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Impact of Siargao Environmental Awareness Movement on Building a Sustainable Future in Siargao Island

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Abstract

This study examined the impact of the Siargao Environmental Awareness (S.E.A.) Movement Project on sustainable development in Siargao Island, focusing on residents' environmental awareness, participation, perceived sustainability outcomes, and relationships between awareness and participation. A quantitative descriptive-correlational design was employed involving 200 purposively selected residents of Siargao Island, Surigao del Norte, Philippines. Data were collected using a structured questionnaire and analyzed through descriptive statistics and Spearman's rank-order correlation. Results revealed high awareness of environmental protection programs (M = 3.41), marine and coastal conservation actions (M = 3.40), and waste management initiatives (M = 3.35), alongside high community participation (M = 3.30). Environmental sustainability received the highest perceived impact rating (M = 3.44), followed by social and community development (M = 3.37) and economic sustainability (M = 3.33). Significant positive relationships were identified between participation and environmental protection awareness ($\rho = 0.509$), waste management awareness ($\rho = 0.580$), and marine conservation awareness ($\rho = 0.600$), all at $p < 0.001$. The findings indicate that greater environmental awareness is associated with stronger community participation and favorable perceptions of sustainability contributions. Strengthening waste management education, inclusive participation, and sustainable livelihood initiatives is recommended. Purposive sampling and self-reported responses limit generalizability and causal interpretation. The study provides evidence supporting community-based conservation strategies aligned with SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 14 (Life Below Water), contributing to locally informed sustainability planning.

Keywords: Community Participation; Environmental Awareness; Environmental Sustainability; Marine Conservation; Siargao Island; Sustainable Development; Waste Management

1. Introduction

Sustainable development is a priority for coastal and island communities, where natural resources support tourism, livelihoods, and community well-being. The foundational definition emphasizes meeting present needs without compromising the ability of future generations to meet theirs (World Commission on Environment and Development, 1987). Recent international assessments also emphasize the environmental and economic

consequences of inadequate waste management and the need for coordinated local action (United Nations Environment Programme [UNEP], 2024). These issues are relevant to Siargao Island, where tourism growth and resource use make environmental awareness and community participation important.

Siargao Island, located in Surigao del Norte, Philippines, is recognized for its marine biodiversity, coastal ecosystems, and growing tourism industry. However, increasing tourist arrivals and development have contributed to environmental pressures that threaten its natural attractions and the livelihoods dependent on them. In response, the Siargao Environmental Awareness (S.E.A.) Movement emerged as a community-driven initiative promoting environmental protection through beach clean-ups, waste management, environmental education, marine conservation, and youth engagement. Initially developed through small volunteer activities involving children and local residents, the movement expanded into broader community efforts to address environmental concerns. Its initiatives emphasize collective responsibility and encourage residents, tourists, and local stakeholders to participate in protecting the island's natural resources. Research on Siargao tourism after Super Typhoon Rai also demonstrates the importance of considering local destination resilience and visitor responses in sustainability planning (Cahigas et al., 2023).

Environmental awareness, community participation, and sustainable resource management are interconnected considerations in conservation planning. Research on household waste management has documented differences between environmental knowledge and practical waste management behavior (Castilla et al., 2024). Studies of coastal community waste management likewise emphasize the relevance of community awareness and local implementation conditions (Versoza et al., 2024). These findings suggest that community initiatives require both informed residents and workable opportunities for participation. Recent research on public awareness in Pol-e-Khumri also illustrates the importance of examining environmental knowledge within specific community settings (Qaderi et al., 2021).

Waste management and marine conservation are particularly important in island destinations experiencing tourism-related environmental pressures. A recent global assessment highlights the environmental costs of unmanaged waste and the need to reduce pollution through coordinated systems and community action (UNEP, 2024). Philippine evidence also documents challenges in implementing solid waste management requirements at the barangay level (Yazawa et al., 2025). Household studies also describe waste segregation challenges (Fadhullah et al., 2022). These perspectives support examining how a locally organized environmental movement may contribute to conservation awareness and participation in Siargao Island. A study of household recycling and segregation practices further demonstrates the relevance of awareness to everyday waste decisions (Elmosaad et al., 2023). A systematic review of interventions also identifies household segregation as an important target for community-level programs (Trushna et al., 2024).

