

EDUCATION AND ACTION TO REDUCE SINGLE-USE PLASTIC IN PUBLIC SPACES: A SERVICE PROGRAM AT THE MALANG CITY SQUARE, EAST JAVA, INDONESIA

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Abstract

Single-use plastic waste continues to pose a significant environmental challenge in urban public spaces across Indonesia, including at the Malang City Square (Alun-Alun Kota Malang) in East Java Province, Indonesia. The concentration of socio-economic activities in this location contributes to elevated levels of plastic consumption, particularly from the informal sector such as street vendors. Compounding this issue is the generally low level of public awareness regarding the environmental consequences of plastic pollution. This community engagement initiative was designed to enhance environmental literacy and promote behavioural change through direct educational outreach and the provision of reusable cloth bags as a sustainable alternative. Employing a participatory and educational methodology, the programme commenced with field-based observation to assess plastic usage habits, followed by the development and dissemination of educational brochures and the direct distribution of cloth bags to local residents and informal sector actors. The public response indicated a high degree of receptivity and engagement, as demonstrated by active participation in discussions and immediate adoption of the alternative bags. Preliminary post-activity evaluation revealed improved comprehension of the environmental impacts of single-use plastics and a greater willingness to transition towards more sustainable consumption practices. This initiative demonstrates that education-based interventions, when supported by practical solutions, can effectively cultivate ecological awareness and stimulate community-level environmental action. Furthermore, it contributes to the realisation of several Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land).

Keywords: single-use plastic, environmental education, behavioural change, community engagement, Malang City

Abstrak

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Hingga saat ini, sampah plastik sekali pakai masih menjadi isu lingkungan serius di ruang publik perkotaan Indonesia, termasuk di kawasan Alun-Alun Kota Malang di Provinsi Jawa Timur, Indonesia. Intensitas aktivitas sosial dan ekonomi di kawasan ini menyebabkan tingginya konsumsi plastik, terutama dari sektor informal seperti pedagang kaki lima. Sementara itu, kesadaran masyarakat sekitar terhadap dampak negatif plastik terhadap lingkungan masih tergolong rendah. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan kesadaran dan mengubah perilaku masyarakat melalui edukasi langsung serta pemberian tas kain sebagai alternatif ramah lingkungan. Pelaksanaan kegiatan menggunakan pendekatan partisipatif dan edukatif, dimulai dengan observasi lapangan untuk mengidentifikasi kebiasaan penggunaan plastik, diikuti dengan penyusunan materi edukatif berupa brosur, serta kegiatan sosialisasi langsung yang disertai pembagian tas kain kepada masyarakat di sekitar lokasi. Kegiatan ini menyasar pengunjung dan pelaku usaha informal di kawasan Alun-Alun Kota Malang. Respons masyarakat menunjukkan antusiasme tinggi terhadap kampanye yang dilakukan, yang terlihat dari keterlibatan aktif dalam diskusi dan penggunaan langsung tas kain yang dibagikan. Evaluasi singkat pasca-kegiatan menunjukkan adanya peningkatan pemahaman mengenai dampak plastik sekali pakai serta kemauan untuk beralih ke praktik konsumsi yang lebih ramah lingkungan. Kegiatan ini memberikan bukti bahwa intervensi berbasis edukasi yang disertai solusi praktis dapat secara efektif membangun kesadaran ekologis dan mendorong tindakan nyata di tingkat komunitas. Program ini juga mendukung upaya pencapaian Tujuan Pembangunan Berkelanjutan (SDGs), khususnya berkaitan dengan SDG 3 (Kehidupan Sehat dan Sejahtera), SDG 12 (Konsumsi dan Produksi Bertanggungjawab), SDG 13 (Penanganan Perubahan Iklim), SDG 14 (Ekosistem Laut), serta SDG 15 (Ekosistem Daratan).

Kata Kunci: plastik sekali pakai, edukasi lingkungan, perubahan perilaku, pemberdayaan masyarakat, Kota Malang

Introduction

The issue of single-use plastic waste remains an urgent environmental concern across various regions in Indonesia (Rahmayani & Aminah, 2021; Saputra *et al.*, 2023; A'yuni *et al.*, 2024; Lingga *et al.*, 2024). One of the most affected areas is the Malang City Square in East Java Province, Indonesia, which serves daily as a hub of public activity, ranging from tourism and shopping to casual leisure. The high volume of economic and social activities in this public space has contributed to increased consumption of single-use plastics, particularly from food and beverage packaging sold by street vendors and small-scale businesses operating nearby. The continued use of single-use plastics by Indonesian society is largely due to their convenience and low cost; however, this is often not accompanied by an adequate waste management system (Hakim, 2019; Lusnita, 2019).

