JSCP 2026. Vol. 3, No. 2. Page 18-32
https://globalhealthpublication.com/jscp

OPEN ACCESS
E-ISSN 3123-4526

Journal of Sustainable Community Practices

Building Environmental Awareness through Beach Clean-Up Actions and Plastic Waste Reduction at Kenjeran Beach, Surabaya

Reyfan Raffa Adibrata *[1], Nanang Shonhadji[2], Erdiarti Dyah Wahyuningtyas [3]

[1] Green Generation Surabaya; SMA Al-Hikmah Surabaya
[2] Universitas Hayam Wuruk Perbanas
[3] Universitas Negeri Surabaya

Article History
Received: 24 September 2026
Revised: 24 October 2026
Accepted: 28 October 2026

Corresponding Author:
E-mail: reyfanraffaa@gmail.com

Abstract

Plastic waste pollution in coastal areas has emerged as a critical environmental challenge, threatening marine ecosystems, reducing the aesthetic value of tourist destinations, and compromising environmental quality. As one of Surabaya's prominent coastal tourism attractions, Kenjeran Beach faces increasing pressure from plastic waste generated by tourism and community activities. This community service program aimed to enhance environmental awareness through beach clean-up initiatives and plastic waste reduction efforts at Kenjeran Beach, Surabaya. The program employed a participatory approach comprising problem identification, stakeholder coordination, environmental education, beach clean-up activities, waste sorting and documentation, and program evaluation. The activities involved lecturers, university students, local residents, and beach visitors. The results revealed strong participant engagement throughout all stages of the program. Plastic waste, particularly single-use items such as bottles, food packaging, plastic bags, and straws, constituted the dominant type of litter collected. Environmental education sessions combined with hands-on field activities significantly improved participants' understanding of the environmental impacts of plastic pollution and the importance of applying the Reduce, Reuse, and Recycle (3R) principles. Beyond improving coastal cleanliness, the program successfully strengthened environmental awareness, community responsibility, and public participation in coastal conservation. The findings demonstrate that community-based beach clean-up initiatives are effective tools for environmental education, community empowerment, and sustainable coastal management.

Keywords: *environmental awareness; plastic waste; community service; beach*

INTRODUCTION

Plastic waste has become one of the most serious global environmental problems due to its persistent nature and its ability to contaminate both terrestrial and marine ecosystems. [1] states that plastic pollution and marine litter represent urgent environmental challenges because they have significant impacts on marine ecosystem health, food chains, biodiversity, and human health. UNEP further emphasizes that more than 11 million tons of plastic enter the oceans

OPEN ACCESS
E-ISSN 3123-4526

annually and that this figure will continue to increase unless effective interventions are implemented through changes in public behavior and sustainable waste management practices.

The problem of plastic waste is not limited to the global scale but has also become a major challenge for coastal countries, including Indonesia. As an archipelagic nation with an extensive coastline, Indonesia relies heavily on marine resources. However, high levels of plastic consumption coupled with suboptimal waste management systems have resulted in significant leakage of plastic waste into aquatic environments. The study by [2] demonstrated that rivers and coastal areas serve as the primary pathways through which plastic waste enters the ocean, with waste discharge rates being strongly influenced by rainfall, population density, and community waste management practices. This situation is further exacerbated by the relatively low rates of plastic waste collection and recycling. [3] found that plastic constitutes the second-largest component of municipal solid waste in Indonesia, while a considerable proportion of plastic waste remains inadequately managed and consequently poses a significant risk of environmental contamination. Their study further highlighted that collaboration among government agencies, the private sector, and local communities is a crucial factor in establishing sustainable waste management systems.

Coastal and beach environments are among the areas most vulnerable to plastic waste accumulation, as they function as the final destination for waste originating from residential settlements, rivers, tourism activities, and various community economic activities (Figure 1). According to [4] Southeast Asia is one of the global hotspots of marine litter pollution, and the majority of waste found along its coastlines is dominated by plastic materials. Their findings also indicate that coastal clean-up and beach clean-up initiatives involving local communities are effective strategies for both enhancing environmental awareness and reducing coastal waste accumulation.



