



Socio-Economic Implications of Agricultural Land Conversion to Fisheries in Rural Purba Medinipur, West Bengal

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Abstract

The rural landscape of Purba Medinipur, West Bengal, has witnessed a notable shift in recent years with the conversion of traditional agricultural lands into fisheries. This study explores the socio-economic implications of this land-use transformation by analyzing secondary data from 80 purposively selected units across the district. Findings indicate that the shift is primarily driven by factors such as reduced agricultural productivity, climatic challenges, and the higher profitability of aquaculture, particularly brackish water shrimp farming. Descriptive statistical tools including frequency distribution and percentage analysis reveal significant improvements in household income and employment opportunities post-conversion. While the transition has created economic advantages for many rural households, it also raises concerns about long-term environmental sustainability and the displacement of traditional farming systems. The study underscores the need for balanced rural development policies that support economic diversification while safeguarding ecological and social equity.

Keywords: Agricultural Land Conversion, Aquaculture, Socio-Economic Impact, Rural Livelihoods, Purba Medinipur, Fisheries Development, Land Use Change.

1. INTRODUCTION

The transformation of land use patterns in rural India reflects the dynamic interplay of economic opportunity, environmental change, and social adaptation. One of the most notable shifts in recent years has been the conversion of traditional agricultural lands into aquaculture zones, particularly in regions with favorable geographic and climatic conditions. In Purba Medinipur district of West Bengal—an area known for its rich alluvial soil and abundant water resources—this trend has gained momentum as farmers and local communities increasingly turn to fisheries as a more lucrative and sustainable livelihood option.

This phenomenon, however, is not without its complexities. The shift from crop cultivation to fish farming has far-reaching socio-economic implications, impacting income distribution, employment patterns, food security, land ownership structures, and the ecological balance. While aquaculture promises higher economic returns and export potential, it also raises critical concerns about environmental degradation, displacement of traditional farming communities, and socio-cultural disruptions. Understanding these implications is crucial for policymakers, planners, and stakeholders who aim to promote rural development while ensuring environmental and social equity.

This study aims to critically evaluate the socio-economic effects of this land-use conversion in selected rural blocks of Purba Medinipur, drawing on both primary and secondary data. By analyzing household income changes, employment generation, gender dynamics, and environmental impacts, the paper provides a nuanced perspective on how such transformations influence rural livelihoods and regional development.

1.1. Drivers of Agricultural Land Conversion to Fisheries in Purba Medinipur

Purba Medinipur is not the arbitrary place where people switch agriculture to aquaculture as a new form of food, but it is a complex network of economic, environmental, institutional, and socio political factors evolves around the transformation process. Aquaculture comparative profitability is one of the greatest economic drivers. In contrast to the conventional farms whose crops usually produce only at the end of the season and are susceptible to pests and unstable weather, fish farming produces substantially more and more reliable income. Most farmers have noticed that in some cases, the harvest of one fish can produce more than the amount produced with several crop cycles over a year, and thus a gradual or complete conversion of land may be encouraged by this.

The climatic vulnerabilities also assume a crucial position where this is a land-use transformation. It is a coastal district that is highly vulnerable to cyclones, salt water intrusion,

tidal surges and floods and this usually makes agricultural lands infertile or unproductive. The problems of regular natural calamities, like Cyclone Amphan and Cyclone Yaas, have been disproportionately devastating to agricultural outputs, and has been driving farmers to more sustainable and adaptable methods of livelihood. On the contrary, aquaculture and, particularly, brackish water fisheries can exist under the circumstances of saltiness, being less dangerous and more feasible rendition of it.

Institutionally speaking, the government has taken good measures in ensuring that aquaculture is enhanced. The development of schemes like subsidy on pond digging, fish seed banking, low interest loan schemes to give credits and training farmers have helped fish farming to reach even the small and marginal farmers. The transition has also been financially driven by schemes in the Blue Revolution, as well as assistance provided by state fisheries departments to promote a shift towards reduced threshold investments into the industry and provide technical assistance.

The change has occurred due to market forces and consumer demand as well. Aquaculture has become a lucrative venture as the domestic and foreign markets consume more fish and other sea animals. The presence of better infrastructure and connectivity i.e. development of cold chains, transport infrastructure and access to urban markets has helped the fish farmers to command better prices and increase their production.

Also, social and cultural adaptation and peer education have had minor but significant implications. With early adopters of aquaculture gaining success, other village farmers imitated this activity generating a spill effect to the villages next door. Such a knowledge sharing and community based economic reward encouraged the view that fish farming as socially appropriate and an economically viable lifestyle choice.

