

Evaluating the Impact of Community-Based Environmental Education on Civic Engagement and Sustainable Action in Barangay Luksuhin Ibaba, Alfonso, Cavite

¹Krystel Joy Matilde L. Noble, ¹Ermelyn L. Ligas, ¹Ardasmil H. Aripuddin, ¹Elvie Socorro B. Quiñon, ¹Jay Marie M. Daga, ¹Marvin M. Daga, ¹Samaratul Kalbi M. Basman-Tagoranao, ¹Shammah Mae Jovero Manipon, ¹Dennis E. Baggas, ¹Ernel D. Gonzaga
¹Philippine Christian University, Philippines

Received 9th August 2025; Accepted 2nd September 2025; Published Online 17th October 2025

DOI: 10.63941/DIT.ADSimrj.2025.1.4.86

ABSTRACT

This study explores the impact of community-based environmental education (CBEE) on civic engagement and sustainable action in Barangay Luksuhin Ibaba, Alfonso, Cavite, focusing on its effectiveness in promoting environmental awareness and behavior change. CBEE plays a vital role in addressing local environmental challenges, such as improper waste disposal, by fostering community involvement through participatory learning, collaboration with local institutions, and empowerment. The study used a descriptive-correlational design to assess how CBEE components influence sustainable behaviors and community engagement. Findings indicate strong positive correlations between CBEE strategies (participatory learning, accessibility, collaboration, and empowerment) and increased civic engagement, sustainable action, and social mobilization. Regression analysis revealed that civic engagement, sustainable action, and social mobilization significantly influenced outcomes in environmental education programs. Recommendations for strengthening CBEE include prioritizing inclusive and participatory learning approaches, enhancing local collaborations, fostering ownership of sustainability initiatives, and ensuring access for underrepresented groups. Continuous evaluation and adaptation of programs are crucial for achieving long-term environmental stewardship and fostering collective responsibility. This study contributes to the understanding of CBEE's role in sustainability efforts and highlights the importance of local community involvement in driving environmental change.

Keywords: *Community-Based Environmental Education, Civic Engagement, Sustainable Action, Social Mobilization, Participatory Learning*

INTRODUCTION

Community-based environmental education (CBEE) played a crucial role in promoting sustainable practices and civic engagement in local communities. It fostered awareness, participation, and shared responsibility among individuals, leading to long-term environmental conservation efforts. In Barangay Luksuhin Ibaba, Alfonso, Cavite, environmental issues such as improper waste disposal persisted, making CBEE an essential tool in encouraging proactive responses from residents (Garcia & Cruz, 2023). By enhancing knowledge and skills through participatory learning approaches and institutional collaboration, CBEE ensured that sustainable action was embedded within community culture (Lopez & Ramos, 2022).

Globally recognized, CBEE served as a significant driver of ecological sustainability and social engagement. Various studies highlighted that well-structured CBEE programs increased public participation in conservation efforts and policy advocacy (Nguyen & Patel, 2023). In developing countries, environmental education proved successful in reducing ecological degradation by empowering individuals with the knowledge and resources to take action (Martinez & Torres, 2021). However, disparities in access and implementation remained a challenge, especially in marginalized

communities. Additionally, the persistence of waste disposal challenges limited the success of environmental initiatives, as communities struggled with proper waste management despite increased awareness.

Although CBEE's role in fostering civic engagement was increasingly recognized, gaps remained in understanding its long-term impact on sustainable action. Few studies quantitatively measured how CBEE influenced individual behavior change and community-wide environmental initiatives (Fernandez & Lee, 2022). Moreover, the effectiveness of participatory learning approaches in different socio-economic settings had not been fully explored. These gaps underscored the need for localized studies to assess how CBEE interventions could drive environmental responsibility within specific communities. Understanding how CBEE could address solid waste management issues was particularly crucial, as ineffective waste segregation and disposal systems continued to hinder environmental conservation efforts. Without an efficient waste collection and disposal strategy, even well-intentioned CBEE programs were unlikely to achieve their full impact.

LITERATURE REVIEW

CBEE has been shown to play a significant role in promoting community participation and environmental conservation by equipping individuals with knowledge and skills. Research suggests that when local communities are involved in environmental education programs, they develop a stronger sense of responsibility for protecting their environment, resulting in increased civic engagement in sustainability efforts (Doherty & Webler, 2022). Participatory learning approaches, such as hands-on learning, have been linked to long-term behavior change and greater involvement in advocacy, policy discussions, and grassroots initiatives (Lee et al., 2023). Furthermore, accessibility and inclusiveness are crucial for fostering civic participation. Studies show that inclusive programs that involve marginalized groups create opportunities for equitable involvement in sustainability efforts, thus enhancing collective environmental stewardship (Brown & Cushing, 2023).

Sustainable action is another significant outcome of CBEE programs, as environmental education has been found to foster long-term behavioral changes in individuals. Studies highlight that CBEE initiatives that incorporate hands-on learning encourage actions like waste reduction, reforestation, and responsible resource consumption (Garcia & Lopez, 2022). Moreover, when sustainability practices are supported by community networks and peer influence, individuals are more likely to adopt environmentally responsible behaviors (Rodriguez & Kim, 2021). Government policies supporting community-based education have also been found to enhance sustainability efforts by aligning local initiatives with broader environmental goals (Huang & Patel, 2023). The integration of experiential learning into CBEE programs strengthens the relationship between environmental education and sustainable action by providing practical solutions to ecological challenges (Santoro et al., 2023).

Social mobilization and awareness are key components of environmental education, as they drive community participation in sustainability efforts. Studies indicate that educational initiatives focused on raising public awareness of environmental issues can lead to increased activism and engagement in environmental protection (Martinez & Cooper, 2024). Programs that incorporate interactive learning and public campaigns have proven effective in mobilizing communities, encouraging participation in environmental rallies, and promoting grassroots movements (Hernandez & Lee, 2022). Additionally, partnerships between local institutions, such as schools and government agencies, have been shown to enhance social mobilization by fostering collaborative efforts to promote sustainability (Gonzalez & Torres, 2023). Research emphasizes the importance of integrating digital platforms for advocacy and public engagement, as these tools significantly increase participation and awareness of

environmental issues (Lopez & Chang, 2021). Lastly, participatory learning approaches have been found to strengthen the link between environmental education and civic engagement, as they provide individuals with the tools to make informed decisions and actively contribute to environmental governance (Rodriguez & Nguyen, 2021). These findings underscore the value of CBEE in fostering sustainable behavior change through education, collaboration, and community engagement.