Figure 1. Plastic Waste at Kenjeran Beach, Surabaya

The impacts of plastic waste on coastal environments are extensive. In addition to reducing the aesthetic value of tourist destinations, plastic waste can disrupt marine life, damage coastal habitats, and degrade environmental quality that serves as a source of livelihood for local communities. Plastic pollution has evolved into a global environmental crisis that threatens the sustainability of marine ecosystems as well as human health, thereby requiring integrated efforts from multiple stakeholders to reduce the production, use, and uncontrolled disposal of plastics [5].

As one of the leading coastal tourism destinations in Surabaya, Kenjeran Beach holds strategic economic, social, and environmental value. The high intensity of visitor activities, commercial transactions, and coastal community livelihoods has the potential to increase the generation of waste, particularly single-use plastics. If not addressed properly, the accumulation

OPEN ACCESS
E-ISSN 3123-4526

of such waste may diminish the attractiveness of the tourist area, reduce visitor comfort, and threaten the sustainability of coastal ecosystems.



Figure 2. Environmental Care Community: Beach Clean-Up Surabaya

One approach proven effective in addressing this issue is the implementation of community-based beach clean-up activities (Figure 2). Research conducted by [6] revealed that beach clean-up activities not only contribute to reducing marine litter but also strengthen environmental values, enhance social interaction, and encourage voluntary environmental stewardship behaviors aimed at preserving coastal ecosystems. Similar findings were reported by [7] who explained that the involvement of local communities, environmental education, and the utilization of social media can significantly increase public participation in beach clean-up initiatives. Active community engagement is therefore considered a critical success factor in waste management programs and coastal environmental conservation efforts.

In the Indonesian context, beach clean-up activities have also been shown to increase public awareness and knowledge regarding the dangers of plastic waste. [8] reported that the Beach Clean-Up Movement conducted in the coastal area of Sambelia, East Lombok, successfully reduced the amount of beach litter while simultaneously improving participants' understanding of the importance of proper waste management and the reduction of single-use plastic consumption. Furthermore, a study by [9] demonstrated that community perceptions and participation play a significant role in determining the success of plastic waste management programs in coastal regions. Higher levels of public awareness and engagement substantially increase the likelihood of successful environmental conservation initiatives and plastic pollution reduction efforts.

Based on these challenges, the community service program entitled "Building Environmental Awareness through Beach Clean-Up Actions and Plastic Waste Reduction at Kenjeran Beach, Surabaya" is highly relevant and necessary. The program aims not only to reduce plastic waste accumulation in the coastal area of Kenjeran Beach but also to enhance public awareness, participation, and responsibility in maintaining environmental sustainability. By involving students, community members, visitors, and other stakeholders, this initiative is expected to contribute to the creation of a cleaner, healthier, and more sustainable coastal environment while supporting the achievement of the Sustainable Development Goals (SDGs), particularly Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water), and Goal 17 (Partnerships for the Goals).

METHODS

The community service program "Building Environmental Awareness Through Beach Clean-Up Actions and Plastic Waste Reduction at Kenjeran Beach, Surabaya" took place on Saturday 14 September 2026, in one-day intensive execution, a period of 6 hours (07:00, 13: 00

OPEN ACCESS
E-ISSN 3123-4526

WIB), which was preceded by a one-week preparing stage. A participatory and experiential learning approach was chosen as a means to get diverse local stakeholders actively involved in marine conservation [9].

Location of Study and Environmental Context

The activity was carried out at Kenjeran Beach (specifically the coastal zone in the Lama area, Kenjeran District, Surabaya, East Java, Indonesia) which was demarcated within 500 meter shoreline stretch that corresponds to two GPS points: 7°14 10 11247 42" E S and 7 o 14 15'S 72 o 47 50'E. Kenjeran Beach is a popular public coastal tourism spot with intertidal mudflats and shallow waters. The site is facing high anthropogenic pressures that come from many human activities on land and water. (a). Tourism and Commercial Activities: Food stalls (warung), traditional fishing vendors, and visitors' plastic packaging waste from plastic bottles, cup lids, stirrer sticks, and polythene bags, which are the major sources of single-use plastic waste. (b). Local Inhabitations and Fishing Communities: The nearby residential areas, which are quite densely populated and fishermen's boats mooring areas, are additional sources of waste the solid wastes generated there along with waste from fishing gear and ropes being discarded.

