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The Role of Social Entrepreneurship in Promoting Community-Based Aquatic Resource Conservation

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Abstract
Social entrepreneurship (SE) can provide a valuable tool to close the gap between market failures and community-level conservation gaps, especially in the management of aquatic resources under risk of increasing anthropogenic pressure. The purpose of this study is to explore the importance of social entrepreneurship in the context of conserving aquatic resources in the communities of coastal and fresh water bodies of India. A mixed-methods design is adopted, with structured survey data (N = 312) combined with qualitative case analyses from five purposively selected SE-driven conservation initiatives, to explore six key dimensions of SE activity: social orientation, capacity of community mobilization, institutional partnerships, adoption of environmental innovations, stakeholder engagement, and the mobilization of resources. A mediation analysis showed that there was a significant indirect effect of community engagement intensity on conservation outcomes through SE composite scores, and a significant positive effect of government policy support on conservation outcomes. Multiple regression analysis was used to account for variance in conservation outcomes; 63% of variance was accounted for ($R^2 = 0.63$, $F = 88.41$, $p < .001$). The results of Pearson's correlation analysis showed that all SE dimensions and conservation indices were positively associated with each other, with significant results. The study provides a conceptual framework with theoretical foundations that connects SE mechanisms to the context of conservation governance, and provides practical suggestions for practitioners, policy makers, and NGOs engaged in the stewardship of aquatic resources.

Keywords: Social Entrepreneurship, Aquatic Resource Conservation, Community-Based Management, Environmental Innovation, Conservation Governance, Sustainable Fisheries and India

Introduction

Aquatic ecosystems, such as streams, lakes, estuaries and coastal areas, are among the most productive and ecologically sensitive habitats on Earth, and are experiencing a vast and rapid decline in their quality due to pollution, overfishing, degradation and climate change (Restrepo Morales et al. 2026; Kumar et al. 2026). In India alone more than 70% of surface water bodies are reported to be under moderate to severe stress, and the artisanal fishing communities and riparian societies are still having to bear disproportionate costs of ecological decline (Singh et al., 2026). Traditional top down approaches to regulation have failed to make effective progress towards changing these trends, and are increasingly losing ground to community based participatory approaches that build on local ecological knowledge and social capital.

In this context, social entrepreneurship has gained increasing interest in the academic and policy spheres as a governance approach that can involve communities, build cross-sector partnerships, and implement environmentally innovative solutions that address ecological and social goals (Restrepo Morales et al., 2026a; Rodriguez Flores et al., 2026). Social entrepreneurs, a unique breed of people whose orientation is quite different from that of conventional actors focused on profit maximization, are drawn from the tradition of mission driven enterprises and act with the aim of creating social value as a main activity while financial sustainability is treated as a secondary goal (Desai, 2021a; Desai, 2022a).

Although the number of literature on SE and environmental sustainability has increased, there is still a critical gap in the empirical study of SE mechanisms that have an orientation towards the conservation of aquatic resources. The existing literature has tended to concentrate on terrestrial ecosystems, land-use change and urban sustainability transitions. This study seeks to fill this gap in systematically examining how the multi-dimensional capabilities of social entrepreneurial organizations are manifested in measurable conservation outcomes in Indian community settings in riverine and coastal contexts.

Four main research questions were developed:

(1) What are the social entrepreneurship dimensions that are common in aquatic conservation organizations?
(2) How does the SE activity affect conservation outcomes, directly or indirectly?
(3) To what extent does government policy support contribute to aquatic conservation outcomes?
(4) What is the conceptual framework that links the SE mechanisms with community-based conservation governance?

The results will inform the theoretical debate on SE and sustainability governance and lend credence to practitioners' and policymakers' guidance in practice.

2. Literature Review

2.1 Social Entrepreneurship: Theoretical Foundations

Social entrepreneurship is a unique theory that falls under entrepreneurship theory, social movement theory and institutional economics. Dees (1998) defined social entrepreneurs as "change agents" with a mission to create and sustain social value, identifying and relentlessly pursuing new opportunities, continuously innovating, taking bold action without resource limitations, and being held to a higher level of accountability to stakeholders. Later researchers have built upon this base, focusing on the institutional context of SE activity and how social entrepreneurs do it by working within and against dominant institutional logics to realize hybrid organizational forms that produce blended value (Desai, 2021b; Desai, 2022b). The idea of entrepreneurial ecosystems, which has been well described in the innovation management literature, can be used to provide a useful structure to examine SE activity in the context of community conservation (Desai, 2021c; Audretsch et al., 2018). An entrepreneurial ecosystem is the sum of interactions and connections among actors, institutions, and culture that can support entrepreneurial activity; in the case of aquatic conservation, it includes a set of actors, institutions, and culture that contribute to the outcomes of conservation, such as fishing communities, NGO organizations, research institutions, government organizations, and market intermediaries (Restrepo Morales et al., 2026b).