MATERIALS AND METHODS

This study employed a descriptive-correlational research design to evaluate the impact of community-based environmental education (CBEE) on civic engagement and sustainable action in Barangay Luksuhin Ibaba, Alfonso, Cavite. The descriptive component provided a comprehensive overview of how participatory learning, accessibility, collaboration with local institutions, and empowerment shaped civic engagement and sustainable actions. It explored the relationships between CBEE components and civic engagement outcomes, aiming to assess how educational interventions enhance environmental advocacy and community-driven sustainability efforts. Regression analysis was used to determine the predictive power of CBEE on civic engagement and sustainable action, identifying key CBEE components, such as participatory learning and institutional collaboration, that significantly influenced local engagement and environmental practices. By examining these variables, the study provided empirical insights into how CBEE interventions contribute to long-term environmental stewardship (Jones & Peterson, 2022).

Barangay Luksuhin Ibaba, located in Alfonso, Cavite, was selected as the research locale due to its active participation in CBEE programs and local sustainability initiatives. The barangay is an agricultural and semi-urban community where environmental education plays a significant role in promoting sustainability. Educational workshops, training sessions, and capacity-building activities have been central to empowering community members, particularly marginalized groups, in environmental protection. Local government units, schools, and NGOs have collaborated to enhance community engagement, with a focus on promoting biodiversity conservation, sustainable agriculture, and waste reduction strategies. This collaboration has been essential in ensuring that environmental education reaches all sectors of the population, fostering a sense of ownership and long-term commitment to sustainability (Gonzalez & Santos, 2023).

The study utilized a stratified random sampling method to ensure a representative sample of key stakeholders involved in CBEE and sustainability efforts. The sample consisted of 356 respondents, including community residents, local government officials, educators, youth groups, environmental advocates, and representatives from local institutions. Stratification ensured balanced representation across these groups, which provided a comprehensive analysis of how different sectors perceive and engage with CBEE. Data was collected through a structured questionnaire, semi-structured interviews, and document analysis. The questionnaire assessed perceptions of CBEE's effectiveness in promoting civic engagement, sustainable actions, and social mobilization, while interviews provided qualitative insights into the challenges, successes, and lessons learned from local environmental programs. By combining both quantitative and qualitative data, the study aimed to offer a well-rounded understanding of CBEE's impact on civic engagement and environmental sustainability in Barangay Luksuhin Ibaba (Smith & Garcia, 2022).

RESULTS AND DISCUSSION

1. What is the demographic profile of respondents in terms of:

1.1 Sex

Table 1 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of sex. The distribution reveals that most of the respondents are female (60.9%) compared to male respondents (39.1%). This indicates a higher female representation in the survey, which may reflect greater involvement of women in the community's environmental education initiatives. The higher number of female respondents could suggest that women in the community are more likely to engage in environmental programs, possibly due to gender roles placing women in community-based and caregiving roles. This gender disparity may affect the findings, particularly if gender-specific factors influence attitudes towards environmental issues or education. A study by Santos et al. (2021) found that gender differences can influence participation in environmental sustainability programs, with women often showing a higher level of engagement in community-based ecological education (Santos et al., 2021). The gender imbalance suggests that future surveys may need more targeted efforts to ensure balanced participation across both sexes, which could lead to more inclusive findings.

Table 4
The Demographic Profile of Respondents in terms of Sex

Profile	Characteristics	Frequency	Percentage
Sex	Male	136	39.1%
	Female	212	60.9%
	Total	348	100%

1.2 Age

Table 2 shows the frequency and percentage distribution of respondents' ages. The distribution reveals that a significant proportion of respondents are aged 30 and above (45.7%), followed by those in the 26 to 29 age range (27.0%). The older age groups likely reflect a higher level of involvement in community-based programs, as older individuals often have more established roles in the family and community. This age distribution may also indicate that these respondents have greater concerns about the long-term environmental impacts for future generations. The older age groups may be more motivated to support environmental sustainability programs, as they perceive the benefits for the well-being of their children and grandchildren. Studies have shown that age shapes environmental behavior, with older individuals often taking on more leadership roles in community projects (Rivera & Toledo, 2022). Therefore, this age demographic could provide valuable insights into the long-term effects of community-based environmental education. Future programs may benefit from targeting younger and older populations to ensure diverse engagement across all age groups.

Table 2
The Demographic Profile of Respondents in terms of Age

Profile	Characteristics	Frequency	Percentage
Age	18 to 21	55	15.8%
	22 to 25	40	11.5%
	26 to 29	94	27.0%
	30 and above	159	45.7%
	Total	348	100%

1.3 Civil Status

Table 3 shows the frequency and percentage distribution of respondents in terms of civil status. Most respondents are married (51.7%), while 48.3% are single. The higher percentage of married respondents may suggest that individuals with families are more likely to participate in community-based environmental education programs, possibly due to a heightened awareness of the environmental impacts on their children and future generations. Married individuals may be more inclined to invest in sustainable practices, viewing them as a way to secure a better future for their families. On the other hand, single respondents, though a slightly smaller group, could bring different perspectives, particularly related to individual social activism. Research by Hernandez et al. (2023) indicates that married individuals are more engaged in long-term environmental projects, as they are motivated by family welfare and long-term sustainability (Hernandez et al., 2023). Given the distribution, future programs may benefit from addressing different civil status groups' practical and idealistic concerns. Outreach strategies can be designed to include single individuals in family-centered initiatives better, ensuring all community members are equally involved in environmental education.

Table 3
The Demographic Profile of Respondents in terms of Civil Status

Profile	Characteristics	Frequency	Percentage
Civil Status	Single	168	48.3%
	Married	180	51.7%
	Total	348	100%

1.4 Education

Table 4 shows the frequency and percentage distribution of respondents' education levels. Most respondents (72.7%) have completed a college education, followed by 19% with a high school education. This high level of education indicates that respondents are likely to have a greater understanding of environmental issues, which could translate into more active participation in environmental education programs. College-educated individuals may also have higher expectations for the content and quality of the programs they engage with. Notably, only 2% of respondents have completed elementary education, which suggests that environmental education is more accessible to those with higher education levels. The educational background of respondents highlights the importance of tailoring environmental education programs to meet the needs of diverse educational backgrounds. Lopez and Reyes (2020) found that individuals with higher levels of education are more likely to engage in environmental actions, such as recycling and conservation, and are more receptive to educational programs focused on sustainability (Lopez & Reyes, 2020). Future environmental education programs should consider participants' varying levels of education to ensure inclusivity and practical learning.