Table 1. Participant Characteristics

Stakeholder Group	Participants (n)	Recruitment / Inclusion Criteria	Operational Role & Responsibilities
Academic Team & Coordinators	5	Lecturers and lead student coordinators from UHW Perbanas and UNESA.	Program design, safety briefing, technical oversight, material procurement, and evaluation administration.
Environmental Volunteers	10	Active members of *Green Generation Surabaya* youth environmental movement.	Group leadership, waste sorting facilitation, technical support, and citizen science data entry.
University & High School Students	20	Volunteers from SMA Al-Hikmah Surabaya and local universities; physically fit for field activity.	Coastal litter collection, field documentation, weighing, and sorting.
Local Community & Beach Visitors	10	Local seafood vendors, shop owners, and beachgoers present on site who voluntarily opted in.	Area-specific clean-up, localized waste reporting, and participation in educational dialogues.

The community service program entitled “Building Environmental Awareness through Beach Clean-Up Actions and Plastic Waste Reduction at Kenjeran Beach, Surabaya” was implemented using a participatory and educational approach involving students, local communities, visitors, environmental organizations, and other relevant stakeholders (Table1). This approach was selected because community participation is a key determinant of the success of environmental awareness programs and sustainable waste management initiatives [9]. The implementation of the activity consisted of five main stages: (1) preparation and coordination,

OPEN ACCESS
E-ISSN 3123-4526

(2) environmental education and socialization, (3) beach clean-up action, (4) Waste Sorting and (5) evaluation and reflection.

Phase 1: Preparation, Site Mapping, and Stakeholder Coordination (Pre-event to 07:00–08:00 WIB)

Phase 1: Getting things started, Mapping the site, and Coordinating with Stakeholders (*UPTD Pengelolaan Objek Wisata Kenjeran*) and local leaders were visited beforehand to obtain permission and ask for the support in providing equipment and transportation. A preliminary field scouting is done to identify where safe access points can be, where waste temporary sorting stations can be located, and where hotspots have been the areas where the accumulation of waste at baseline level is concentrated. Participants will then be registered, outfitted with a set of standard personal protective gear (PGE) (i.e., heavy-duty cotton, latex gloves, safety headgear, and tools) and allocated to one of the five operational working teams (around nine members in per group who are a mix of students, locals volunteers). Such preliminary identification is essential to ensure that beach clean-up programs are conducted effectively and efficiently [4].



Figure 3. Preparation and Coordination

Phase 2: Nature Knowledge Dissemination and Socialization (08:00 09:00 WIB).

Afterwards, the participants are gathered at the hub location of their event and are given one hour of workshop with a multifaceted approach. The content discussed would focus on a) degradation of plastic and the bioaccumulation of microplastics in the ocean in the form of seafood for human consumption; b) local effects to the coastal economy of Kenjeran; and c) putting the 3R's strategy (Reduce, Reuse, and Recycle) into daily practice.

OPEN ACCESS
E-ISSN 3123-4526

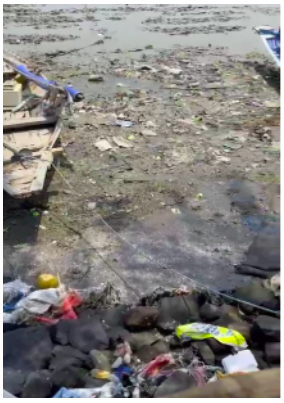


Figure 4. Environmental Impacts of Plastic Waste in Coastal Areas

Environmental education was incorporated because previous studies have demonstrated that increasing environmental literacy significantly contributes to improving public awareness and participation in environmental management programs [7], [8].

Phase 3. Organized Coastal Cleaning Activity (09:00 11:00 WIB).