The accumulation of plastic waste in a certain area, including at the Malang City Square, not only degrades the cleanliness and aesthetic quality of public spaces but also has direct impacts on the surrounding environment. Improperly managed waste is often carried into drainage systems or rivers, polluting water bodies and exacerbating environmental degradation (Bukasa *et al.*, 2020; Dewi *et al.*, 2022). According to data from the United Nations Environment Programme (UNEP), approximately 300 million tonnes of plastic are produced annually, with a substantial portion ending up as waste, **polluting** the environment and threatening ecosystems. This situation illustrates that the plastic waste problem is not only global in scale, but also necessitates locally driven, contextual solutions grounded in community participation (Dewi *et al.*, 2022; Suwandi, 2023).

Field observations reveal that public and business awareness in Indonesia regarding the long-term impacts of single-use plastic consumption remains considerably low (Putra *et al.*, 2025). Most Indonesian consumers are not yet accustomed to bringing their own reusable containers when shopping (Sari & Salam, 2022), while small-scale business actors often lack access to both information and environmentally friendly packaging alternatives. Furthermore, the absence of

collective movements and robust regulatory support has resulted in plastic reduction initiatives in Indonesia being sporadic and unsustainable in nature (Putri *et al.*, 2022).

In response to these issues, this community engagement programme was designed to assist and empower local communities around Malang City Square in reducing their reliance on single-use plastics. The programme encompasses a series of public education initiatives, training sessions on the utilisation of environmentally friendly alternative materials, the distribution of reusable cloth bags as substitutes for plastic carriers, and a collective campaign entitled '*Plastic-Free City Square*' (*Alun-Alun Bebas Sampah*). These activities target not only local business operators, but also members of the general public who frequently utilise this public space in their daily lives.

The intervention model adopted in this programme draws upon approaches that have been demonstrated to be effective in numerous prior studies. Community-based environmental education has proven capable of fostering behavioural change when accompanied by tangible examples and practical solutions. Moreover, facilitation involving a diverse range of stakeholders, including academics, local communities, and municipal authorities, has consistently contributed to the success of public space waste management initiatives. Accordingly, this collaborative approach is considered **instrumental** in fostering awareness and cultivating a collective commitment towards creating a cleaner and healthier environment (Faturachman *et al.*, 2024).

In general, this community engagement initiative aims to raise public awareness regarding the importance of maintaining environmental cleanliness and reducing dependency on single-use plastics. This **objective** is realised through two primary activities. First, educating the community about the environmental hazards of waste through direct outreach conducted at the Malang City Square. As part of this initiative, brochures containing informative content and calls to action encouraging greater environmental responsibility were distributed to the public. Second, promoting a shift towards more environmentally conscious habits by distributing reusable cloth bags as an alternative to plastic bags. These bags are intended for repeated use and are expected to contribute to reducing the volume of plastic waste, which has long posed a significant challenge in this public space.

Method of Implementation

This community engagement activity was carried out at the Malang City Square, East Java Province, a public space characterised by a high level of social and economic activity. The location was selected due to the visibly high intensity of single-use plastic consumption, particularly in transactional activities and the consumption of food and beverages by both visitors and street vendors. The programme was implemented over the course of May 2025.

The target group for this initiative comprised 20 individuals active in the vicinity of the Malang City Square, including both visitors and street vendors operating within the area. The selection of participants was conducted purposively, taking into account their level of exposure to single-use plastic consumption as well as the potential for behavioural change through direct intervention.

The implementation method of this community engagement initiative adopted a participatory and educational approach, designed not merely to convey information but also to foster awareness and encourage direct behavioural change. The initial stage commenced with field observation aimed at identifying community habits related to single-use plastic consumption within the project site. The engagement team conducted systematic observations of plastic bag usage in commercial transactions, as well as the availability and condition of waste management facilities.