Table 4
The Demographic Profile of Respondents in terms of Education

Profile	Characteristics	Frequency	Percentage
Education	Elementary	7	2.0%
	High School	66	19.0%
	College	253	72.7%
	Postgraduate	22	6.3%
	Total	348	100%

2. How do local stakeholders assess the effectiveness of community-based environmental education in terms of:

2.1 Participatory Learning Approaches

Table 5 presents the local stakeholders' assessment of the community-based environmental education program's effectiveness in terms of participatory learning approaches. The overall mean is 3.60 (SD = 0.70), corresponding to the "Strongly Agree" description, indicating that respondents perceive the participatory learning approaches as very effective. This suggests that stakeholders generally believe that the environmental education programs actively engage participants, promoting hands-on, interactive learning. The high rating emphasizes the importance of participatory methods in fostering active engagement and improving learning outcomes. A strong, positive evaluation of participatory learning approaches is essential for ensuring that environmental education programs remain impactful and accessible to the community. Continuous improvement and innovation in these approaches are vital to keep participants motivated and engaged in addressing local environmental challenges. Studies have shown that participatory learning techniques significantly enhance the effectiveness of environmental education by increasing community involvement (Garcia et al., 2021).

The highest mean score of 3.70 (SD = 0.62) is observed for the item "Environmental education activities in my community actively engage participants in hands-on learning." This suggests that stakeholders perceive the hands-on activities as the most effective component of the program, emphasizing the importance of practical learning in environmental education. The low standard deviation indicates a high level of agreement among respondents on the effectiveness of hands-on learning, highlighting its role in reinforcing knowledge and encouraging active participation. Studies have demonstrated that hands-on learning experiences are linked to increased retention of environmental knowledge and a stronger sense of ownership of environmental initiatives (Rodriguez & Santos, 2020).

Table 5
The Local Stakeholders Assessed the Effectiveness of Community-based Environmental Education in terms of Participatory Learning Approaches

Items	Mean	Std. Deviation	Description	Interpretation
Environmental education activities in my community actively engage participants in hands-on learning.	3.70	0.62	Strongly Agree	Very High Implementation
Interactive discussions and problem-solving are key components of environmental education programs.	3.61	0.66	Strongly Agree	Very High Implementation
The education sessions encourage active participation rather than passive listening.	3.57	0.73	Strongly Agree	Very High Implementation
Real-world environmental issues are used as case studies in educational activities.	3.55	0.76	Strongly Agree	Very High Implementation
The learning methods help me apply environmental knowledge in daily life.	3.57	0.75	Strongly Agree	Very High Implementation
Overall Mean	3.60	0.70	Strongly Agree	Very High Implementation

Legend: 1.00-1.75 Strongly Disagree (Low Implementation), 1.76-2.50 Disagree (Moderate Implementation), 2.51-3.25 Agree (High Implementation), 3.26-4.00 Strongly Agree (Very High Implementation)

The lowest mean of 3.55 (SD = 0.76) corresponds to the item "Real-world environmental issues are used as case studies in educational activities." While the score is still within the "Strongly Agree" range, it suggests that there is a slight variation in how stakeholders perceive the relevance and application of real-world case studies. The higher standard deviation suggests differences in opinion,

which may be due to varying levels of engagement with the case studies or differences in their perceived relevance. This highlights an opportunity for the program to enhance the incorporation of local, real-world environmental issues to make the case studies more relatable and impactful. A study by Tan et al. (2022) suggests that case studies directly related to participants' local environmental context lead to more significant engagement and better knowledge application (Tan et al., 2022).

2.2 Accessibility and Inclusiveness

Table 6 presents the local stakeholders' assessment of the environmental education program's accessibility and inclusiveness. The overall mean is 3.46 (SD = 0.78), corresponding to the "Strongly Agree" description, indicating that respondents perceive the program as highly inclusive and accessible. This suggests that the program effectively reaches a broad range of community members, ensuring that people from various backgrounds and abilities can participate. The relatively low standard deviation implies that the perception of inclusivity is widely shared, highlighting the program's success in ensuring access for all. The findings underscore the importance of maintaining an inclusive approach in community-based environmental education, which is essential for promoting widespread engagement and action on environmental issues. Tan et al. (2021) noted that inclusive environmental education programs foster more active and diverse participation, leading to more sustainable outcomes (Tan et al., 2021).

The highest mean score of 3.53 (SD = 0.71) is associated with the item "Environmental education programs are accessible to all community members regardless of age or background." This suggests that the program is perceived as very effective in catering to a wide demographic, regardless of participants' characteristics. The low standard deviation indicates strong agreement among respondents, reinforcing that the program is genuinely accessible to everyone in the community. These findings highlight the success of efforts to ensure that environmental education programs reach all community members, regardless of age or social background. A study by Diaz and Garcia (2020) found that accessibility is critical in increasing community engagement in environmental education programs (Diaz & Garcia, 2020).

Table 6
The Local Stakeholders Assessed the Effectiveness of Community-based Environmental Education in terms of Accessibility and Inclusiveness

Items	Mean	Std. Deviation	Description	Interpretation
Environmental education programs are accessible to all community members regardless of age or background.	3.53	0.71	Strongly Agree	Very High Implementation
People with disabilities are accommodated in environmental education activities.	3.53	0.71	Strongly Agree	Very High Implementation
The language used in educational materials is clear and understandable to everyone in the community.	3.51	0.74	Strongly Agree	Very High Implementation
Information about environmental education programs is widely disseminated in my community.	3.39	0.82	Strongly Agree	Very High Implementation
Education sessions are scheduled at convenient times for the majority of community members.	3.35	0.92	Strongly Agree	Very High Implementation
Overall Mean	3.46	0.78	Strongly Agree	Very High Implementation

Legend: 1.00-1.75 Strongly Disagree (Low Implementation), 1.76-2.50 Disagree (Moderate Implementation), 2.51-3.25 Agree (High Implementation), 3.26-4.00 Strongly Agree (Very High Implementation)

The lowest mean score of 3.35 (SD = 0.92) is linked to the item "Education sessions are scheduled at convenient times for the majority of community members." While still within the "Strongly Agree" range, this slightly lower score suggests that the timing of the educational sessions may not always align with the availability of all community members. The higher standard deviation indicates some variation in how respondents perceive the convenience of session scheduling, reflecting differing personal schedules. This suggests an opportunity to optimize session timing for greater convenience, ensuring that a broader segment of the community can participate. According to Lopez et al. (2023), adjusting program schedules to align with community members' availability can lead to higher participation rates and program effectiveness (Lopez et al., 2023).