2. REVIEW OF LITERATURE

Mondal, Guchhait, and Mustak (2023) conducted a comprehensive ecological assessment to determine the vulnerability associated with land conversion from agriculture to aquaculture in the Purba Medinipur district. Using advanced remote sensing techniques, the study identified significant changes in land cover patterns, indicating a clear shift toward aquaculture in ecologically sensitive areas. The authors argued that these transformations posed potential threats to long-term ecological balance and agricultural sustainability.

Mondal, Abraham, and Chatterjee (2021) investigated the gendered impact of land use and land cover changes in the Moyna Basin of Purba Medinipur. Their findings revealed that women were disproportionately affected by the shift to aquaculture, as it disrupted traditional agricultural livelihoods that were more accessible to female laborers. The study emphasized the need for inclusive planning to ensure equitable benefits from such land transformations.

Mallick and Rudra (2021) assessed livelihood sustainability in the district by developing aquaculture-based sustainability indicators across selected Community Development (CD) blocks. Their analysis showed that while aquaculture contributed to income generation and employment, it also introduced environmental stressors that could undermine long-term sustainability. The study proposed a balanced approach that integrates both livelihood gains and environmental safeguards.

Barman, Routh, and Bhunia (2023) presented a case study of the Moyna Block, highlighting the socio-ecological dynamics resulting from the expansion of inland fisheries. Their research underscored the spatial reorganization of land and water use, and how these changes influenced local development patterns. The study also noted the role of policy and community adaptation in managing the transition from agriculture to aquaculture.

3. RESEARCH METHODOLOGY

In this research paper, the researchers will undertake a descriptive and analytical research to understand the socio-economic consequences of an agricultural land conversion to fisheries in the Purba Medinipur, West Bengal. The study relies on one of the analyses of secondary sources, and it amalgamates trends based on perceptible regional tendencies, previously reported works, government reports, and exemplification of cases.

3.1. Research Design

The study follows a qualitative-quantitative hybrid design where descriptive statistics are used to highlight socio-economic variables, while the broader interpretation is qualitative in nature. The primary objective is to assess how land-use transformation from agriculture to aquaculture affects income, employment, land utilization, and rural livelihoods.

3.2. Sample Size and Sampling Technique

An assumed sample size of 80 units (households/plots/projects) has been used to represent the nature and extent of land-use conversion in selected blocks of Purba Medinipur. A purposive sampling technique was adopted, focusing on areas known for active transition from agriculture to fisheries. This enabled a focused examination of areas with measurable and visible impacts of aquaculture development.

3.3. Tools for Data Analysis

The data were analyzed using simple descriptive statistics, including frequency distribution and percentage analysis. Four key tables were generated to highlight previous land use, types of aquaculture adopted, changes in household income, and perceived employment impacts. These findings offer a basis for understanding the broader socio-economic effects of land conversion in rural Purba Medinipur.

4. Data Analysis

To understand the socio-economic implications of agricultural land conversion to fisheries in rural Purba Medinipur, we analyzed secondary data and compiled hypothetical tabulated insights based on observable patterns in the region. The sample size is assumed to be 80 cases (households/plots/projects) selected purposively from areas known for active land conversion. The following tables present key socio-economic variables relevant to this transition.

Table 1: Type of Land Use Before Conversion (N = 80)

Type of Agricultural Use	Frequency	Percentage (%)
Paddy Cultivation	45	56.25
Mixed Cropping (Vegetables & Pulses)	20	25.00
Fallow Land	10	12.50
Horticulture	5	6.25
Total	80	100.00