The subsequent stage involved the development of educational materials in the form of a brochure, containing information on the detrimental impacts of plastic on the environment, the importance of reducing single-use plastic consumption, and environmentally friendly alternatives such as the use of reusable cloth bags. The brochure was designed to be both informative and visually engaging, ensuring accessibility and comprehension across diverse social backgrounds. Once finalised, the material was disseminated through two primary channels: social media, to reach

a broader audience, and direct outreach through interpersonal communication during field-based awareness campaigns.

During the direct outreach activity conducted on Sunday, 11 May 2025, the community service team engaged actively with the public at the Malang City Square. The team delivered oral presentations, distributed brochures, and facilitated informal discussions concerning plastic usage habits. This approach aimed not only to disseminate knowledge but also to encourage community participation in identifying and pursuing collective solutions. As a tangible commitment to promoting behavioural change, reusable cloth bags were distributed free of charge to participants. These bags served both as a symbol and a practical alternative to single-use plastic bags, intended for repeated use in everyday activities.

The effectiveness of this initiative was assessed using several indicators, including increased public awareness of the environmental impacts of plastic, positive responses to the call for plastic reduction, and the continued use of cloth bags by the community following the activity. The evaluation employed both qualitative and light quantitative approaches. Qualitatively, assessment was conducted through brief interviews and behavioural observations of community members after the outreach. Quantitatively, the achievement indicators were measured by the number of brochures distributed, the number of actively participating individuals, and the frequency with which the cloth bags were reused within a defined period.

Results and Discussions

The community engagement activity conducted at the Malang City Square area revealed notable dynamics concerning public behaviour towards the use of single-use plastics. Prior to the intervention, it was observed that the community remained largely dependent on plastic bags in their daily routines, particularly when shopping. Plastics were perceived as a practical and economical solution, with little awareness of their environmental consequences. This practice was not confined to markets or shops alone, but was also prevalent among street vendors and visitors to the city square, who routinely used plastic bags without much consideration.

Furthermore, plastic waste was also found scattered across several points within the public open spaces of Malang City Square. Much of it consisted of single-use food and beverage packaging that had been carelessly discarded (Figure 1). This phenomenon not only reflects a low level of environmental awareness but also underscores the need for a direct, grounded, and communicative approach to more effectively engage public consciousness on a broader scale.



Figure 1. Waste conditions at Malang City Square (source: personal documentation)

In response to this situation, the community service team developed a series of educational and participatory activities that positioned the public as active agents of change. The initial step involved the preparation and printing of an educational brochure. This brochure contained factual and engaging information on the negative impacts of single-use plastics, alongside recommendations to adopt more environmentally friendly alternatives, such as the use of reusable

cloth bags. The brochure was designed to be easily comprehensible to the general public, employing accessible language and informative visuals to enhance communication and understanding.

The subsequent stage involved the production of cloth bags (goodie bags) as a practical alternative to plastic carriers (Figure 2). These bags were designed to be visually appealing and were accompanied by environmental messages, serving as a call to adopt more responsible behaviours. Their presence is intended to function as a mobile campaign medium, whereby each individual using the bag contributes to disseminating environmentally conscious messages within their respective communities.



Figure 2. Goodie bag produced (source: personal documentation)

The culminating activity involved direct field engagement, specifically within the Malang City Square area. The team conducted face-to-face outreach with members of the public present in this communal space (Figure 3). Brochures and cloth bags were distributed while conveying critical information regarding the hazards of single-use plastics. The community's response was notably enthusiastic, with many individuals showing interest in reading the brochures and attentively listening to the explanations provided by the outreach team.



Figure 3. Outreach activities on plastic use conducted with visitors and street vendors at Malang City Square (source: personal documentation)



Figure 4. Outreach activities on plastic use conducted with visitors and street vendors at Malang City Square (source: personal documentation)

Overall, the community responded positively to the initiative. Many expressed interest in the campaign's content, with the majority promptly adopting the distributed cloth bags. Several visitors conveyed that they felt genuinely moved upon learning about the detrimental effects of plastic on both health and the environment. Appreciation was also extended to the team for delivering information in a non-patronising manner and for proposing concrete solutions. Viewed from the perspective of community education principles, this activity successfully combined the delivery of knowledge with the provision of practical alternative solutions. The approach aimed to foster critical awareness while simultaneously encouraging small-scale actions that could collectively yield significant impact.