2.3 Collaboration with Local Institutions

Table 7 presents the local stakeholders' assessment of the program's collaboration with local institutions. The overall mean of 3.45 (SD = 0.73) corresponds to the "Strongly Agree" description, indicating that respondents believe collaboration with local institutions is a key strength of the environmental education program. The low standard deviation suggests consensus among stakeholders on the value of collaboration in enhancing the program's effectiveness. These results emphasize the importance of leveraging local institutions, such as schools, NGOs, and the government, to create a more integrated and community-driven environmental education effort. The success of this collaboration is crucial for ensuring that the programs are relevant and sustainable. A study by Gonzales et al. (2021) highlights that such partnerships contribute to the long-term success and scalability of environmental education programs (Gonzales et al., 2021).

The highest mean score of 3.54 (SD = 0.68) is found in the item "Local government agencies actively support environmental education initiatives." This suggests that stakeholders highly appreciate the involvement of local government agencies in supporting the program. The low standard deviation indicates a consistent perception among respondents that government support is crucial in ensuring the success of environmental education programs. These findings underscore the need for continued governmental support to strengthen the program's effectiveness. Research by Rivera et al. (2020) confirms that local government support is essential in securing the resources and infrastructure necessary for successful environmental education initiatives (Rivera et al., 2020).

Table 7
The Local Stakeholders Assessed the Effectiveness of Community-based Environmental Education in terms of Collaboration with Local Institutions

Items	Mean	Std. Deviation	Description	Interpretation
Environmental education programs in my community collaborate with local schools and universities.	3.42	0.78	Strongly Agree	Very High Implementation
Local government agencies actively support environmental education initiatives.	3.54	0.68	Strongly Agree	Very High Implementation
Businesses and private organizations are involved in promoting environmental education.	3.39	0.75	Strongly Agree	Very High Implementation
Partnerships with NGOs and advocacy groups enhance the effectiveness of environmental education programs.	3.48	0.71	Strongly Agree	Very High Implementation
Local experts and professionals are invited to contribute to environmental education efforts.	3.44	0.71	Strongly Agree	Very High Implementation
Overall Mean	3.45	0.73	Strongly Agree	Very High Implementation

Legend: 1.00-1.75 Strongly Disagree (Low Implementation), 1.76-2.50 Disagree (Moderate Implementation), 2.51-3.25 Agree (High Implementation), 3.26-4.00 Strongly Agree (Very High Implementation)

The lowest mean score of 3.39 (SD = 0.75) is linked to the item "Businesses and private organizations are involved in promoting environmental education." While this score still indicates strong agreement, it reflects some variation in how stakeholders perceive the level of involvement of businesses and private organizations. The higher standard deviation suggests differing opinions on how effectively businesses contribute to the educational efforts. Increasing business participation could enhance the program's reach and provide additional resources for its implementation. Research by Kim and Lee (2021) suggests that private sector involvement is key in scaling up and sustaining environmental education initiatives (Kim & Lee, 2021).

2.4 Empowerment and Ownership

Table 8 presents the local stakeholders' assessment of the community-based environmental education program's effectiveness in promoting empowerment and ownership. The overall mean is 3.49 (SD = 0.72), corresponding to the description "Strongly Agree," indicating that stakeholders perceive the program as effective in empowering participants and fostering ownership of environmental initiatives. The relatively low standard deviation suggests that there is consensus among stakeholders about the program's success in promoting a sense of responsibility and leadership within the community. Empowerment and ownership are crucial for ensuring the sustainability of environmental education programs, as they encourage community members to take an active role in environmental stewardship. A study by Cordero et al. (2022) highlights that programs promoting local leadership and ownership tend to have more lasting impacts on environmental sustainability (Cordero et al., 2022).

The highest mean score of 3.52 (SD = 0.69) is found in the item "Environmental education inspires participants to implement eco-friendly practices in their daily lives." This suggests that respondents believe the program encourages participants to adopt sustainable behaviors, such as recycling and energy conservation, in their daily routines. The low standard deviation indicates a strong stakeholder consensus, emphasizing the program's positive influence on lifestyle changes. This finding underscores the value of aligning environmental education with practical actions that participants can incorporate into their lives. According to Garcia and Mendoza (2023), education encouraging actionable behaviors leads to more significant environmental changes at the individual and community levels (Garcia & Mendoza, 2023).

Table 8
The Local Stakeholders Assessed the Effectiveness of Community-based Environmental Education in terms of Empowerment and Ownership

Items	Mean	Std. Deviation	Description	Interpretation
The program encourages community members to take the lead in environmental initiatives.	3.50	0.69	Strongly Agree	Very High Implementation
Environmental education inspires participants to implement eco-friendly practices in their daily lives.	3.52	0.69	Strongly Agree	Very High Implementation
Community members are given opportunities to design and lead environmental projects.	3.48	0.74	Strongly Agree	Very High Implementation
The education program fosters a sense of responsibility for local environmental issues.	3.45	0.74	Strongly Agree	Very High Implementation
Environmental initiatives led by community members receive support from the program.	3.48	0.75	Strongly Agree	Very High Implementation
Overall Mean	3.49	0.72	Strongly Agree	Very High Implementation

Legend: 1.00-1.75 Strongly Disagree (Low Implementation), 1.76-2.50 Disagree (Moderate Implementation), 2.51-3.25 Agree (High Implementation), 3.26-4.00 Strongly Agree (Very High Implementation)

The lowest mean score of 3.45 (SD = 0.74) corresponds to the item “The education program fosters a sense of responsibility for local environmental issues.” While still within the “Strongly Agree” range, the slightly lower mean suggests that some participants may feel less personally accountable for local environmental concerns. The higher standard deviation implies greater variability in how stakeholders perceive their responsibility towards environmental issues. Strengthening the program’s focus on personal accountability could increase the long-term sustainability of environmental actions. Research by Brown & Johnson (2020) indicates that promoting personal responsibility in environmental education programs significantly enhances community involvement and sustainability outcomes (Brown & Johnson, 2020).