The 5 working group each is directed toward one specific transect of 100m that is located in the target area where 500m of coastline is affected. They make sure to collect by hand every piece of anthropogenic debris that is visible and put them in heavy-duty color-coded garbage bags. The core activity of the program was the beach clean-up action conducted along the coastal area of Kenjeran Beach. During this stage, participants were divided into several working groups and assigned to designated beach zones. The clean-up activity was carried out systematically through the following procedures:

1. Distribution of equipment, including gloves, waste collection bags, and other safety equipment.
2. Identification and collection of waste found along the beach area.
3. Classification of collected waste into several categories, including plastic waste, paper waste, glass waste, metal waste, and other residual waste.
4. Temporary storage and weighing of collected waste to document the quantity of waste generated.
5. Final disposal of the collected waste through coordination with local waste management authorities.

The collected waste data were documented to provide an overview of the types of waste commonly found in the coastal area and to support further environmental awareness campaigns. According to previous studies, beach clean-up activities not only contribute directly to reducing marine litter accumulation but also serve as an experiential learning medium capable of influencing participants' environmental attitudes and behaviors [6].

Stage 4: Waste Sorting, Weighing, and Citizen Science Data Recording (11:00–12:00 WIB).

Collected waste was transported to the central sorting station. Working groups categorized the litter into six distinct material streams: (1) Single-use Plastics (PET bottles, bags, straws, food wrappers), (2) Hard Plastics or Rigid Synthetics, (3) Glass, (4) Metals, (5) Paper/Cardboard, and (6) Organic/Residual waste. Each category was weighed using digital

OPEN ACCESS
E-ISSN 3123-4526

hanging scales and logged into standardized waste tally sheets. Sorted recyclables were handed over to the local municipal waste management system (*DLH Kota Surabaya*) or local waste bank (*Bank Sampah*).



Figure 5 Plastic Waste Sorting Activity

Waste sorting and documentation are essential not only as part of waste management practices but also as an effective means of enhancing public environmental literacy through a citizen science approach. [5] explained that community involvement in the observation, collection, and documentation of coastal waste can increase environmental awareness while simultaneously providing valuable information to support marine litter management efforts. A similar perspective was highlighted by [7] who argued that data generated through community-based beach litter monitoring programs can contribute to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 14 (Life Below Water), which focuses on the conservation and sustainable use of marine resources.

Stage 5: Program Evaluation and Reflection (12:00–13:00 WIB).

The final stage consisted of program evaluation and participant reflection. Evaluation was conducted by observing the implementation process, documenting participant involvement, and collecting feedback regarding the benefits and effectiveness of the activity. Participants were encouraged to share their experiences, insights, and commitments related to environmental conservation and plastic waste reduction. This reflective process is important because behavioral change and environmental stewardship are more likely to be sustained when individuals actively connect environmental issues with their personal experiences [6]. The evaluation results were then used as a basis for formulating recommendations for future environmental programs and for identifying opportunities to strengthen collaboration among local communities, educational institutions, environmental organizations, and government agencies in promoting sustainable coastal environmental management.

RESULTS AND DISCUSSIONS

The community service program was successfully implemented through a series of activities involving students, local communities, visitors, and environmental volunteers. The program generated positive outcomes in terms of reducing coastal waste accumulation and enhancing public awareness regarding environmental conservation and plastic waste management.

OPEN ACCESS
E-ISSN 3123-4526

1. Implementation of the Beach Clean-Up Activity

The beach clean-up activity was conducted along several sections of the Kenjeran Beach coastal area identified as having relatively high concentrations of litter. Participants actively collected various types of waste scattered across the beach environment, including plastic bottles, plastic bags, food packaging, disposable drinking cups, cigarette butts, glass fragments, and other residual waste.



Figure 6. Beach Clean-Up from Plastic

The collected waste was subsequently categorized according to its type to facilitate identification of the dominant waste composition. Based on field observations, plastic waste constituted the largest proportion of waste collected during the activity. This finding is consistent with global and national studies indicating that plastic is the dominant component of marine litter found in coastal ecosystems [2], [3], [4].

