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Influence of Beneficiary Farmer profiles on the Socio-economic Impact of the IAMWARM Project in Tamil Nadu

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Abstract

The Irrigated Agriculture Modernization and Water-Bodies Restoration and Management (IAMWARM) project, launched by the Government of Tamil Nadu with World Bank support aimed to modernize irrigation systems, restore water resources and improve rural livelihoods. This study investigates the association between the profiles of beneficiary farmers and the socio-economic impact of the project in the Ponnaniyar sub-basin of Tiruchirappalli district. Using an ex-post facto research design, data were collected from 120 beneficiaries through structured interviews. Findings indicate that IAMWARM interventions contributed to stabilization of agricultural production, improved housing, enhanced education for children, diversified diets and increased social participation. Migration was entirely prevented, reflecting strengthened livelihood security. Regression analysis identified education, training, scientific orientation, innovativeness, risk orientation and economic motivation as significant determinants influencing the extent of socio-economic change. While the project brought substantial improvements, income and savings gains were relatively modest, highlighting the need for sustained institutional support. The study underscores that beneficiary characteristics play a critical role in shaping project outcomes and tailoring interventions to farmers' profiles can enhance the effectiveness of development initiatives.

Key words : IAMWARM, Beneficiary profile, Socio-economic impact, Rural livelihoods and Agricultural development.

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Agriculture in India is heavily dependent on water resources, yet declining rainfall, groundwater depletion, and deteriorating irrigation infrastructure have significantly constrained productivity[18]. In Tamil Nadu, more than half of the cultivated area depends on irrigation, making efficient water management a long-standing policy priority. To address these challenges, the Government of Tamil Nadu launched the IAMWARM project in 2007 with financial support from the World Bank[1,5].

IAMWARM adopted a basin-wide, multi-disciplinary approach by integrating water body restoration with agricultural modernization, fisheries, horticulture and livestock development. Beyond rehabilitating tanks and canals, the project promoted climate-resilient practices, efficient input use, market linkages, and farmer training[16,17]. This convergence of multiple line departments aimed not only at improving agricultural productivity but also at enhancing rural livelihoods[2].

Although Iamwarm's technical outcomes, such as crop diversification and improved water use efficiency, are well documented, relatively less attention has been paid to its socio-economic impact at the household level. Equally important is understanding how beneficiary profiles-education, training, motivation and orientation-affect project outcomes[12,13]. This study addresses these gaps by examining the association between farmer profiles and the socio-economic impact of IAMWARM interventions in the Ponnaniyar sub-basin of Tiruchirappalli district, thereby providing valuable insights for policymakers and extension professionals engaged in integrated rural development[14,15].

Study area :

The study was conducted in the Ponnaniyar sub-basin of Tiruchirappalli district, Tamil Nadu, where IAMWARM interventions had been actively implemented. The region is predominantly agrarian, with agriculture depending on irrigation from restored water bodies. Five villages-Navalur Kuttapattu, Thayanur, Pirattaiyur, K. Kallikudi and Poolangudi were purposively selected as they represented areas with substantial IAMWARM activities.

Research design and sampling :

An ex-post facto research design was adopted for the study. A total of 120 beneficiaries were selected using proportionate random sampling across the five villages to ensure adequate representation.

Data collection :

Primary data were collected using a structured interview schedule designed to capture socio-economic dimensions such as food habits, dressing pattern, housing, education of children, income and savings, personal changes, contact with development personnel, social participation, media participation and migration.

In addition to primary data collected from beneficiaries relevant secondary information was obtained from government records, IAMWARM project reports, agricultural department publications and statistical handbooks of Tamil Nadu[10,11]. These sources provided background on project implementation, sub-basin characteristics and official records of

water body restoration and agricultural modernization activities. Secondary data were particularly useful for validating the field-level findings and placing the household-level analysis within a broader policy and developmental context[3&14].

Variables and measurement :

Independent variables included age, education, landholding, farming experience, information source utilization, economic motivation, scientific orientation, innovativeness, risk orientation and training received. Dependent variables were extent of participation in IAMWARM and socio-economic impact.