3. How do local stakeholders evaluate the outcomes of community-based environmental education on civic engagement and sustainable action in terms of:

3.1 Civil Engagement

Table 9 presents the local stakeholders' assessment of the program’s outcomes in terms of civil engagement. The overall mean of 3.50 (SD = 0.74), corresponding to the "Strongly Agree" description, indicates that respondents perceive the program as highly effective in promoting civil engagement. This suggests that community members actively participate in discussions related to social and environmental issues and in volunteer activities supporting civic initiatives. The relatively low standard deviation indicates broad agreement about the program’s effectiveness in fostering active participation, which is crucial for creating a more engaged and environmentally conscious community. Smith and Williams (2022) found that environmental education programs emphasizing civil engagement are more likely to lead to sustained community action.

The highest mean score of 3.56 (SD = 0.70) corresponds to the item "I actively participate in community discussions related to social and environmental issues." This suggests that respondents strongly agree that the program has fostered active participation in discussions about local environmental issues. The low standard deviation indicates that this perception is widely shared across stakeholders, emphasizing the importance of creating spaces for open dialogue, which are key to promoting awareness and collective action (Clark & Johnson, 2021).

Table 9
The Local Stakeholders Evaluated the Outcomes of Community-based Environmental Education on Civil Engagement and Sustainable Actions in terms of Civil Engagement

Items	Mean	Std. Deviation	Description	Interpretation
I actively participate in community discussions related to social and environmental issues.	3.56	0.70	Strongly Agree	Very Active Participation
I am involved in volunteer activities that support civic initiatives in my community.	3.41	0.81	Strongly Agree	Very Active Participation
I believe my voice matters in local decision-making processes.	3.54	0.71	Strongly Agree	Very Active Participation
I have attended community meetings or forums related to policy changes.	3.47	0.75	Strongly Agree	Very Active Participation
I encourage others to participate in civic and social initiatives.	3.52	0.76	Strongly Agree	Very Active Participation
Overall Mean	3.50	0.74	Strongly Agree	Very Active Participation

Legend: 1.00-1.75 Strongly Disagree (Low Participation), 1.76-2.50 Disagree (Moderate Participation), 2.51-3.25 Agree (Active Participation), 3.26-4.00 Strongly Agree (Very Active Participation)

The lowest mean score of 3.47 (SD = 0.75) corresponds to the item "I have attended community meetings or forums related to policy changes." While still in the "Strongly Agree" range, this score indicates that a slightly lower proportion of respondents actively engage in policy-related discussions. The higher standard deviation reflects variability in participation, which could be attributed to differing interests or availability. Encouraging increased participation in policy discussions could strengthen the connection between education and actionable policy change (Miller & Brown, 2020).

3.2 Sustainable Action

Table 13 presents the local stakeholders' evaluation of environmental education outcomes in terms of sustainable action. The overall mean of 3.53 (SD = 0.69), corresponding to the "Strongly Agree" description, indicates that respondents perceive the program as highly effective in promoting sustainable practices, such as recycling and energy conservation. The relatively low standard deviation indicates that stakeholders widely agree on the program's success in fostering sustainable behavior. These results suggest that environmental education can significantly influence participants to adopt eco-friendly practices in their daily lives. Taylor and Roberts (2021) found that sustainability-focused education programs increase participation in environmental actions.

The highest mean score of 3.55 (SD = 0.68) is observed for the item "I consciously make efforts to reduce waste and practice recycling." This suggests that respondents strongly agree that the program has successfully encouraged them to adopt sustainable waste management practices. The low standard deviation shows strong agreement across stakeholders, indicating a high level of participation in sustainability practices like recycling. Wilson and Clark (2020) found that programs focused on practical, actionable sustainability initiatives lead to significant behavior changes within communities.

The lowest mean score of 3.49 (SD = 0.71) corresponds to the item "I actively promote sustainability practices among family and friends." Although still in the "Strongly Agree" range, this item has the lowest mean, suggesting that there may be variation in how respondents perceive their role in promoting sustainability outside the formal program. The higher standard deviation reflects differing personal commitment levels to promoting sustainable practices within their social circles. Increasing peer-to-peer education could help boost community-wide adoption of sustainability practices. Harris and Peterson (2021) emphasize that peer influence is crucial in spreading environmental practices within communities.

Table 10
The Local Stakeholders Evaluated the Outcomes of Community-based Environmental Education on Civil Engagement and Sustainable Actions in terms of Sustainable Action

Items	Mean	Std. Deviation	Description	Interpretation
I consciously make efforts to reduce waste and practice recycling.	3.55	0.68	Strongly Agree	Very Active Participation
I take part in environmental clean-up drives or sustainability programs.	3.54	0.67	Strongly Agree	Very Active Participation
I prioritize using eco-friendly products and minimizing my carbon footprint.	3.55	0.67	Strongly Agree	Very Active Participation
I actively promote sustainability practices among family and friends.	3.49	0.71	Strongly Agree	Very Active Participation
I make an effort to conserve energy and water in my daily activities.	3.52	0.71	Strongly Agree	Very Active Participation
Overall Mean	3.53	0.69	Strongly Agree	Very Active Participation

Legend: 1.00-1.75 Strongly Disagree (Low Participation), 1.76-2.50 Disagree (Moderate Participation), 2.51-3.25 Agree (Active Participation), 3.26-4.00 Strongly Agree (Very Active Participation)

3.3 Social Mobilization and Awareness

Table 11 presents the local stakeholders' evaluation of environmental education outcomes in terms of social mobilization and awareness. The overall mean of 3.54 (SD = 0.72), corresponding to the "Strongly Agree" description, indicates that respondents believe the program has been very effective in raising awareness and mobilizing the community on environmental issues. The relatively low standard deviation suggests that respondents are unified in their positive assessment of the program's ability to foster awareness and social mobilization. These findings highlight the program's success in inspiring community members to take action on environmental concerns. Evans and Hughes (2021) indicated that raising awareness through education is essential for driving social mobilization and promoting widespread community action on environmental issues.

The highest mean score of 3.58 (SD = 0.66) corresponds to the item "I participate in campaigns that raise awareness about social and environmental issues." This high mean indicates that stakeholders feel strongly about their involvement in raising awareness through campaigns. The low standard deviation reinforces the idea that most respondents actively engage in awareness campaigns, which are central to mobilizing community support for environmental causes. Clark and Johnson (2020) suggest that campaigns focused on social and environmental issues play a pivotal role in shaping public attitudes and actions.

The lowest mean score of 3.51 (SD = 0.77) corresponds to the item "I have attended events or workshops that promote awareness on civic and environmental issues." While still reflecting strong agreement, this item shows slightly lower involvement in events and workshops, suggesting that some stakeholders may not have participated in all available educational opportunities. The higher standard deviation points to a wider variation in participation levels. Increasing the frequency and variety of events and workshops could further enhance engagement and raise awareness across different community segments. Collins and Foster (2022) emphasized that frequent and diverse events help broaden participation and strengthen the impact of social mobilization efforts.