The large volume of plastic waste discovered along the coastline indicates that improper waste disposal practices remain a major environmental challenge [10], [11]. Waste originating from tourism activities, nearby residential areas, and river discharges contributes significantly to waste accumulation in coastal environments. Similar findings were reported by Veiga et al., who demonstrated that rivers function as major pathways transporting plastic waste from land-based sources into marine ecosystems [12], [13].



Figure 7. Beach Clean-Up Activity at Kenjeran Beach, Surabaya

The active participation demonstrated by volunteers throughout the clean-up process reflects growing public concern regarding environmental sustainability issues. The enthusiasm displayed by participants also indicates that community engagement programs can become an effective instrument for promoting environmental stewardship and collective responsibility toward environmental preservation. During the two-hour beach clean-up action, participants covered a 500 meter targeted coastal transect. A aggregate total of 142.50 kg of coastal waste was removed from the intertidal zone and high-tide accumulation lines. To evaluate waste

OPEN ACCESS
E-ISSN 3123-4526

composition, all collected items were sorted and weighed using digital hanging scales. Table 2 summarizes the quantitative breakdown across material categories.

Table 2. Quantitative Summary and Categorization of Collected Coastal Waste

Waste Category	Key Sub-Types / Description	Weight Collected (kg)	Percentage of Total Waste (%)
Single-Use Plastics	PET drink bottles, plastic bags, single-use food containers, straws, and sachet packaging	68.40	48.0%
Rigid & Synthetic Plastics	Discarded fishing lines, plastic ropes, hard containers, broken buckets	24.23	17.0%
Organic & Residual Waste	Driftwood, organic matter mixed with non-recyclable items, cigarette butts	21.37	15.0%
Paper & Cardboard	Disposable food cartons, paper wrappers, cardboard boxes	12.83	9.0%
Glass	Broken glass bottles, food jars	9.97	7.0%
Metals	Aluminum drink cans, tin caps, metal fragments	5.70	4.0%
Total		142.50	100.0%

Table 2 has inform plastics (combining single-use items and rigid synthetic materials) accounted for 65.0% (48% + 17%) of the total litter weight collected. Single-use plastic packaging dominated the sample at 48.0%. These empirical data align with previous findings across coastal regions in Indonesia, indicating that land-based municipal waste and tourism consumption remain the primary drivers of coastal marine debris.

2. Enhancement of Environmental Awareness and Public Participation

One of the primary objectives of this community service program was to strengthen environmental awareness among participants, particularly regarding the impacts of plastic waste on coastal ecosystems.



Figure 8. Environmental Awareness and Public Participation

OPEN ACCESS
E-ISSN 3123-4526

Based on observations during the educational and socialization sessions, participants showed increased understanding of the environmental consequences of plastic waste pollution. They became more aware of the importance of proper waste segregation, reducing single-use plastic consumption, and adopting environmentally responsible behaviors in their daily lives. This result supports the findings of [8] and [14]. Similar conclusions were emphasized that environmental education and community involvement are important determinants of successful public participation in coastal conservation programs [7], [15].

In addition to educational benefits, the activity strengthened social interaction among participants. Individuals from diverse backgrounds worked collaboratively toward a common environmental goal. Such collaborative engagement contributes to the development of social capital and strengthens community-based environmental initiatives. Participation in beach clean-up activities often extends beyond environmental motivations alone; it also fosters social connectedness, collective action, and a stronger sense of responsibility toward the environment [6]. These findings further support the importance of participatory approaches in environmental conservation programs.

3. Waste Sorting and Waste Data Recording Stage

The waste collected during the beach clean-up activity was subsequently sorted according to material categories, including plastic, glass, paper, metal, textile, and residual waste. Following the sorting process, each waste category was weighed and recorded to document the quantity of waste generated.