Measurement of participation :

To quantify the level of change, the Participation Index (PI) was used, calculated as:
where:

$$PI = \frac{Pr}{P} \times 100$$

- Pr = score obtained by the respondent
- P = maximum possible score

Data Analysis :

The data were analysed using:

- Percentage analysis to describe socio-economic changes
- Correlation analysis to establish relationships between variables
- Multiple regression analysis to identify determinants of socio-economic impact
- All statistical analyses were conducted using SPSS software

Findings :

Profile characteristics of Beneficiaries :

The majority of respondents were middle-aged (59.2%), had middle school education (31.67%) and were marginal farmers (56.67%). Most had medium farming experience (45.83%), medium economic motivation (55%) and medium levels of scientific orientation (42.5%), innovativeness (48.33%) and risk orientation (50%). Nearly half (42.5%) had attended medium levels of training, while 49.17% reported moderate information source utilization. These characteristics shaped the extent of beneficiaries' participation and outcomes under IAMWARM[12,17].

Socio-economic impact :

The project generated substantial socio-economic benefits. Migration was completely prevented across households (100%) underscoring IAMWARM's role in livelihood stabilization. Housing improvements were reported by 84.58% of households, food habits improved for 66.39% and 54.44% of beneficiaries provided better education for their children. Personal changes such as self-confidence, social respect, and expenditure on education and festivals were noted by 59.31%. Community-level impacts were also visible: social and media participation rose to 75.33%. However, income and savings gains remained modest (37.5%) and only 12.5% managed to clear debts indicating persistent financial vulnerability[4-6].

Determinants of Socio-economic impact :

Regression analysis revealed that education, economic motivation, scientific orientation, innovativeness, risk orientation and

training received significantly influenced socio-economic outcomes ($p < 0.05$), explaining 63.8% of the variance ($R^2 = 0.638$). Age, landholding and farming experience were not significant predictors. This highlights the critical role of psychological and behavioural factors in mediating the success of development interventions[7-9].

Table-1. Profile characters of beneficiaries (n=120)

Children's education improved	54.44
Contact with development personnel	39.33
Income and savings increased	37.50
Dressing pattern improved	8.33

Table-2. Socio-economic changes observed among IAMWARM beneficiaries (n=120)

Socio-economic Indicator	Beneficiaries reporting change (%)
Migration prevented	100.00
Housing improved	84.58
Media participation	75.33
Social participation	75.33
Food habits improved	66.39
Personal changes	59.31

