the loss of fish stock and making the land unfit for future aquaculture activities.

4. Disease Outbreak in Fish Stock: The unregulated import of fish seeds from other states without proper quarantine measures has led to the introduction of diseases in local fish populations. Farmers have reported high mortality rates, with some losing up to 80% of their stock due to infected or poor-quality seeds supplied by the Fisheries Department.

5. Limited Insurance Coverage: There is a general lack of awareness and availability of comprehensive insurance solutions among fish farmers. While some accident insurance schemes exist, coverage for assets like fishing gear, infrastructure, and losses due to natural disasters is minimal. This leaves farmers vulnerable to significant financial losses without any safety net.

6. Lack of Credit: Many fish farmers rely on loans to fund their operations. However, delays in the supply of fish seeds and other inputs can lead to idle periods where farmers are unable to generate income, making it difficult to service their debts. The lack of timely support exacerbates the financial strain on these farmers.

7. Theft: Instances of fish theft have been reported, especially during periods when ponds are flooded or bunds are breached. The loss of mature fish ready for harvest due to theft adds to the financial burdens faced by farmers, who already contend with environmental and infrastructural challenges.

8. Lack of Government Support: While the government has initiated schemes like the Subhiksha Keralam and Pradhan Mantri Matsya Sampada Yojana to promote fish farming, implementation issues persist. Delays in the delivery of fish seeds, lack of training, and inadequate infrastructure support have left many farmers disillusioned. Despite investing significant amounts based on government projections, farmers often find themselves without the promised support, leading to financial distress.

The following Table 1 explains descriptive statistics (mean and standard deviation) were used to summarize responses for each identified problem. Additionally, a **one-sample t-test** was conducted to determine whether the mean scores significantly differed from a neutral value (typically 3.0 on the Likert scale), indicating the statistical significance of each issue.

Table 1

Summary Statistics and One-Sample T-Test Results for Problems faced by fish Farmers in Alappuzha

Problem	Mean	Std Dev	t-Statistic	p-Value	df	N
Input Price Hike	4.79	0.49	42.17	< 0.0001	133	134
Excess Rain and Flood Damage	4.72	0.56	35.69	< 0.0001	133	134
Salinity Intrusion	4.61	0.61	30.49	< 0.0001	133	134
Disease Outbreak in Fish Stock	4.12	0.85	15.24	< 0.0001	133	134
Limited Insurance Coverage	3.49	0.5	11.36	< 0.0001	133	134
Lack of Credit	3.46	0.5	10.7	< 0.0001	133	134
Theft	3.44	0.5	10.23	< 0.0001	133	134
Lack of Government Support	3.4	0.49	9.33	< 0.0002	133	134

Source: Primary Data

The results of the one-sample t-test indicate that all the identified problems faced by small-scale fish farmers in Kerala are rated significantly higher than the neutral midpoint value of 3 on a five-point Likert scale ($p < 0.001$ for all items). This suggests a strong consensus among respondents about the severity of these issues. Among the problems, *input price hike*, *excess rain and flood damage*, and *salinity intrusion* received the highest mean scores (above 4.6), indicating that they are the most pressing challenges. Other issues such as *disease outbreak in fish stock*, *limited insurance coverage*, *lack of credit*, *theft*, and *lack of government support* were also found to be statistically significant, although with slightly lower average ratings. Overall, the data reflect a broad and consistent perception of vulnerability across multiple dimensions of fish farming operations.

Key findings of the study

- Fish farmers in Alappuzha reported that rising input prices, especially for feed and fuel, are their most pressing challenge, severely affecting their profit margins.
- Excessive rainfall and frequent flooding lead to significant fish loss and infrastructure damage, making fish farming increasingly unpredictable.
- Salinity intrusion, particularly in coastal and low-lying areas, disrupts freshwater fish cultivation and limits species selection.
- Disease outbreaks in fish stocks were common and often resulted in major economic losses due to inadequate preventive measures.
- Many farmers lack access to adequate insurance coverage, leaving them financially vulnerable to sudden losses.
- Limited access to formal credit sources forces farmers to rely on informal lenders, often at higher interest rates.
- Theft of fish stock, especially during night hours, adds to the financial burden and risk of loss.

- Farmers expressed dissatisfaction with the level of government support, citing delays, poor implementation, and lack of awareness about existing schemes.

Policy Implications

- Subsidizing input costs through government support for fish feed, seeds, and equipment can help ease the financial burden on small-scale fish farmers. This would make aquaculture more viable in the face of rising prices.
- Strengthening climate resilience by constructing flood-resistant ponds and improving drainage systems can protect farms from frequent flooding. Early warning systems and weather-based insurance can further mitigate risks.
- Managing salinity intrusion requires sustainable water management practices like bund construction, canals, and buffer zones. Promoting salinity-tolerant fish varieties can also help maintain productivity in affected areas.
- Enhancing fish health management through local fish health clinics and farmer training programs will reduce losses from disease outbreaks. Biosecurity and water quality control should be emphasized in routine practices.
- Expanding insurance coverage with affordable, accessible policies tailored to aquaculture needs will protect farmers against unpredictable losses. Special schemes should include both crop and infrastructure protection.
- Improving access to credit by simplifying loan procedures and offering low-interest or interest-free loans can reduce farmers' dependence on informal lending sources. Cooperative banks and microfinance institutions can play a key role.
- Strengthening security through community monitoring and providing insurance against theft can help farmers recover from stock losses. Legal support mechanisms should also be established for dispute resolution.
- Enhancing government engagement involves timely disbursement of subsidies and effective disaster compensation. Including small-scale fish farmers in local policy planning can ensure more responsive and relevant interventions.
- Promoting farmer cooperatives allows for resource sharing, joint marketing, and greater bargaining power. Regular training and exposure to new technologies can further empower farmers and boost productivity.

Conclusion

The study highlights the multifaceted challenges faced by fish farmers in Alappuzha, with input price hikes, excess rain and flood damage, and salinity intrusion emerging as the most severe problems. The statistical analysis confirms that these issues are not only widespread but significantly impact the sustainability and profitability of fish farming in the region. Other concerns such as disease outbreaks, limited insurance coverage, lack of credit access, theft, and inadequate government support further compound the difficulties faced by farmers. Addressing these problems requires a coordinated approach involving policy reforms, financial support mechanisms, infrastructure development, and farmer education. By prioritizing these needs, stakeholders can help strengthen the aquaculture sector and improve the resilience of rural livelihoods in Kerala.

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