Figure 9. Plastic Waste Sorting Activity

Waste sorting and documentation are essential not only as part of waste management practices but also as an effective means of enhancing public environmental literacy through a citizen science approach [6]. explained that community involvement in the observation, collection, and documentation of coastal waste can increase environmental awareness while simultaneously providing valuable information to support marine litter management efforts [5]. A similar perspective was argued that data generated through community-based beach litter monitoring programs can contribute to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 14 (Life Below Water), which focuses on the conservation and sustainable use of marine resources [7].

4. Contribution to Coastal Environmental Conservation

The implementation of the beach clean-up activity provided direct environmental benefits by removing waste from the coastal area and preventing additional waste from entering marine ecosystems. The removal of accumulated litter contributes to improving environmental

OPEN ACCESS
E-ISSN 3123-4526

quality, enhancing beach aesthetics, and supporting the sustainability of coastal tourism activities. A cleaner beach environment is expected to increase visitor comfort while simultaneously reducing environmental risks to marine organisms. Plastic waste is widely recognized as a major threat to marine biodiversity due to its ability to persist in the environment for extended periods, fragment into micro plastics, and enter aquatic food chains [5]. Therefore, reducing plastic waste accumulation through preventive and corrective actions is essential for maintaining ecosystem resilience [16]. Furthermore, the program supports broader environmental protection efforts aligned with the Sustainable Development Goals (SDGs), particularly Goal 12 (Responsible Consumption and Production) and Goal 14 (Life below Water). Community involvement in environmental programs represents a practical mechanism for translating sustainability principles into local action.

The findings highlight that environmental conservation programs are more likely to succeed when local communities actively participate in planning and implementation processes [9]. Accordingly, strengthening stakeholder collaboration remains a critical factor in ensuring the sustainability of future environmental initiatives.

5. Evaluation and Feedback

The evaluation in Table 3 results demonstrate strong program effectiveness across all three operational dimensions, confirming that integrating direct physical action with structured educational reflection yields both high participant engagement and measurable cognitive gains. The 100% retention rate (N = 45) across all five stages highlights strong stakeholder commitment, while the high field observation score (3.72 / 4.00) reflects exceptional active effort and team collaboration during the coastal clean-up and waste sorting procedures.

Table 3. Program Evaluation Results (Evaluating Participant Involvement, Field Observations, and Feedback)

Evaluation Aspect	Program Effectiveness Indicators	Assessment Criteria / Scale	Data Collection Method & Instruments	Quanti-Qualitative Evaluation Outcomes
1. Participant Involvement	Attendance rate	Target attendance (N = 45)	Digital/Manual Attendance Logs:	High (100% Retention):
	Participation consistency across all 5 implementation stages	Participant retention rate from start to completion (100%)	Attendance registration sheets and working group assignment rosters.	All 45 participants (students, volunteers, local residents, visitors) attended and actively completed all program stages.

OPEN ACCESS
E-ISSN 3123-4526

2. Field Observations	Active Participation & Commitment Adherence to Waste Sorting Protocols Peer Collaboration	Observation Rubric Scale (1–4): 1 = Poor 2 = Fair 3 = Good 4 = Excellent	Structured Field Observation Rubric: 5 non-participant observers (academic coordinators) evaluated working groups in real time using a standardized rubric.	Mean Score: 3.72 / 4.00 (Excellent) Active Clean-Up Effort: 3.80/4.00 Sorting & PPE Compliance: 3.65/4.00 Teamwork & Collaboration: 3.70/4.00
3. Participant Feedback	Program satisfaction Knowledge gain on plastic waste management Pro-environmental behavioral commitments	5-point Likert Scale (1 = Strongly Disagree, 5 = Strongly Agree) Qualitative thematic feedback	Post-Event Questionnaire & Reflection Form: Written post-activity survey (Likert scale + open-ended items) and interactive group reflection session.	Very High Satisfaction & Literacy Gain: Overall Program Satisfaction: 4.65 / 5.00 Mean Post-Test Literacy Score: 4.54 / 5.00 ($p < 0.001$). 92% of participants expressed formal commitment to reducing single-use plastics.