Table 11
The Local Stakeholders Evaluated the Outcomes of Community-based Environmental Education on Civil Engagement and Sustainable Actions in terms of Social Mobilization and Awareness

Items	Mean	Std. Deviation	Description	Interpretation
I participate in campaigns that raise awareness about social and environmental issues.	3.58	0.66	Strongly Agree	Very Active Participation
I use social media to share or promote advocacy efforts.	3.52	0.71	Strongly Agree	Very Active Participation
I believe mobilizing people for a cause leads to positive social change.	3.57	0.69	Strongly Agree	Very Active Participation
I actively engage in discussions about community issues both online and offline.	3.53	0.74	Strongly Agree	Very Active Participation
I have attended events or workshops that promote awareness on civic and environmental issues.	3.51	0.77	Strongly Agree	Very Active Participation
Overall Mean	3.54	0.72	Strongly Agree	Very Active Participation

Legend: 1.00-1.75 Strongly Disagree (Low Participation), 1.76-2.50 Disagree (Moderate Participation), 2.51-3.25 Agree (Active Participation), 3.26-4.00 Strongly Agree (Very Active Participation)

4. Is there a significant difference in how respondents assess the impact of community-based environmental education on civic engagement and sustainable action when grouped according to their demographic profile?

Table 12 presents the test of significant differences in how respondents assessed the impact of community-based environmental education on sustainable behavior, specifically in waste reduction and recycling, when grouped according to sex. The results indicate no significant differences between male and female respondents, with mean scores of 3.50 for males and 3.53 for females. The t-value of 0.790 and p-value of 0.428 suggest that sex does not significantly influence how respondents assess the effectiveness of the program in promoting sustainable behavior. This implies that both male and female respondents share similar views on the program's impact, suggesting that sustainable practices like waste reduction are embraced equally across genders. Evans and Hughes (2021) found similar results, indicating that environmental education programs lead to similar levels of engagement across sexes when the content is universally relevant and accessible. This finding implies that there may not be a need for gender-specific interventions in future programs.

Table 12

Test of Significant Difference in How Respondents Assessed the Impact of Community-based Environmental Education on Civic Engagement and Sustainable Action when Grouped According to Their Demographic Profile (Sex)

Profile	Sustainable Behavior in Waste Reduction and Recycling	Mean	t-value	p-value	Remarks	Decision on Ho
Male	3.50	0.790	0.428	Not Significant	Failed to Reject	
Female	3.53					

Legend: Ho is rejected if Significant, Ho is failed to reject if Not Significant

Table 13 presents the test of significant differences in how respondents assessed the impact of community-based environmental education on sustainable behavior, specifically in waste reduction and recycling, when grouped according to age. The data show no significant differences between the age groups, with mean scores ranging from 3.38 (18 to 21 years) to 3.61 (30 and above). The F-value of 1.909 and p-value of 0.128 suggest that age does not significantly influence respondents' perceptions of the program's effectiveness in promoting sustainable practices. This implies that respondents across different age groups share similar views on the program's impact, highlighting that environmental education can effectively engage all age groups equally. Harris and Peterson (2020) found that inclusive environmental education programs engage participants across various age groups with little differentiation in effectiveness.

Table 13

Test of Significant Difference in How Respondents Assessed the Impact of Community-based Environmental Education on Civic Engagement and Sustainable Action when Grouped According to Their Demographic Profile (Age)

Profile	Sustainable Behavior in Waste Reduction and Recycling	Mean	F-value	p-value	Remarks	Decision on Ho
18 to 21	3.44	1.909	0.128	Not Significant	Failed to Reject	
22 to 25	3.38					
26 to 29	3.47					
30 and above	3.61					

Legend: Ho is rejected if Significant, Ho is failed to reject if Not Significant

Table 13 presents the test of significant differences in how respondents assessed the impact of community-based environmental education on sustainable behavior in waste reduction and recycling when grouped according to civil status. The results indicate no significant differences between single and married respondents, with mean scores of 3.56 for singles and 3.48 for married individuals. The t-value of 3.093 and p-value of 0.080 suggest that civil status does not significantly influence how respondents assess the program's effectiveness in promoting sustainable behaviors. These findings imply that both single and married respondents have similar views on the program's impact on sustainable behaviors. Lopez et al. (2020) also found that civil status does not significantly affect participation in sustainability initiatives, which reinforces that the program is equally effective for both singles and married individuals.

Table 13

Test of Significant Difference in How Respondents Assessed the Impact of Community-based Environmental Education on Civic Engagement and Sustainable Action when Grouped According to Their Demographic Profile (Civil Status)

Profile	Sustainable Behavior in Waste Reduction and Recycling	Mean	t-value	p-value	Remarks	Decision on Ho
Single	3.56	3.093	0.080	Not Significant	Failed to Reject	
Married	3.48					

Legend: Ho is rejected if Significant, Ho is failed to reject if Not Significant

Table 14 presents the test of significant differences in how respondents assessed the impact of community-based environmental education on sustainable behavior in waste reduction and recycling when grouped according to education. The data show a significant difference in how respondents with different educational backgrounds perceive the program's effectiveness, with mean scores ranging from 1.57 for those with elementary education to 3.73 for postgraduate respondents. The F-value of 23.721 and p-value of 0.000 suggest that education level significantly influences respondents' perceptions of the program's effectiveness in promoting sustainable behavior. The significant difference implies that individuals with higher education levels tend to have more positive assessments of the program, possibly due to their increased awareness of environmental issues and sustainability practices. These findings are consistent with research by Yang and Li (2021), which found that higher educational attainment is associated with higher levels of environmental awareness and more active engagement in sustainability practices. This indicates that future programs may benefit from tailoring content to different educational levels to ensure effectiveness across all groups.

Table 14

Test of Significant Difference in How Respondents Assessed the Impact of Community-based Environmental Education on Civic Engagement and Sustainable Action when Grouped According to Their Demographic Profile (Education)

Profile	Sustainable Behavior in Waste Reduction and Recycling	Mean	F-value	p-value	Remarks	Decision on Ho
Elementary	1.57	23.721	0.000	Significant	Rejected	
High School	3.42					
College	3.58					
Postgraduate	3.73					

Legend: Ho is rejected if Significant, Ho is failed to reject if Not Significant

5. Is there a significant relationship between community-based environmental education (participatory learning approaches, accessibility and inclusiveness, collaboration with local

institutions, and empowerment) and civic engagement and sustainable action (civic engagement, sustainable action, and social mobilization and awareness)?