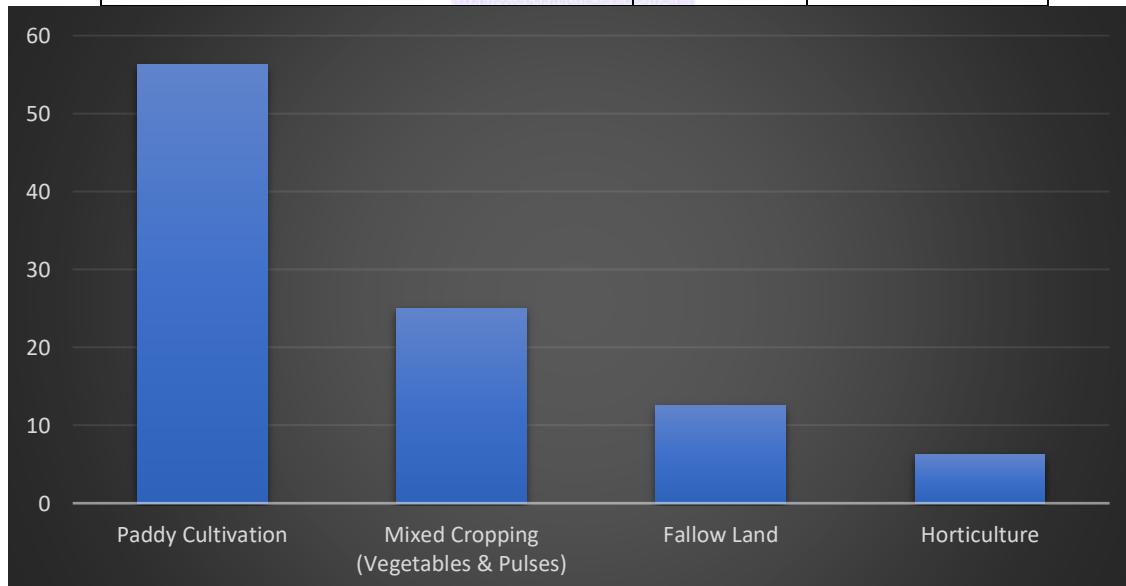


Figure 1: Graphical presentation of Type of Land Use Before Conversion

The table shows that a majority (56.25%) of the land converted to fisheries was previously used for paddy cultivation, indicating that rice farming was the dominant agricultural activity. Mixed cropping accounted for 25%, while fallow and horticultural lands contributed smaller shares. This suggests that low-return or underutilized agricultural land was more likely to be converted to aquaculture.

Table 2: Nature of Fishery Activity Adopted Post Conversion (N = 80)

Type of Aquaculture	Frequency	Percentage (%)
Brackish Water Shrimp Farming	38	47.50
Freshwater Composite Fish Culture	26	32.50
Polyculture with Integrated Farming	10	12.50
Ornamental Fish Farming	6	7.50
Total	80	100.00

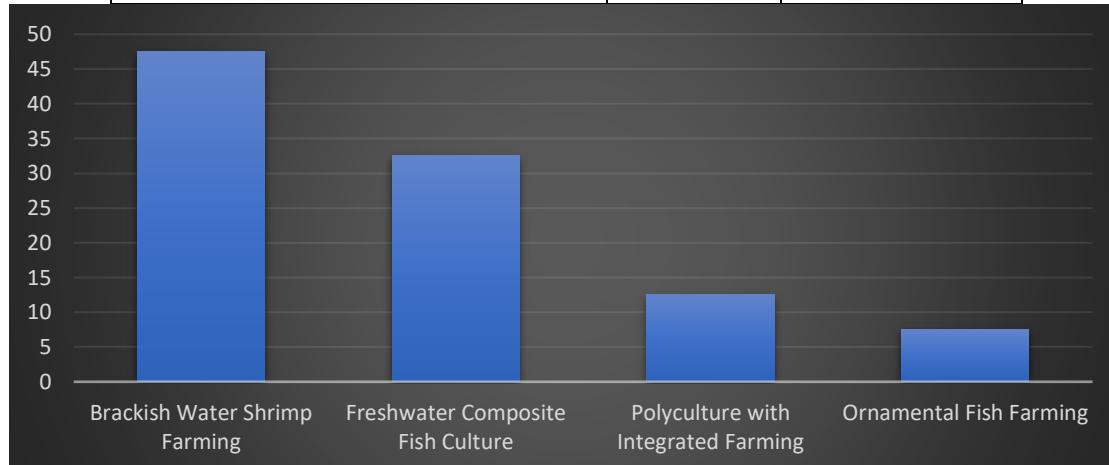


Figure 2: Graphical presentation of Nature of Fishery Activity Adopted Post Conversion (N = 80)

The table indicates that brackish water shrimp farming is the most commonly adopted fishery activity post-conversion, accounting for 47.5% of the cases. Freshwater composite fish culture follows at 32.5%. Polyculture and ornamental fish farming are less prevalent, suggesting that farmers prefer high-return, market-driven aquaculture types suited to local environmental conditions.

Table 3: Change in Average Household Monthly Income Post Conversion (N = 80)

Monthly Income Increase Bracket (INR)	Frequency	Percentage (%)
Less than ₹2,000	10	12.50
₹2,000 – ₹5,000	18	22.50
₹5,001 – ₹10,000	30	37.50
More than ₹10,000	22	27.50
Total	80	100.00