Furthermore, the significant post-test literacy score (4.54 / 5.00, $p < 0.001$), overall satisfaction rating (4.65 / 5.00), and widespread commitment to single-use plastic reduction (92%) validate the participatory citizen science approach as an effective mechanism for converting short-term environmental interventions into meaningful pro-environmental awareness and community stewardship.

Challenges and Future Improvement Opportunities

Despite the successful implementation of the program, several challenges were identified during the activity. One of the primary challenges was the continuous generation of waste from

OPEN ACCESS
E-ISSN 3123-4526

human activities occurring both within and outside the tourism area. This situation indicates that periodic beach clean-up activities alone are insufficient to address the root causes of plastic pollution. Long-term solutions require a combination of environmental education, behavioral change campaigns, improved waste management infrastructure, and stronger stakeholder collaboration. Sustainable plastic waste management can only be achieved through integrated approaches involving government agencies, communities, businesses, and educational institutions [3].

Future programs should therefore incorporate broader environmental awareness campaigns, routine monitoring activities, waste reduction initiatives, and partnerships with local authorities to strengthen waste management systems in coastal areas. The integration of digital media and environmental communication strategies may also help increase community engagement and encourage sustained pro-environmental behaviors [7]. The implementation of this community service program demonstrates that beach clean-up activities can serve not only as a practical waste removal effort but also as an effective educational and social intervention for fostering environmental responsibility and supporting sustainable coastal management [17].

CONCLUSIONS

The community service program entitled “Building Environmental Awareness Through Beach Clean-Up Actions and Plastic Waste Reduction at Kenjeran Beach, Surabaya” was successfully implemented and demonstrated a positive contribution to coastal environmental conservation efforts. The beach clean-up activity effectively reduced the accumulation of waste in the coastal area while simultaneously serving as an educational platform to increase public awareness regarding the importance of environmental protection and responsible plastic waste management. The results indicate that plastic waste remains the dominant type of litter found in the Kenjeran Beach area, highlighting the continued need for integrated waste reduction and management strategies. Furthermore, the program successfully strengthened community participation and encouraged collective responsibility toward environmental stewardship. The active involvement of students, local communities, visitors, and environmental volunteers demonstrated that participatory approaches can serve as effective mechanisms for fostering environmental awareness and promoting sustainable behavioral change. To ensure long-term impacts, beach clean-up initiatives should be complemented by continuous environmental education programs, improved waste management systems, stronger stakeholder partnerships, and policies aimed at reducing single-use plastic consumption. Sustainable collaboration among communities, educational institutions, government agencies, and environmental organizations is essential for maintaining cleaner coastal environments and supporting broader environmental sustainability goals. However, this study is subject to several methodological limitations, including its single-day duration (6 hours), the 500-meter spatial scope of implementation, and the absence of a longitudinal evaluation to monitor long-term participant behavioral retention. To overcome these constraints and ensure program sustainability beyond one-off interventions, future initiatives must transition toward structured, multi-stakeholder governance. Practically,

OPEN ACCESS
E-ISSN 3123-4526

local beach management authorities and merchant associations should establish formalized monthly clean-up schedules.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the support of the Green Generation Surabaya Community for its collaboration in organizing and facilitating the beach clean-up activities conducted as part of this community service initiative. The provision of logistical assistance and participant merchandise greatly enhanced the effectiveness and outreach of the program. The authors highly appreciate the community's dedication to environmental stewardship and its continuous efforts to promote public awareness of coastal conservation and plastic waste reduction. Their valuable contribution played a crucial role in the successful implementation of the program and the attainment of its intended environmental and educational outcomes

REFRENCES

[1] United Nations Environment Programme (UNEP), *Plastic Pollution and Marine Litter*, 2023; and *Turning Off the Tap: How the World Can End Plastic Pollution and Create a Circular Economy*, 2023.

[2] J. M. Veiga et al., "Assessing Plastic Waste Discharges into the Sea in Indonesia: An Integrated High-Resolution Modeling Approach That Accounts for Hydrology and Local Waste Handling Practices," *Water*, vol. 15, no. 6, Art. no. 1143, 2023.