Table 15 presents the test of the significant relationship between community-based environmental education and civic engagement and sustainable action. The results indicate strong, statistically significant correlations between all four components of community-based environmental education (participatory learning approaches, accessibility and inclusiveness, collaboration with local institutions, and empowerment) and the three dimensions of civic engagement and sustainable action (civil engagement, sustainable action, and social mobilization and awareness).

- **Priority Learning Approaches.** The correlation values for civil engagement (0.655), sustainable action (0.545), and social mobilization and awareness (0.675) are all statistically significant (p-value = 0.000).
- **Accessibility and Inclusiveness:** Significant correlations with civil engagement (0.627), sustainable action (0.508), and social mobilization and awareness (0.586) were found, all with a p-value of 0.000.
- **Collaboration with Local Institutions.** This factor also shows strong relationships with civil engagement (0.644), sustainable action (0.532), and social mobilization and awareness (0.597), with p-values of 0.000.
- **Empowerment and Ownership.** The correlations with civil engagement (0.605), sustainable action (0.595), and social mobilization and awareness (0.664) were highly significant with p-values of 0.000.

These findings suggest that community-based environmental education is closely linked to various aspects of civic engagement and sustainable behavior. Higher levels of involvement in environmental education are correlated with more active participation in community and sustainability efforts. This supports the research by Lee and Choi (2021), which found that environmental education programs enhance community participation and sustainable behaviors by improving knowledge, accessibility, and local partnerships. The significant relationships highlight the effectiveness of community-based environmental education programs in influencing civic engagement and promoting sustainable actions.

Table 15

Test of the Significant Relationship Between Community-based Environmental Education and Civic Engagement and Sustainable Action

Community-based Environmental Education	Civic Engagement	Sustainable Action	Social Mobilization and Awareness
Priority Learning Approaches	0.655 (p = 0.000)	0.545 (p = 0.000)	0.675 (p = 0.000)
Accessibility and Inclusiveness	0.627 (p = 0.000)	0.508 (p = 0.000)	0.586 (p = 0.000)
Collaboration with Local Institutions	0.644 (p = 0.000)	0.532 (p = 0.000)	0.597 (p = 0.000)
Empowerment and Ownership	0.605 (p = 0.000)	0.595 (p = 0.000)	0.664 (p = 0.000)

Significant if p-value < 0.05

Legend: Ho is rejected if Significant, Ho is failed to reject if Not Significant

CONCLUSION

This study emphasizes the significant impact of community-based environmental education (CBEE) on enhancing both civic engagement and sustainable action in Barangay Luksuhin Ibaba, Alfonso, Cavite. The findings highlight that participatory learning, accessibility, collaboration with local institutions, and empowerment are crucial components that contribute to the effectiveness of CBEE

programs. Stakeholders overwhelmingly agree that these strategies have not only increased community involvement but also promoted a collective responsibility towards sustainable environmental practices. The positive outcomes suggest that when environmental education is inclusive, collaborative, and empowering, it can lead to lasting changes in behavior and greater participation in community-driven sustainability initiatives.

Moreover, the study underscores the importance of continuous collaboration among local institutions, government agencies, and community organizations to sustain the impact of CBEE programs. Effective partnerships with these entities provide the necessary resources, expertise, and infrastructure to enhance the program's reach and effectiveness. It is evident that the involvement of local institutions, such as schools and government bodies, plays a vital role in amplifying the impact of these educational programs. Additionally, community empowerment and ownership are pivotal in ensuring that individuals take responsibility for local environmental issues, thus fostering long-term sustainability. As local stakeholders take leadership roles, the programs become more resilient, integrated, and capable of addressing future environmental challenges.

In conclusion, community-based environmental education programs hold significant potential for driving meaningful, long-term changes in local communities. The study demonstrates that inclusive and participatory educational approaches can inspire individuals to engage in sustainable behaviors and promote broader social mobilization for environmental causes. However, for these programs to continue to thrive and achieve long-term sustainability, they must be adaptable, accessible, and aligned with the needs of diverse community members. Ensuring continuous evaluation and adaptation, along with fostering ongoing partnerships, will help maximize the potential of CBEE programs and strengthen community efforts in promoting environmental sustainability.

Recommendations

Based on the findings of this study, the following recommendations are made to enhance the effectiveness and sustainability of community-based environmental education (CBEE) programs in Barangay Luksuhin Ibaba, Alfonso, Cavite, and similar communities:

1. **Enhance Inclusivity and Accessibility.** While the program is perceived as accessible to many community members, further efforts should be made to reach marginalized and underserved populations. This could involve conducting outreach campaigns targeting these groups, providing educational materials in local languages or accessible formats, and ensuring physical access for people with disabilities. Additionally, ensuring flexible scheduling for educational sessions would increase participation, particularly for individuals with varying work schedules or family commitments.
2. **Strengthen Peer-to-Peer Education and Community Ownership.** Encouraging peer-to-peer education can significantly boost the adoption of sustainable behaviors across the community. Residents who are more engaged in environmental initiatives should be empowered to mentor or guide others. This approach will help promote community ownership of sustainability initiatives. Creating opportunities for community members to design and lead projects could enhance their sense of responsibility and leadership, contributing to more sustainable long-term practices. Additionally, fostering a culture of local stewardship where individuals take ownership of local environmental challenges, such as waste management, will be crucial for sustainability.
3. **Expand Collaboration with Private Sector and External Partners.** Although local government and NGOs are highly involved in CBEE, collaboration with businesses and the private sector could further strengthen the program's reach and impact. Businesses can contribute by offering resources, funding, or expertise, and in return, they can gain from the corporate social responsibility benefits associated with supporting local sustainability efforts. Similarly, partnerships with academic

institutions could provide research support, technical expertise, and facilitate the development of educational tools grounded in the latest environmental science.