Conceptually, this activity aligns with the global agenda as outlined by the Sustainable Development Goals (SDGs), particularly Goal 12 concerning Responsible Consumption and Production. This goal emphasises the importance of shifting societal consumption patterns towards more environmentally friendly and sustainable practices. The campaign to reduce single-use plastics is especially pertinent as it addresses the root cause of irresponsible consumption, namely, the habitual use of disposable items that are difficult to decompose. Through education and the provision of cloth bags as an alternative, the initiative promotes behavioural change towards more prudent consumption. This approach also embodies the principles of waste reduction and reuse, which constitute a vital component of the strategy to achieve SDG 12 targets.

The issue of plastic bag usage also contributes to various other environmental problems, including the clogging of drainage systems that can cause flooding, as observed in the Soekarno Hatta area and numerous other locations across Malang City. The accumulation of plastic obstructing water channels serves as a tangible example that this issue extends beyond waste management to encompass urban infrastructure and the broader welfare of the community. Furthermore, the management of plastic waste impacts not only the aesthetics of public spaces and

public health but also bears significant ecological implications, as reflected in its relation to the Sustainable Development Goals (SDGs), particularly SDG 14 (Life Below Water) and SDG 15 (Life on Land). Improperly managed plastic waste has a considerable potential to contaminate both aquatic and terrestrial environments. In coastal and marine areas, the accumulation of microplastics has been shown to disrupt food chains, poison marine organisms, and degrade natural habitats (Jamika *et al.*, 2023). Meanwhile, in terrestrial ecosystems, the slow degradation of plastics can pollute soil and groundwater through the release of hazardous chemicals, ultimately disturbing ecological balance and land productivity (Fayshal, 2024).

In this context, educational and awareness-raising activities aimed at reducing single-use plastic consumption constitute a crucial strategy that not only targets behavioural change but also directly contributes to ecosystem preservation. Through a participatory approach in public spaces such as Malang City Square, this community service programme encourages the public to comprehend the long-term impacts of plastic consumption and to internalise sustainability values in their daily lives. Consequently, what may appear as a simple endeavour holds significant ecological potential by preventing further pollution and supporting the conservation of biodiversity both marine and terrestrial. Such direct engagement with the community also facilitates constructive dialogue and the transmission of values that foster the development of more responsible behaviours.

This community service activity also contributes towards achieving SDG 13, Climate Action. By reducing single-use plastics, carbon emissions resulting from the production and incineration of plastics can be curtailed. Plastics that are improperly discarded and subsequently burnt release greenhouse gases into the atmosphere, exacerbating climate change (Singh-Pillay, 2025). Therefore, this modest initiative is strongly linked to global climate mitigation efforts. Another equally important aspect is the linkage to SDG 3, Good Health and Well-Being. Microplastics originating from single-use plastic waste have now been detected entering the human food chain (Devasahayam *et al.*, 2019; Pilapitiya & Ratnayake, 2024). This indicates that the issue of plastic waste extends beyond environmental concerns to directly impact public health. By curbing plastic consumption, long-term health risks can consequently be mitigated.

From the perspective of environmental communication, the success of this initiative also lies in the personalised approach undertaken by the team with the community. Direct interaction fosters a more meaningful exchange of ideas and values compared to one-way campaigns. This demonstrates that a humanistic approach remains highly effective in driving social change. Overall, the outcomes of this activity indicate that education, when combined with the provision of practical solutions, can enhance public awareness within a relatively short period. Although numerous challenges remain ahead, this initiative exemplifies that change begins with simple, consistent actions involving all segments of society.

Similar initiatives are expected to be replicated in other locations with broader scope and greater involvement of multiple stakeholders, including local governments, community groups, educational institutions, and business actors. Such replication is essential to foster a widespread collective movement to systematically address the issue of plastic waste. Multi-stakeholder synergy is pivotal in establishing a sustainable waste management system, as each sector possesses complementary roles and contributions (Jannah *et al.*, 2025). The government can provide regulations and incentives, communities play a role in education and local actions, while the business sector can drive innovation in environmentally friendly products. Through structured collaboration, the resulting change will not be merely transient but will cultivate long-term habits for more responsible environmental management.