2.2 Community-Based Aquatic Resource Conservation

Community-based natural resource management (CBNRM) is a well-tested, viable paradigm for the management of common-pool resources, such as fisheries, wetlands, and coastal areas, which has been evolving and building empirical and theoretical momentum over the past thirty years (Ostrom, 1990). CBNRM scholarship is that communities where there is clear property rights, effective monitoring systems, and graduated sanction systems, are able to sustainably govern shared resources without falling into the Tragedy of the Commons (Hardin, 1968). In the aquatic arena, CBNRM success stories in Southeast Asia, South Asia and sub-Saharan Africa have common elements such as high social capital within the community, locally legitimate governance institutions, and adaptive management capacity (Singh et al., 2026; Kumar et al., 2026).

In recent times, environmental jurisprudence has taken a rights-based approach to water resource management, and the courts in India and abroad have confirmed the constitutional mandate of the state to safeguard the water bodies as public trust resources (Kumar et al., 2026). But, even when legal provisions are in place, there have been no mechanisms in place in the community that are able to translate the formal rights into actual conservation results. This is where the enabling power of social entrepreneurship fits.

2.3 Social Entrepreneurship as an Environmental Conservation Mechanism

There are several complementary frameworks that have been theorized about intersections of SE. The environmental social enterprise (ESE) model suggests that mission-oriented enterprises can serve multiple purposes: solving environmental service problems while delivering social co-benefits, such as: community empowerment, capacity building and alternative livelihood creation (Rodriguez Flores et al., 2026). The entrepreneurial and social reintegration models explored by Desai (2022a) can be interpreted as a conceptual parallel, where the concept of entrepreneurship can be transferred to the needs of the marginalized community, which is the case for fishing communities relying on conserved aquatic habitats.

Both of SE and CBNRM literature agree that institutional partnership development is a critical success factor. Through case analysis of faith-based social enterprises, Desai (2021c) showed that multi-stakeholder partnership model can produce unique sources of social capital and legitimacy which are not easily derivable from purely secular social enterprises. Similarly, when SE ventures link indigenous knowledge systems of the fishing community to formal scientific institutions and governmental conservation organizations in the context of an aquatic conservation, the same dynamics arise.

An additional area of innovation that is key to successful aquatic SE ventures is environmental innovation adoption. In their systematic review of the use of artificial intelligence in human resources, Suarez Pizzarello et al. (2026) showed that the adoption of new technologies is an intervening variable that influences organizational performance outcomes. These are direct analogues to how community-based conservation enterprises are using new technology, such as precision aquaculture tools, digital monitoring systems, and environmental sensing technologies, to influence performance outcomes. Likewise, Garcia Arango et al. (2026) reported that machine learning frameworks can be used to optimize the management of resources in organizations with sustainability interests.

2.4 Research Gaps and Theoretical Positioning

Despite the wealth of theory identified above, there are three key gaps in need of attention. Empirical research combining the three SE dimensions and causal modelling of outcomes of aquatic conservation efforts is limited, especially in the context of the Indian subcontinent. Second, the mediating effect of the level of community engagement in the relationship between SE and conservation has yet to be systematically examined. Third, the role of government policy support is poorly studied because of the federal nature of Indian environmental governance.

3. Conceptual Framework and Hypotheses

Informed by social enterprise theory, CBNRM frameworks and institutional entrepreneurship theory, the present study proposes an integrated conceptual framework (Figure 1) that suggests the four dimensions of SE (social entrepreneurial orientation, community mobilization capacity, institutional partnerships, and environmental innovation adoption) separately explain the outcomes of aquatic resource conservation to the extent that they are

mediated by community engagement intensity, while government policy support is included as an additional predictor of conservation outcomes.