Environmental education and community engagement are relevant to sustaining conservation efforts. A study of households in Butuan City examined knowledge, attitudes, and practices in solid waste management (Cando et al., 2022), while research in a Philippine coastal community examined residents' waste management awareness and practices (Versoza et al., 2024). Together, these studies provide a basis for considering how environmental information and community circumstances relate to local action. They do not, however, establish the effectiveness of the S.E.A. Movement Project itself. Philippine school-based studies likewise examine solid waste management awareness and practices among students, underscoring the value of environmental learning (Molina & Catan, 2021; Nabor & Ortega-Dela Cruz, 2022).

The study is informed by the sustainable development framework and the Theory of Planned Behavior. Sustainable development emphasizes the joint consideration of environmental protection, economic development, and social well-being (World Commission on Environment and Development, 1987). The Theory of Planned Behavior explains how attitudes, subjective norms, and perceived behavioral control relate to intentions and behavior (Ajzen, 1991). Recent applications of planned-behavior frameworks have also examined environmental intentions and waste separation (Ilagan et al., 2024; Pan & Liu, 2024). Community participation is treated as an important practical dimension of local resource management. These perspectives guide the examination of awareness, participation, and perceived sustainability outcomes; the study's correlational design does not establish causal impacts. Research on home composting intentions integrates planned behavior with personal norms and composting knowledge, providing a recent application of behavior-focused sustainability models (Kopaei et al., 2021).

Despite extensive research on environmental awareness, sustainable tourism, waste management, and coastal conservation, limited studies have specifically examined the localized contributions of community-based environmental organizations in Philippine island communities. Existing literature has largely addressed these environmental concerns separately, providing limited understanding of how the activities of the S.E.A. Movement Project relate to residents' awareness, participation, and perceived sustainability outcomes in Siargao Island. This gap highlights the need for a localized assessment of the movement's initiatives and their perceived contributions

to sustainable development. Accordingly, this study aimed to determine residents' awareness of the S.E.A. Movement Project, assess their participation in its activities, examine its perceived impact on environmental sustainability, economic sustainability, and social and community development, and determine the significant relationship between environmental awareness and community participation.

The study aligns with several United Nations Sustainable Development Goals, particularly SDG 4 (Quality Education), through environmental awareness and education; SDG 8 (Decent Work and Economic Growth), through the promotion of sustainable tourism and livelihood opportunities; SDG 11 (Sustainable Cities and Communities), through community-based environmental initiatives; SDG 12 (Responsible Consumption and Production), through waste reduction and responsible resource management; SDG 13 (Climate Action), through environmental responsibility and conservation awareness; SDG 14 (Life Below Water), through marine and coastal ecosystem protection; and SDG 17 (Partnerships for the Goals), through cooperation among residents, environmental organizations, local government units, and tourism stakeholders. These connections reflect the importance of integrating environmental protection with community development and responsible economic activities.

From a multidisciplinary sustainability perspective, the study contributes to understanding the relationship between environmental education, community participation, coastal resource management, sustainable tourism, and local development. Its findings may provide useful insights for environmental organizations, local government units, educational institutions, tourism businesses, and community stakeholders in strengthening environmental programs and encouraging responsible resource management. By examining residents' awareness, participation, and perceptions of the S.E.A. Movement Project, the research seeks to support evidence-based recommendations for environmental conservation, community engagement, and the long-term sustainability of Siargao Island.

2. Material and methods

2.1 Research Design

The study utilized a quantitative descriptive-correlational research design to assess residents' awareness, participation, and perceived impact of the S.E.A. Movement Project on sustainability in Siargao Island. Quantitative research enables the systematic collection and analysis of numerical data to examine research variables objectively. The descriptive component examined respondents' demographic characteristics, environmental awareness, participation, and perceived sustainability outcomes, while the correlational component determined the relationship between awareness and participation in the movement's environmental initiatives.

2.2 Locale of the Study

The study was conducted on Siargao Island, Surigao del Norte, Philippines, a prominent tourism destination recognized for its beaches, coral reefs, marine biodiversity, and coastal resources. The island's economy is supported by tourism, fisheries, and local entrepreneurship, making environmental conservation essential to sustainable development. Siargao was selected because of the environmental initiatives implemented by the S.E.A. Movement Project, including coastal clean-ups, waste management, marine conservation, and environmental education. These activities provided a relevant setting for examining community awareness, participation, and perceived sustainability outcomes.