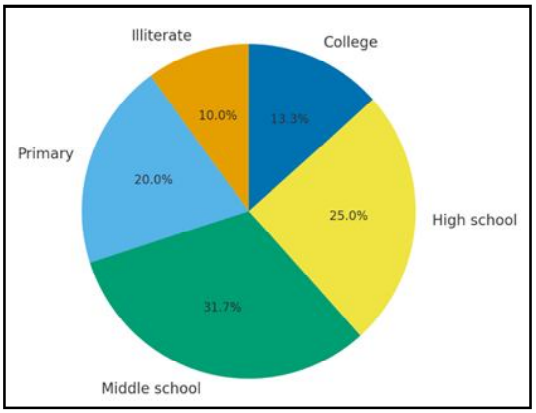

Figure 1. Education profile of beneficiaries

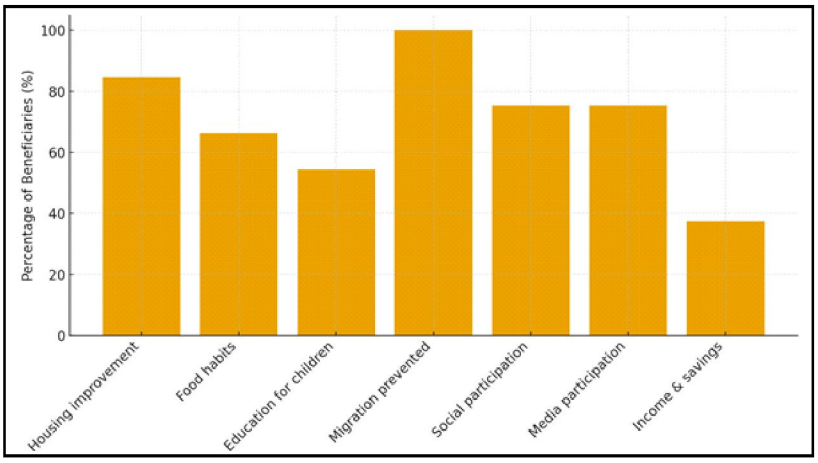

Figure 2. Socio–Economic impact of IAMWARM on beneficiaries

Table-3. Multiple regression analysis of factors influencing socio-economic impact

Independent Variable	Regression Coefficient (β)	t-value	Significance
Education	0.298	2.24	*
Information source utilization	-0.4021	-0.80	NS
Economic motivation	3.3325	4.11	**
Scientific orientation	1.4766	3.89	**
Innovativeness	0.3394	3.01	**
Risk orientation	0.7704	2.62	*
Training received	1.7744	4.33	**

(* Significant at $p < 0.05$; ** Significant at $p < 0.01$; NS = Non-Significant)

$R^2 = 0.638$; $F = 12.303$; $p < 0.01$

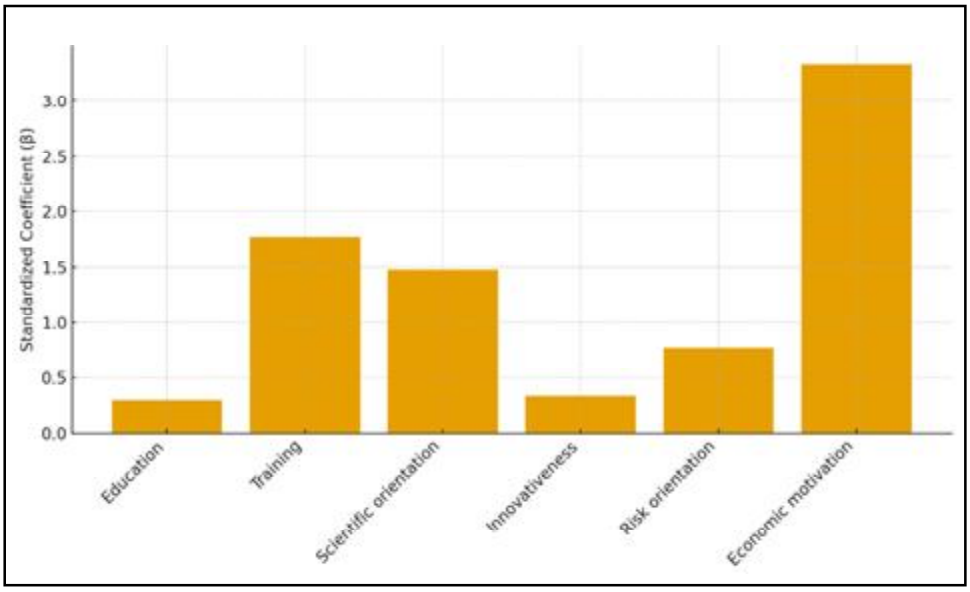

Figure 3. Determinants influencing Socio-Economic impact

The IAMWARM project has significantly enhanced the socio-economic well-being of farming households in the Ponnaniyar sub-basin. Key benefits included reduced migration, improved housing, diversified diets, better education and greater social participation. Importantly, psychological and motivational traits such as scientific orientation, innovativeness and risk orientation played a decisive role in shaping outcomes. Despite these achievements, limited progress in income and savings underscores the need for sustained institutional and financial support. Policy efforts should focus on timely subsidies, credit access, capacity-building and stronger extension linkages to ensure the long-term sustainability

of IAMWARM's gains. Tailoring interventions to beneficiary profiles can further enhance project effectiveness and contribute to resilient rural development.

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Conflict of interest :

The authors declare that there is no conflict of interest

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