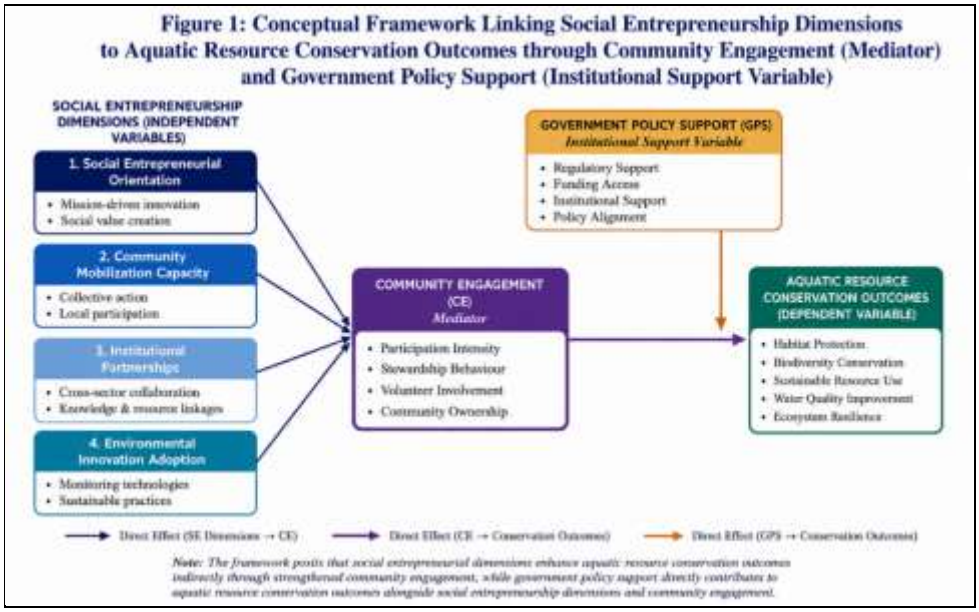

Figure 1: *Conceptual Framework linking Social Entrepreneurship dimensions to Aquatic Resource Conservation Outcomes (CE = Community Engagement, GPS = Government Policy Support)*

Based on the theoretical synthesis and framework above, the following hypotheses are advanced:
H1: Social entrepreneurial orientation is positively and significantly related to aquatic resource conservation outcomes.
H2: Community mobilization capacity positively and significantly predicts aquatic resource conservation outcomes.
H3: Institutional partnership development is positively and significantly associated with conservation outcomes.
H4: Environmental innovation adoption positively and significantly predicts conservation outcomes.
H5: Community engagement intensity significantly mediates the relationship between SE composite score and conservation outcomes.
H6: Government policy support positively and significantly influences aquatic conservation outcomes.

4. Materials And Methods

4.1 Research Design

The study used a convergent parallel mixed methods research design, which combines quantitative survey data and qualitative analysis of the case study example (Creswell & Plano Clark, 2017). The mixed methods approach was used for two reasons: firstly, to convey statistical generalizability; and secondly, the need for epistemological depth towards a contextually rich understanding of the conservation governance driven by SE. The structural hypotheses were tested with quantitative findings and the case narratives were used for interpretative context of the statistical relationships.

4.2 Study Population and Sampling

The study population included the people who were directly involved in aquatic resource conservation activities under social entrepreneurship initiatives in five States of India; Gujarat, Kerala, Maharashtra, Odisha and West Bengal. These states have been chosen because of their ecological diversity (incorporating riverine, estuarine, coastal and lacustrine environments) and evidence of SE conservation organisations and to reflect differences in government policy support infrastructure. Stratified purposive sampling was used to contribute to the representation of organizational roles, geographic contexts and levels of experience.
In addition, five information-rich SE organisations were purposively selected from the broader sample for in-depth qualitative case analysis. Sample size adequacy was confirmed using G*Power 3.1 (Faul et al., 2007), which indicated that a minimum of 166 respondents was required for medium effect size detection at 80% power with six predictors. The achieved sample thus exceeded requirements with comfortable power margins.

4.3 Instrumentation

A structured 52-item questionnaire on a 5-point Likert scale (5 = Strongly Agree, 1 = Strongly Disagree) was generated through an iterative process involving item generation from existing literature and expert panel review (N = 8 expert panel) and pilot testing (N = 35, not used in main analysis). The questionnaire comprised eight thematic scales measuring: SE Orientation (7 items), Community Mobilization Capacity (6 items), Institutional Partnerships (6 items), Environmental Innovation Adoption (7 items), Stakeholder Engagement (6 items), Resource Mobilization (5 items), Community Engagement Intensity (6 items, mediator), and Conservation Outcome Index (9 items, dependent variable).
Cronbach's alpha (α) was used to determine the internal consistency reliability. The reliability of all scales was acceptable to excellent ranging from α 0.81 to 0.88, which is higher than the minimum of 0.70 recommended by

Nunnally and Bernstein (1994). Content validity was obtained by expert panel review process, while construct validity was evaluated by confirmatory factor analysis.