2.3 Respondents of the Study

The respondents consisted of 200 selected residents of Siargao Island who were knowledgeable about, exposed to, or involved in the S.E.A. Movement Project. They included community members, young individuals, local workers, and residents familiar with environmental protection, waste management, marine conservation, and community engagement activities. Their demographic characteristics were examined in terms of age, sex, civil status, educational attainment, and occupation. Their experiences and perceptions provided the primary data for assessing the project's contribution to environmental, economic, and social sustainability.

2.4 Sample and Sampling Procedure

The study employed purposive sampling, a non-probability sampling technique, to select 200 respondents based on their familiarity with the S.E.A. Movement Project. Eligible participants were residents of Siargao Island aged 18 years or older who had knowledge of, exposure to, or experience with the movement's environmental initiatives. These included waste management, environmental protection, marine and coastal conservation, and community activities. Participation was voluntary, and respondents were selected based on their ability to provide information relevant to the study's objectives.

2.5 Research Instrument

A structured survey questionnaire served as the primary data collection instrument. It consisted of three parts. The first gathered demographic information, including age, sex, civil status, educational attainment, and occupation.

The second assessed respondents' awareness of the S.E.A. Movement Project, particularly its environmental protection programs, waste management initiatives, marine and coastal conservation activities, and community and youth engagement. The third measured respondents' participation in project activities and their perceptions of its impact on environmental sustainability, economic sustainability, and social and community development. A four-point Likert scale was used to quantify respondents' answers, ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). Mean scores were interpreted using the following intervals: 3.25–4.00 indicated highly aware, 2.50–3.24 indicated aware, 1.75–2.49 indicated slightly aware, and 1.00–1.74 indicated not aware. This measurement approach enabled the researchers to summarize and compare respondents' levels of awareness, participation, and perceived sustainability outcomes.

2.6 Data Gathering Procedure

Data collection began with securing permission from local authorities, barangay officials, and community leaders in Siargao Island. Following approval, the researchers administered structured questionnaires to respondents selected through purposive sampling. The study's purpose and instructions were explained to ensure that participants understood the questionnaire and could provide appropriate responses. Completed questionnaires were collected and reviewed for completeness and consistency, particularly the Likert-scale responses. The data were subsequently coded, organized, and prepared using Excel or statistical software such as SPSS for quantitative analysis.

2.7 Data Analysis Techniques

The collected data were analyzed using frequency counts, percentage distribution, mean, standard deviation, and Spearman's rank-order correlation. Frequency counts and percentages described respondents' demographic characteristics, including age, sex, civil status, educational attainment, and occupation. Mean scores determined the respondents' levels of awareness, participation, and perceived impact of the S.E.A. Movement Project, while standard deviations measured the variability of their responses. Spearman's rank-order correlation examined the relationship between respondents' awareness of environmental protection programs, waste management initiatives, and marine and coastal conservation activities and their participation in the movement. The analysis provided quantitative evidence for evaluating the relationships among the study variables.

2.8 Ethical Considerations

The study observed ethical principles to protect the rights, dignity, privacy, and welfare of respondents. Participants were informed about the research objectives, procedures, and voluntary nature of their involvement. Informed consent was obtained, and respondents were assured that they could withdraw without negative consequences. Confidentiality and anonymity were maintained through appropriate handling, coding, and secure storage of responses. The researchers avoided coercion and undue incentives and maintained accuracy, honesty, and integrity throughout data collection and analysis. These measures ensured that participation remained voluntary and that respondents' information was protected.

3. Results and Discussion

3.1 Demographic Profile of the Respondents

3.1.1 Age

The respondents were predominantly young adults, with the largest proportion aged 24–26 years (28.0%), followed by those aged 21–23 years (25.0%), 30 years and above (21.5%), 27–29 years (14.0%), and 18–20 years (11.5%). Overall, respondents aged 18–26 accounted for 64.5% of the sample, indicating substantial representation of younger residents. The findings highlight the importance of young adults in community-based environmental initiatives. The results underscore the importance of making environmental programs accessible to different age groups.

3.1.2 Sex

Of the 200 respondents, 148 (74.0%) were male and 52 (26.0%) were female, indicating a predominantly male respondent population. This distribution highlights the greater representation of men in the study and the need to consider gender inclusivity when interpreting community participation. The sex distribution should be considered when interpreting the representativeness of reported participation.