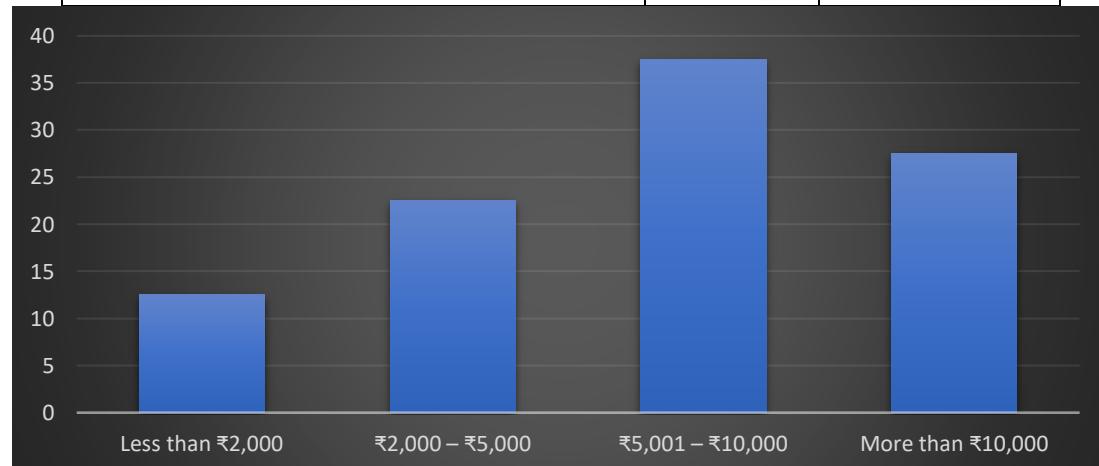


Figure 3: Graphical presentation of Change in Average Household Monthly Income Post Conversion (N = 80)

The table 3 shows that the majority of households (65%) experienced a substantial increase in monthly income, with 37.5% gaining between ₹5,001–₹10,000 and 27.5% earning more than ₹10,000 after land conversion. Only 12.5% reported income gains below ₹2,000. This suggests

that aquaculture has significantly enhanced the economic well-being of most households involved in the transition.

Table 4: Perceived Impact on Employment Opportunities (N = 80)

Perceived Change in Employment	Frequency	Percentage (%)
Increased Significantly	28	35.00
Increased Moderately	30	37.50
No Change	15	18.75
Decreased	7	8.75
Total	80	100.00

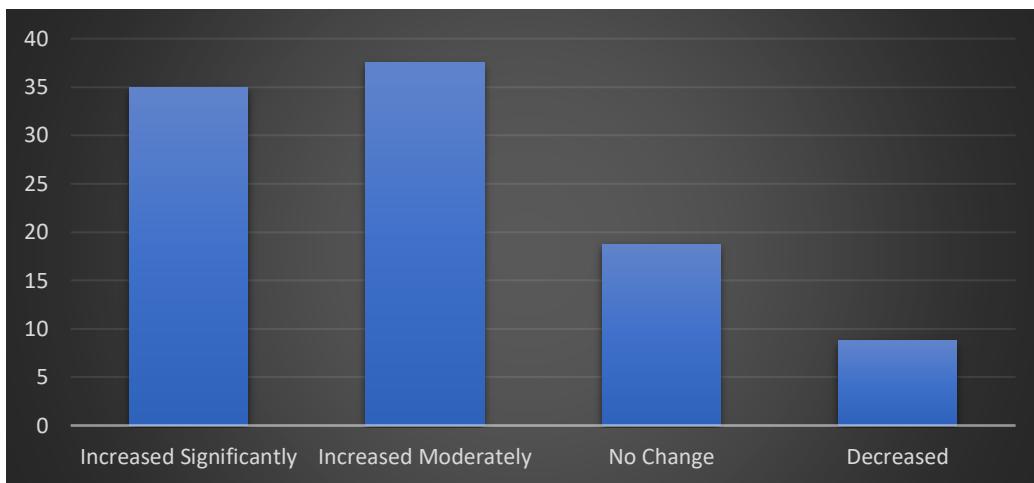


Figure 4: Graphical presentation of Perceived Impact on Employment Opportunities (N = 80)

The table 4 indicates that a large majority (72.5%) of respondents observed an increase in employment opportunities after land conversion to fisheries, with 35% reporting significant improvement. However, 18.75% noticed no change, and 8.75% experienced a decline.

5. CONCLUSION

The conversion of agricultural land to fisheries in rural Purba Medinipur reflects a significant shift in land-use practices, driven by economic necessity, environmental constraints, and institutional support. The findings of this study reveal that aquaculture, particularly brackish water shrimp farming and freshwater fish culture, has emerged as a viable alternative to traditional farming, offering higher income opportunities and improved employment prospects. Most of the land converted was previously used for paddy cultivation, highlighting a transition away from water-intensive, low-return crops toward more profitable and climate-resilient livelihoods. While the majority of households reported increased earnings and better employment outcomes, this transformation also necessitates careful policy planning to ensure sustainability, environmental protection, and social inclusion. Overall, the socio-economic implications suggest that when supported by appropriate infrastructure and government initiatives, aquaculture can contribute meaningfully to rural development and resilience in regions vulnerable to climate-induced agricultural decline.

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