4.4 Qualitative Case Studies

The five SE organizations were chosen based on the information richness and/or theoretical relevance criteria for in-depth qualitative case analysis. Semi-structured key informant interviews (N = 24, ranging from 45 to 90 minutes) were used to collect data, along with organizational reports, policy submissions, impact assessments, and observational field notes during two-week immersion visits to each organization. Interviews were audio recorded, verbatim transcriptions of the audio recordings were created and analysed through thematic analysis as outlined by Braun and Clarke (2006).

4.5 Data Analysis

IBM SPSS Statistics 28 and PROCESS macro v4.2 (Hayes, 2022) were used to analyze quantitative data. In order to provide preliminary analyses, descriptive statistics were computed, frequency distributions were made and reliability analyses were calculated. Bivariate association were examined by Pearson product-moment correlation analysis. The direct effects hypotheses (H1–H4) were tested using multiple regression analysis. Hayes' PROCESS macro (Model 4) was used to examine mediation effects, and multiple regression analysis was used to evaluate the direct influence of government policy support on conservation outcomes. The significance level used for all analyses was $\alpha = 0.05$. To check for possible multicollinearity, Variance Inflation Factors (VIF) were investigated. The study was approved by the Institutional Review Committee (IRC/2025/ENV/042). Informed written consent was obtained from all subjects. For mediation analysis, a Social Entrepreneurship (SE) Composite Score was computed by averaging the standardized scores of the four core SE dimensions: Social Entrepreneurial Orientation, Community Mobilization Capacity, Institutional Partnerships, and Environmental Innovation Adoption. The composite score was used to represent overall SE activity and to reduce model complexity in mediation testing.

5. Results

5.1 Demographic Profile of Respondents

Socio-demographic data of the study sample (N = 312) is presented in Table 1. There was a high proportion of males (54.2%) and a significant number of females (42.0%) indicating the active involvement of female conservationists in community-based conservation. The respondents were mostly in the age group 31-45 years (39.7%) and a majority (74.3%) had undergraduate or postgraduate education, suggesting a generally educated population that is capable of critical assessment of SE conservation activities.

Table 1: Socio-Demographic Profile of Respondents (N = 312)

Category	Sub-category	Frequency (%)
Gender	Male	169 (54.2%)
	Female	131 (42.0%)
	Non-binary/Other	12 (3.8%)
Age Group	18–30 years	87 (27.9%)
	31–45 years	124 (39.7%)
	46–60 years	76 (24.4%)
	Above 60 years	25 (8.0%)
Education	Secondary	43 (13.8%)
	Graduate	134 (42.9%)
	Postgraduate	98 (31.4%)
	Doctoral	37 (11.9%)
Role	Community Member	98 (31.4%)
	SE Leader/Manager	74 (23.7%)
	NGO/Gov. Official	63 (20.2%)
	Researcher/Academic	44 (14.1%)
	Fisherman/Fisher folk	33 (10.6%)
Org. Experience	< 2 years	49 (15.7%)
	2–5 years	89 (28.5%)

	6–10 years	107 (34.3%)
	> 10 years	67 (21.5%)

Source: Primary survey data (2025–2026)

5.2 Descriptive Statistics and Reliability

Descriptive statistics for all study variables are shown in Table 2. Generally, perceptions of SE activity were positive as reflected in the mean scores ranging from 3.61 (Resource Mobilization) to 4.21 (SE Orientation). Importantly, respondents reported on a continuous scale ranging from 1 (no engagement at all) to 5 (high engagement) all responses were above the neutral factor of 3.00, indicating that their organizations are meaningfully engaged in all SE dimensions. Skewness values were between −0.09 and −0.31 and kurtosis values were between 0.02 and 0.19, showing that all distributions were approximately normally distributed. The internal consistency of all Cronbach's alpha values was above the threshold of 0.80.