3.1.3 Civil Status

Most respondents were single, comprising 153 individuals (76.5%), while 47 (23.5%) were married. This distribution corresponded with the predominantly young adult composition of the sample. The findings suggest that civil status is an important demographic consideration in community-based initiatives. This distribution should be considered when planning activities for different household circumstances.

3.1.4 Educational Attainment

More than half of the respondents were high school graduates (54.0%), followed by college graduates (18.0%), college-level respondents (14.5%), elementary graduates (5.0%), high school-level respondents (4.5%), elementary-level respondents (2.5%), those with postgraduate studies (1.0%), and graduate studies (0.5%). The findings indicate that secondary education was the most common educational background. The educational distribution emphasizes the importance of accessible environmental information and community education programs. Research on Philippine coastal communities indicates that waste management awareness and practice can vary across local contexts (Versoza et al., 2024).

3.1.5 Occupation

Most respondents belonged to the unspecified "Others" occupational category (73.5%). Among the identified occupations, business owners represented 8.5%, fishermen 6.5%, carpenters 4.0%, tour guides 3.5%, teachers 2.0%, and farmers and government officials 1.0% each. The findings indicate occupational diversity, although most respondents were not classified under the specified categories. The participation of residents from different occupational backgrounds highlights the relevance of environmental initiatives to community livelihoods. The broad occupational category limits conclusions about how specific livelihoods relate to environmental participation.

3.2 Environmental Awareness and Community Participation

3.2.1 Level of Awareness of S.E.A. Movement Initiatives

The respondents demonstrated high awareness of the S.E.A. Movement Project across three environmental dimensions. Environmental Protection Programs recorded the highest mean ($M = 3.41$, $SD = 0.424$), followed by Marine and Coastal Conservation Actions ($M = 3.40$, $SD = 0.407$) and Waste Management Initiatives ($M = 3.35$, $SD = 0.476$). These results indicate consistently high awareness, with waste management receiving the lowest mean among the evaluated initiatives. The findings demonstrate that respondents were generally familiar with the movement's environmental programs, although waste management awareness remained comparatively lower. Studies of household waste management in the Philippines likewise show the value of examining awareness and implementation together (Cando et al., 2022; Versoza et al., 2024). Research examining community perceptions of waste disposal in Occidental Mindoro provides a related Philippine context for understanding environmental attitudes and disposal behavior (Jou et al., 2024).

3.2.2 Level of Participation in S.E.A. Movement Activities

A recent review of citizens' waste-reduction, separation, and recycling attitudes further highlights the need to consider public participation when designing environmental programs (Konstantinidou et al., 2024).

The respondents reported a high level of participation in S.E.A. Movement activities, with an overall mean of 3.30 and a standard deviation of 0.384. Although participation was relatively high, its mean was slightly lower than the awareness scores across the three environmental dimensions. The findings indicate that respondents' familiarity with environmental programs was accompanied by active community involvement, although awareness levels were slightly higher than participation. Evidence on waste management in coastal communities suggests that opportunities and local implementation conditions matter alongside awareness (Versoza et al., 2024; Yazawa et al., 2025).

3.3 Perceived Impact of the S.E.A. Movement Project on Sustainability

3.3.1 Environmental, Social, and Economic Sustainability

Respondents perceived the S.E.A. Movement Project positively across three sustainability dimensions. Environmental Sustainability received the highest mean ($M = 3.44$, $SD = 0.449$), followed by Social and Community Development ($M = 3.37$, $SD = 0.448$) and Economic Sustainability ($M = 3.33$, $SD = 0.461$). These findings indicate that environmental sustainability was the most strongly perceived contribution, while economic sustainability received the lowest rating. The results suggest that respondents recognized the movement's environmental contributions more strongly than its social and economic benefits. The global waste management outlook emphasizes the importance of linking environmental action with social and economic sustainability (UNEP, 2024). A 2025 overview of 5Rs strategies in an urban community provides a complementary perspective on practical waste reduction and resource management (Shaibur et al., 2025).