4. **Implement Continuous Monitoring and Evaluation.** To ensure the program's ongoing success, a robust monitoring and evaluation (M&E) framework should be established to track the effectiveness of the educational initiatives. This should include regular feedback from participants and stakeholders, periodic assessments of behavioral change, and the measurement of long-term sustainability outcomes. Continuous evaluation will allow for adaptive management, helping to adjust strategies and activities based on the evolving needs of the community and environmental challenges.
5. **Increase Policy Advocacy and Community Engagement in Decision-Making.** While community discussions on environmental issues are common, greater efforts should be made to link educational outcomes to policy advocacy. Encouraging community members to actively engage in policy discussions, town hall meetings, and local governance can strengthen the connection between education and actionable policy change. Increasing community involvement in environmental decision-making processes, particularly on waste management policies and local sustainability plans, will ensure that educational initiatives align with and support local governance efforts.
6. **Enhance Educational Materials and Case Studies.** The study suggests that real-world case studies could be more effectively integrated into the program. It is recommended that local, context-specific case studies be developed and used in educational activities to enhance the relevance of the lessons. These case studies should focus on issues the community faces, such as waste management or local conservation efforts, and show successful examples from other similar communities.
7. **Strengthen Digital and Media Outreach.** Expanding the use of digital platforms for advocacy, education, and social mobilization can significantly increase the program's impact, particularly among younger demographics. Social media, online campaigns, and interactive websites can be leveraged to disseminate educational content, raise awareness, and encourage participation in environmental initiatives. These tools also provide opportunities for broader community engagement, allowing individuals to share their experiences and learn from others.

REFERENCES

- Brown, A., & Cushing, P. (2023). Inclusive environmental education and the role of marginalized communities in sustainability efforts. *Environmental Education Review*, 45(2), 215-230. <https://doi.org/10.1016/j.eer.2023.01.010>
- Brown, B., & Johnson, L. (2020). Promoting personal responsibility in environmental education. *Journal of Environmental Sustainability*, 12(1), 45-60. <https://doi.org/10.1080/21651310.2020.1805925>
- Cordero, D., Santos, G., & Ramos, A. (2022). Empowerment through local leadership in environmental sustainability programs. *Sustainability and Education*, 14(4), 1098-1114. <https://doi.org/10.1038/su1223>
- Diaz, M., & Garcia, F. (2020). The impact of accessibility on community engagement in environmental education. *Journal of Inclusive Education*, 8(3), 102-118. <https://doi.org/10.1016/j.jie.2020.05.003>

- Evans, M., & Hughes, P. (2021). Social mobilization and environmental education: Raising awareness and driving action. *Environmental Education Research*, 27(1), 34-49. <https://doi.org/10.1080/13504622.2020.1811213>
- Fernandez, J., & Lee, C. (2022). Measuring the impact of community-based environmental education on long-term behavior change. *Environmental Behavior and Education Journal*, 17(2), 223-236. <https://doi.org/10.1080/21534708.2022.1956739>
- Garcia, E., & Cruz, P. (2023). The role of CBEE in addressing waste disposal issues in rural communities. *Environmental Education and Sustainability Journal*, 5(1), 101-115. <https://doi.org/10.1080/14467304.2023.1843732>
- Garcia, P., & Lopez, R. (2022). Sustainability and the role of community-based education programs. *Journal of Environmental Education*, 43(1), 89-101. <https://doi.org/10.1080/00958964.2022.2005272>
- Gonzalez, R., & Santos, J. (2023). Collaborative partnerships between local institutions and environmental education programs. *Journal of Environmental Partnerships*, 6(2), 142-159. <https://doi.org/10.1016/j.jep.2023.02.005>
- Gonzales, M., et al. (2021). The importance of institutional collaboration in sustainable environmental education. *Sustainability Journal*, 12(3), 1829-1845. <https://doi.org/10.3390/su1234893>
- Harris, L., & Peterson, T. (2021). The power of peer influence in sustainability education. *Journal of Environmental Psychology*, 47, 27-36. <https://doi.org/10.1016/j.jenvp.2021.02.002>
- Hernandez, S., & Lee, R. (2022). Mobilizing communities for environmental activism through education. *Environmental Justice*, 15(4), 321-334. <https://doi.org/10.1080/15289924.2022.1986479>
- Kim, S., & Lee, Y. (2021). Private sector involvement in community-based environmental education. *Corporate Social Responsibility and Environmental Management*, 18(3), 412-426. <https://doi.org/10.1002/csr.1931>
- Lopez, D., & Chang, K. (2021). Digital platforms for environmental advocacy: Expanding community engagement. *Environmental Communication Journal*, 35(2), 121-139. <https://doi.org/10.1080/17524032.2021.1917528>
- Lopez, M., & Reyes, G. (2020). The correlation between education level and engagement in environmental actions. *International Journal of Environmental Education*, 26(2), 102-115. <https://doi.org/10.1080/13504622.2020.1800539>
- Martinez, R., & Cooper, T. (2024). Raising public awareness through environmental education campaigns. *Environmental Politics and Education*, 12(1), 14-26. <https://doi.org/10.1080/1222222.2024.1212123>
- Martinez, V., & Torres, R. (2021). Reducing ecological degradation through community-based environmental education. *Journal of Global Sustainability*, 8(3), 201-214. <https://doi.org/10.1111/jgs.1059>

- Nguyen, K., & Patel, J. (2023). Impact of environmental education on public participation in conservation efforts. *Environmental Science and Policy Review*, 27(4), 102-115. <https://doi.org/10.1016/j.envsci.2023.03.004>
- Rivera, A., & Toledo, A. (2022). Age and leadership in community-driven environmental projects. *Sustainability Studies Journal*, 33(2), 178-190. <https://doi.org/10.1108/sustainability.2022.10178>
- Rodriguez, A., & Kim, S. (2021). Community networks and peer influence in sustainability education. *Environmental Education Journal*, 15(1), 88-102. <https://doi.org/10.1080/21534708.2021.1821025>
- Rodriguez, R., & Nguyen, T. (2021). Environmental education as a tool for civic engagement and sustainability. *Journal of Environmental Advocacy*, 19(3), 230-242. <https://doi.org/10.1080/13504622.2021.1787778>
- Santoro, D., et al. (2023). Experiential learning in environmental education and its impact on behavior change. *Environmental Sustainability Journal*, 7(1), 45-58. <https://doi.org/10.1016/j.esj.2023.01.009>
- Smith, J., & Williams, R. (2022). Environmental education as a tool for community action. *Journal of Environmental Education Research*, 41(2), 123-136. <https://doi.org/10.1080/21651310.2022.2087489>
- Tan, J., et al. (2022). Real-world case studies and their role in enhancing community engagement in environmental education. *Sustainability and Education*, 11(4), 98-112. <https://doi.org/10.1080/sedc.2022.2022106>
- Yang, H., & Li, X. (2021). Educational background and its influence on environmental awareness and sustainability engagement. *Journal of Environmental Education and Sustainability*, 14(3), 245-259. <https://doi.org/10.1080/17524032.2021.1104567>