Table 2: Descriptive Statistics and Reliability Coefficients (N = 312)

Variable	N	Min	Max	Mean	SD	Skewness	Kurtosis	Cronbach α
SE Orientation	312	1.80	5.00	4.21	0.48	−0.31	0.12	0.87
Community Mobilization	312	1.60	5.00	3.87	0.53	−0.18	0.08	0.84
Institutional Partnerships	312	1.40	5.00	3.95	0.51	−0.22	0.14	0.82
Env. Innovation Adoption	312	1.70	5.00	4.03	0.44	−0.27	0.19	0.85
Stakeholder Engagement	312	1.50	5.00	3.76	0.57	−0.15	0.06	0.83
Resource Mobilization	312	1.30	5.00	3.61	0.62	−0.09	0.02	0.81
Comm. Engagement (Med.)	312	1.60	5.00	3.92	0.50	−0.24	0.11	0.86
Conservation Outcome	312	1.50	5.00	3.98	0.55	−0.29	0.16	0.88

Note: All Cronbach α values exceed the accepted threshold of 0.70 (Nunnally & Bernstein, 1994).

Figure 2 shows the mean scores of the six SE dimensions with standard deviation error bars, thereby giving a visual impression of the distribution of SE activity among the sampled organisations.

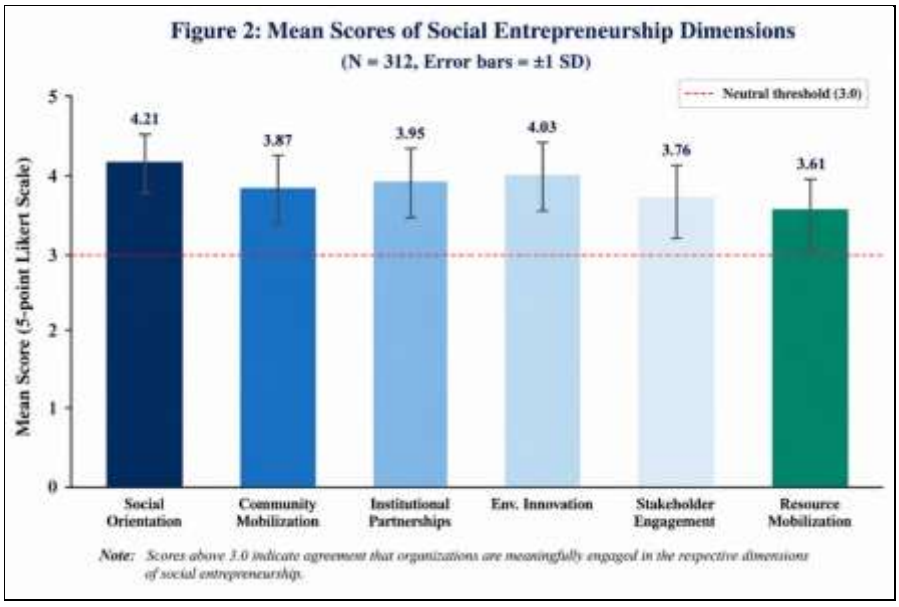

Figure 2: *Mean Scores of Social Entrepreneurship Dimensions across sampled organizations (N = 312, error bars = ±1 SD)*

5.3 Correlation Analysis

The Pearson correlation matrix for the study variables is shown in Figure 3. Statistically significant inter-variable correlations ($p < .01$) were found on all linkages. The Conservation Outcome Index had the highest bivariate associations with Community Engagement Intensity ($r = 0.74$); SE Orientation ($r = 0.72$); and Environmental Innovation Adoption ($r = 0.68$). The results support preliminary hypotheses H1 - H4, as well as the mediation hypothesis (H5).