3.4 Relationship Between Environmental Awareness and Community Participation

3.4.1 Correlation Between Participation and Environmental Awareness Dimensions

Spearman's rank-order correlation revealed statistically significant positive relationships between participation and all three environmental awareness dimensions among the 200 respondents. Participation was positively correlated with Environmental Protection Programs ($\rho = 0.509$, $p < 0.001$), Waste Management Initiatives ($\rho = 0.580$, $p < 0.001$), and Marine and Coastal Conservation Actions ($\rho = 0.600$, $p < 0.001$). Marine and Coastal Conservation Actions demonstrated the strongest relationship with participation. All relationships were statistically significant at the 0.05 level. These findings indicate that respondents with greater awareness of environmental initiatives also tended to demonstrate higher participation in S.E.A. Movement activities. These

correlations describe associations within this sample; they do not show that awareness caused participation. Recent community waste management research provides related context for the importance of local knowledge and practical engagement (Castilla et al., 2024; Versoza et al., 2024).

3.4.2 Relationships Among Environmental Awareness Dimensions

Significant positive correlations were also observed among the three environmental awareness dimensions. Environmental Protection Programs and Waste Management Initiatives demonstrated the strongest relationship ($\rho = 0.607$, $p < 0.001$), followed by Environmental Protection Programs and Marine and Coastal Conservation Actions ($\rho = 0.537$, $p < 0.001$). Waste Management Initiatives and Marine and Coastal Conservation Actions were also positively correlated ($\rho = 0.499$, $p < 0.001$). All relationships were statistically significant, indicating that respondents with greater awareness in one environmental area generally demonstrated greater awareness in the others. These relationships highlight the interconnected nature of environmental awareness across conservation and waste management initiatives. The findings support an integrated approach to environmental education, where awareness of marine conservation, waste management, and environmental protection can be strengthened collectively. The positive associations also reinforce the relevance of comprehensive environmental awareness programs in encouraging informed and sustained community participation.

4. Conclusion & Recommendations

The study concludes that the Siargao Environmental Awareness (S.E.A.) Movement Project has a positive perceived contribution to sustainable development in Siargao Island, particularly in environmental protection, community engagement, and conservation awareness. The 200 respondents demonstrated generally high levels of awareness and participation in environmental protection programs, waste management initiatives, and marine and coastal conservation activities. Environmental sustainability received the highest perceived impact, followed by social and community development and economic sustainability, indicating that respondents recognized the movement's environmental contributions more strongly than its socioeconomic benefits. Significant positive relationships between environmental awareness and participation suggest that residents with greater awareness of the movement's initiatives also tended to participate more actively. Marine and coastal conservation awareness showed the strongest association with participation, highlighting its relevance to community engagement. Overall, the findings demonstrate the importance of community-based environmental initiatives in supporting sustainability efforts, although the observed relationships do not establish causation.

The study recommends that the S.E.A. Movement Project strengthen its waste management programs through targeted awareness campaigns, waste segregation activities, recycling initiatives, composting demonstrations, and efforts to reduce single-use plastics. Environmental organizations and local government units should maintain coastal clean-up activities, marine conservation programs, and community-based environmental education to sustain awareness and participation. Greater emphasis should be placed on strengthening the project's economic sustainability component by exploring environmentally responsible livelihood activities, ecotourism opportunities, and waste-to-resource initiatives that complement existing conservation efforts. Schools, tourism establishments, and community organizations should collaborate in developing accessible environmental education activities and encouraging broader participation among women, families, and different occupational groups. Youth engagement should remain a priority because younger residents constituted a substantial proportion of respondents. Regular assessment of community awareness, participation, and perceived sustainability outcomes is also recommended to identify areas requiring improvement and support more responsive environmental programs.

The study was limited to 200 purposively selected residents of Siargao Island who had knowledge of, exposure to, or experience with the S.E.A. Movement Project. Because purposive sampling is a non-probability approach, the findings may not represent the perceptions of all island residents. The descriptive-correlational design also limits the interpretation of significant relationships to associations rather than causal effects. Furthermore, the study relied on self-reported questionnaire responses concerning awareness, participation, and perceived sustainability outcomes rather than direct measurements of environmental or economic changes. Future studies may include broader and more representative samples, additional communities, and complementary qualitative or longitudinal approaches to provide a more comprehensive assessment of the movement's sustainability contributions.

5. Compliance with ethical standards

The authors affirm that no conflicts of interest exist in relation to this study. The research involved 200 residents of Siargao Island, Surigao del Norte, Philippines, who participated voluntarily in a non-invasive questionnaire survey, with informed consent obtained and the right to withdraw without consequence. Permission was secured from local authorities, barangay officials, and community leaders before data collection. Respondents' privacy,

anonymity, and confidentiality were protected through the coding and secure storage of their responses, and participation was free from coercion or undue incentives.

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