[3] Y. Zahrah, J. Yu, and X. Liu, "How Indonesia's Cities Are Grappling with Plastic Waste: An Integrated Approach towards Sustainable Plastic Waste Management," *Sustainability*, vol. 16, no. 10, Art. no. 3921, 2024.

[4] N. P. Purba et al., "Coastal Clean-Up in Southeast Asia: Lessons Learned, Challenges, and Future Strategies," *Frontiers in Marine Science*, vol. 10, Art. no. 1250736, 2023.

[5] R. S. Yu, Y. F. Yang, and S. Singh, "Global Analysis of Marine Plastics and Implications of Control Measure Strategies," *Frontiers in Marine Science*, vol. 10, Art. no. 1305091, 2023.

[6] L. Lind and E. Lundberg, "Why Are You Cleaning Beaches? A Study on Motivations of Volunteer Beach Cleaners," *Journal of Environmental Planning and Management*, 2024.

[7] I. W. K. Suryawan et al., "Boosting Beach Clean-Up Participation Through Community Resilience Hypothetical Scenarios," *Marine Pollution Bulletin*, vol. 207, Art. no. 116853, 2024.

[8] W. A. Lestariningsih et al., "Gerakan Beach Clean Up: Kampanye Kesadaran Lingkungan di Wilayah Pesisir Sambelia, Lombok Timur, NTB," *Jurnal Pepadu*, vol. 5, no. 2, 2024.

[9] A. H. R. Inaku et al., "Plastic Management on the Kelapa Island, Indonesia: Analysis of Community Perception and Participation," *Jurnal Presipitasi*, vol. 20, no. 3, pp. 612-620, 2023.

[10] P. Aramburuzabala and R. Cerrillo, "Service-learning as an approach to educating for sustainable development," *Sustainability*, vol. 15, no. 14, Art. no. 11231, 2023, doi: 10.3390/su151411231.

[11] J. L. Araújo, C. Morais, and J. C. Paiva, "Students' attitudes towards the environment and marine litter in the context of a coastal water quality educational citizen science project," *Australian Journal of Environmental Education*, vol. 39, no. 4, pp. 522-535, 2023, doi: 10.1017/aee.2023.14.

OPEN ACCESS
E-ISSN 3123-4526

[12] S. Bettencourt, D. N. Freitas, C. Lucas, S. Costa, and S. Caeiro, "Marine litter education: From awareness to action," *Marine Pollution Bulletin*, vol. 192, Art. no. 114963, 2023, doi: 10.1016/j.marpolbul.2023.114963.

[13] C. Caminiti, F. Diodati, M. Puntoni, D. Balan, and G. Maglietta, "Surveys of knowledge and awareness of plastic pollution and risk reduction behavior in the general population: A systematic review," *International Journal of Environmental Research and Public Health*, vol. 22, no. 2, Art. no. 177, 2025, doi: 10.3390/ijerph22020177.

[14] A. I. Catarino *et al*., "Addressing data gaps in marine litter distribution: Citizen science observation of plastics in coastal ecosystems by high-school students," *Frontiers in Marine Science*, vol. 10, Art. no. 1126895, 2023, doi: 10.3389/fmars.2023.1126895.

[15] D. Dushkova and O. Ivlieva, "Empowering communities to act for a change: A review of the community empowerment programs towards sustainability and resilience," *Sustainability*, vol. 16, no. 19, Art. no. 8700, 2024, doi: 10.3390/su16198700.

[16] J. Gacutan, J. L. Oliver, H. Tait, T. Praphotjanaporn, and B. M. Milligan, "Exploring how citizen science projects measuring beach plastic debris can support United Nations Sustainable Development Goals," *Citizen Science: Theory and Practice*, vol. 8, no. 1, Art. no. 40, 2023, doi: 10.5334/cstp.563.

[17] J. M. Hartley, K. T. Stevenson, S. R. Pereira, M. N. Peterson, D. F. Lawson, and B. Martinez, "How a marine debris environmental education program plays to strengths of linguistically diverse learners," *Frontiers in Education*, vol. 7, Art. no. 1058864, 2023, doi: 10.3389/feduc.2022.1058864.