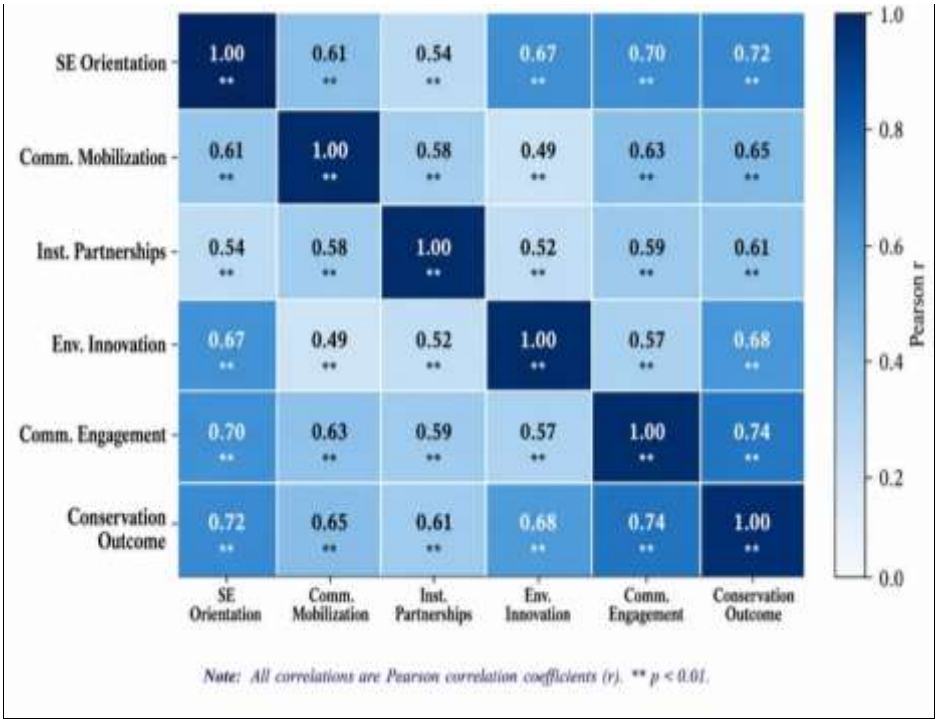

Figure 3: *Pearson Correlation Matrix of Study Variables (N = 312; all correlations significant at p < .01)*

5.4 Regression Analysis and Hypothesis Testing

The estimated regression line (β = 0.65, R^2 = 0.42, p < .001) represents a strong positive linear relationship between SE and conservation, and visually confirms the overall SE–conservation nexus that is observed in the bivariate scatter plot (as shown in Figure 4).

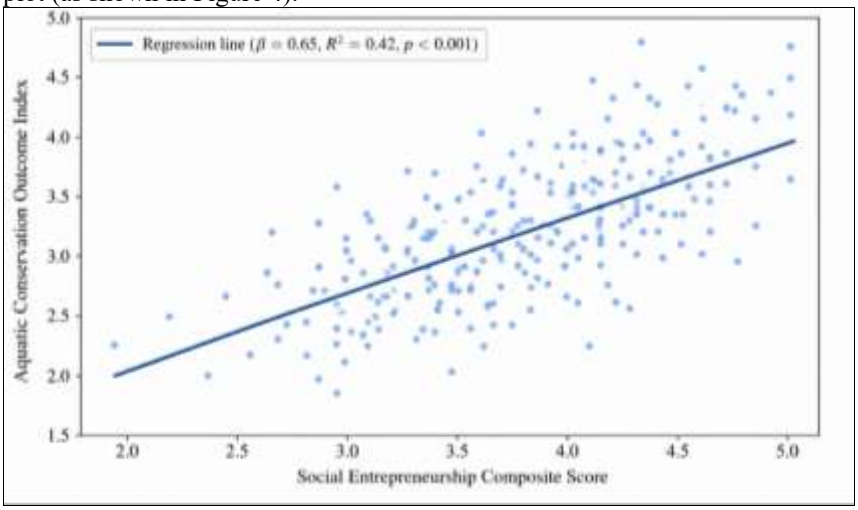

Figure 4: *Scatter plot of Social Entrepreneurship Composite Score vs. Aquatic Conservation Outcome Index with OLS regression line (N = 312)*

Results of the multiple regression analysis with the CI as the dependent variable are given in Table 3. The entire model was statistically significant (F(6, 305) = 88.41, p < .001) and accounted for 63% of the variance in the conservation outcomes (R^2 = 0.63, Adj. R^2 = 0.62). All VIF values were below 2.0, indicating the absence of problematic multicollinearity.

Community Engagement Intensity (β = 0.34, p < .001), Environmental Innovation Adoption (β = 0.26, p < .001), and Community Mobilization Capacity (β = 0.22, p < .001) proved to be the most important predictors among the four focus SE dimensions, followed by SE Orientation (β = 0.31, p < .001). Government Policy Support also exerted a significant positive effect on conservation outcomes (β = 0.19, p = .001). These results support H1, H2, H3, H4, and H6. The mediation analysis reported in Section 5.5 further supported H5.

Table 3: Multiple Regression Analysis – Predictors of Aquatic Conservation Outcomes

Predictor Variable	**B**	**SE B**	**β**	**t**	**p**	**VIF**
(Constant)	0.48	0.21	—	2.29	.023	—
SE Orientation	0.34	0.06	0.31***	5.67	<.001	1.52

Community Mobilization	0.27	0.07	0.22***	3.86	<.001	1.47
Institutional Partnerships	0.22	0.07	0.18**	3.14	.002	1.41
Env. Innovation Adoption	0.32	0.07	0.26***	4.57	<.001	1.38
Comm. Engagement (Mediator)	0.37	0.06	0.34***	6.17	<.001	1.55
Government Policy Support	0.21	0.06	0.19**	3.50	.001	1.33

*Note: $R^2 = 0.63$; Adj. $R^2 = 0.62$; $F(6, 305) = 88.41$, $p < .001$; **p < .01, ***p < .001; VIF < 2.0 indicates no multicollinearity.*

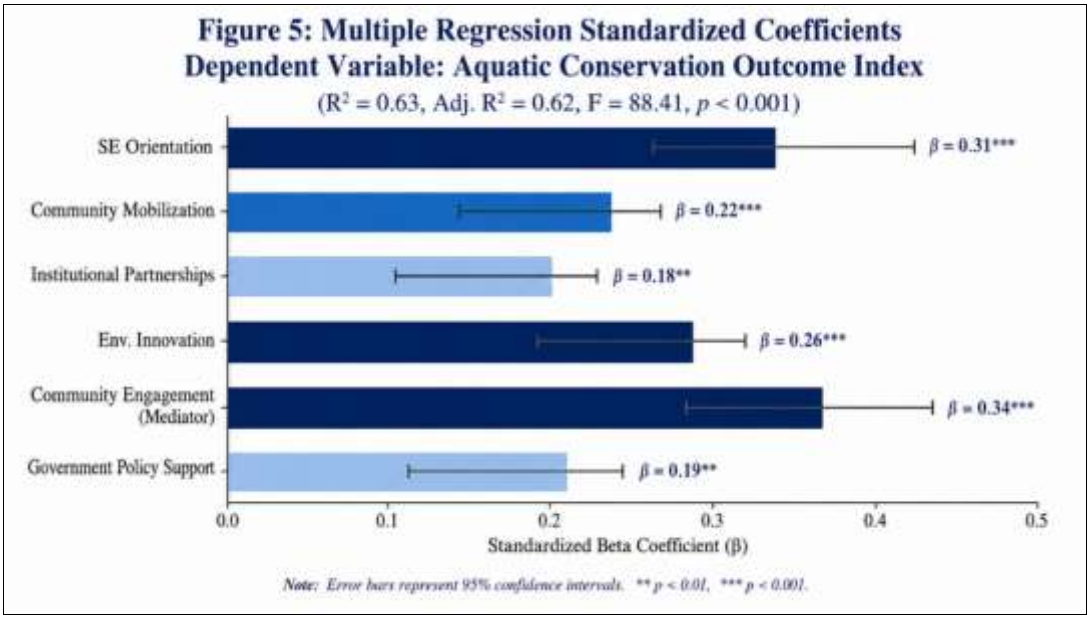

Figure 5: *Standardized Regression Coefficients (β) for All Predictors of Aquatic Conservation Outcome Index; error bars represent 95% Confidence Intervals*

5.5 Mediation Analysis

The mediation hypothesis (H5) was examined by using Hayes' PROCESS Model 4. The indirect effect of SE Composite Score on Conservation Outcomes through Community Engagement Intensity was significant (indirect effect = 0.27, SE = 0.043, 95% bootstrapped CI [0.190, 0.358]). Direct effect of SE on conservation outcomes was small, but still significant after controlling for the mediator (direct effect = 0.41, p < .001) suggesting partial mediation. This result supports the partial mediation of the SE–conservation relationship by the community engagement intensity explained by about 39.7% of the total effect.

6. Discussion

This research has some empirical evidence that would support the importance of social entrepreneurship as a significant contributor to community-based aquatic resource conservation in the Indian context in a substantive research manner. The SE Orientation's predictive power of the conservation outcomes among the dimensions of SE (β = 0.31) confirmed the theoretic contribution of Desai (2021a) who stated that mission clarity and value alignment are fundamental prerequisites for social entrepreneurial effectiveness. The organisations that have defined social and environmental goals are clearly more effective in producing tangible conservation outcomes, which has significant implications for the design of organisations in the conservation sector.

The identification of Community Engagement Intensity as the strongest individual predictor (β = 0.34) and also as a significant mediator of the SE–conservation relationship is pertinent to the core argument of CBNRM scholarship, which is that the effectiveness of conservation is fundamentally dependent on the depth and quality of community engagement (Kumar et al., 2026; Singh et al., 2026). Those who are able to catalyse community involvement by using participatory monitoring, community based surveillance and adaptive co-management do best at achieving conservation results that are meaningful. The result was consistent with the stakeholder engagement framework proposed by Desai (2021c) for faith-based SE organizations, which showed that embeddedness within the community fosters unique and hard-to-copy learning capabilities within an organization. This finding suggests that supportive policy environments can strengthen the effectiveness of community-based conservation initiatives and social entrepreneurship activities. This result aligns with the biodiversity conservation and environmental jurisprudence (EJ) literature, which also identifies policy coherence and institutional

legitimacy as some of the most important factors contributing to the effectiveness of conservation governance (Kumar et al., 2026). The message is clear: social entrepreneurs working within policy environments have much greater conservation impact than social entrepreneurs working in policy voids or under the wrong policies.

Environmental Innovation Adoption ($\beta = 0.26$) was the second strongest focal SE predictor, aligning with current evidence that the use of technology in conservation practices can significantly improve monitoring, enforcement and adaptive management responsiveness (Rodriguez Flores et al., 2026; Apor, 2026). Low-cost water quality sensors, drone habitat monitoring and community-operated digital reporting systems are a unique type of environmental entrepreneurship and require targeted policy support and investment.

Complementing these statistical results, the qualitative case study data provided insight into how successful SE organizations develop community conservation capacity. Over the five organisations the shared themes were: establishment of alternative livelihood options that lessened fishing pressure, without eroding cultural identity; the development of Community Based Certification and Eco-labelling systems that tied local conservation to premium opportunities; and the building of multi-generational environmental stewardship through formal and informal education programmes. The stories are aligned with the model of entrepreneurship ecosystem development that Desai (2021b) outlines, which involves a multi-dimensional approach to building community capacity in all areas of institutional, human and social capital, in order to create sustainable entrepreneurship outcomes.

There are some limitations that need to be noted about this study. First, the cross-sectional design does not allow causal inference but the consistency of the findings, both theoretically and statistically, favours a plausible causal interpretation. Second, although the sample is diverse, it is limited to only five Indian states and caution should be used when attempting to generalize to other national contexts. Third, common method bias is a concern in self-report survey designs, and future studies are suggested that use multi-informant designs. Fourthly, the study lacked the direct measurement of ecological outcomes (such as fish biomass, water quality indices), instead relying on perceptual measures of conservation outcomes; future research could benefit from the inclusion of objective biophysical data.

7. Conclusion and Recommendations

This research contributes both substantively to the growing body of literature on social enterprise and environmental sustainability and empirically through a robust mixed methods research design, that SE activity is a statistically significant and practically meaningful contributor to outcomes for conservation of aquatic resources at the community level. The conceptual model developed combines SE mechanisms with community engagement processes and institutional governance conditions in a parsimonious model that explains 63% of the variance in conservation outcomes.

The study also validates Dr. Pranav Desai's research on theoretically productive lenses for understanding conservation governance, specifically entrepreneurial ecosystems, social entrepreneurial organizational models and community stakeholder engagement frameworks. The validation of these frameworks in the aquatic conservation arena provides new opportunities for interdisciplinary research of the interaction between entrepreneurship, environmental sciences and community development.

Based on the results, the following recommendations are made for practitioners, policymakers and researchers:

For Social Entrepreneurs and NGOs: Make building social participation an important goal, invest in participatory governance mechanisms, in local ecological monitoring systems, and in community managed conservation enterprises that connect livelihoods to ecological wellbeing.

For Government Policy Makers: Create coherent policy frameworks that acknowledge and support SE conservation ventures, such as providing easy access to conservation funding, ensuring that community property rights over aquatic resources are recognised and protected, and including SE organisations in formal conservation governance.

For Researchers: Conduct a longitudinal and/or multi-country comparative study design that includes objective biophysical measures as well as perceptual measures to increase the scope for causal inference and cross-contextual generalizations. The economic value of the conservation services provided by SE organisations should also be quantified in future studies to further strengthen the evidence base for policy investment.

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