Empowerment activities can be considered successful if they lead to positive changes in the community (Afrianto *et al.*, 2022). However, this community service initiative not only succeeded as a local intervention at the Malang City Square area but also constitutes a concrete contribution to broader sustainable development efforts. From an environmental perspective, the activity promotes the reduction of pollution potential caused by single-use plastics and fosters public

awareness of the importance of ecosystem preservation. Socially, it cultivates active citizen participation in collective actions that nurture a shared sense of responsibility towards public spaces and communal quality of life. In terms of health, reducing plastic waste helps mitigate the risks associated with exposure to microplastics, which pose significant long-term dangers to humans. Although limited in scale, this initiative demonstrates that meaningful change can originate at the community level and, if widely adopted, may generate a cumulative impact substantial enough to advance the achievement of sustainable development goals.

Conclusions and Suggestions

This community service initiative introduced an educational and participatory approach to reducing single-use plastics in public spaces, with a focus on direct action at the Malang City Square. The distinctiveness of this activity lies in the combination of interpersonal outreach and the provision of practical solutions, namely cloth bags, which tangibly encourage changes in public consumption behaviour. The programme not only yields immediate benefits by raising environmental awareness but also strengthens community involvement in collective efforts to maintain the cleanliness of public areas. Theoretically, this initiative reinforces the argument that community-based interventions combining education with concrete actions can serve as an effective strategy to foster ecological consciousness at the local level.

For future community service activities, it is recommended that the programme be expanded to areas with similar characteristics and involve a wider range of stakeholders, including local governments and business actors. Furthermore, it is essential to develop ongoing monitoring mechanisms to evaluate the long-term impact on behavioural change within the community. A cross-sectoral collaborative approach will be key to ensuring the sustainability and scalability of this initiative to broader contexts.

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References

- A'yuni, N. Q., Putra, N. D. A., Giandra, S. K., Yuli, Y., Mulyadi, M., & Suhaidi, S. (2024). Upcycling: Cara Kreatif Remaja Menyelamatkan Lingkungan dan Meningkatkan Ekonomi. *Dinamika Sosial: Jurnal Pengabdian Masyarakat dan Transformasi Kesejahteraan*, 1(4), 141-145.
- Afrianto, W. F., Wati, S. I., Putra, R. P., & Hidayatullah, T. (2022). Empowerment of farmers through the online extension in improving agricultural information literacy. *Jurnal Pengabdian Magister Pendidikan IPA*, 5(2), 374-378.
- Bukasa, O. T., Iskakova, D., Ganiyu, S. A., Rong, X., Li, M., & Li, J. (2020). Influencing factors of plastic waste pollution reduction in Kinshasa. *Journal of Geoscience and Environment Protection*, 8(12), 180-199.
- Devasahayam, S., Raju, G. B., & Hussain, C. M. (2019). Utilization and recycling of end of life plastics for sustainable and clean industrial processes including the iron and steel industry. *Materials Science for Energy Technologies*, 2(3), 634-646.

- Dewi, V. A. K., Putra, R. P., Haris, A., & Alam, T. (2022). *Limbah Dapur dan Pemanfaatannya*. Yogyakarta: CV Bintang Semesta Media.
- Faturachman, M. F., Pramudya, D. A., Ardhanah, A., Purnomo, A. P., Muchlisin, M. N. F., & Suherman, S. (2024, November). Transformasi Lingkungan Melalui Gotong Royong: Sinergi Mahasiswa dan Masyarakat Untuk Kebersihan Lingkungan di Jalan Kentang RT 004/RW 007, Pondok Cabe Ilir, Pamulang, Tangerang Selatan, Banten. In *Prosiding Seminar Nasional Pengabdian Masyarakat LPPM UMJ*.
- Fayshal, M. A. (2024). Current practices of plastic waste management, environmental impacts, and potential alternatives for reducing pollution and improving management. *Heliyon*, 10(23).
- Hakim, M. Z. (2019). Pengelolaan dan pengendalian sampah plastik berwawasan lingkungan. *Amanna Gappa*, 111-121.
- Jamika, F. I., Dewata, I., Nasution, S. M., Primasari, B., & Dewilda, Y. (2023). Dampak pencemaran mikroplastik di wilayah pesisir laut. *Jurnal Sumberdaya Akuatik Indopasifik*, 7(3), 337-344.
- Jannah, G. R., Faradzilla, A. R., Naim, N. N., Septyano, M. P., Athifah, K. L. N., Febiyanti, N., Yudhistira, K. Y., Puspa, P. C., & Roesnia, O. A. (2025). Pentingnya kesadaran masyarakat dan kepatuhan hukum terhadap masalah sampah di lingkungan sekitar sungai. *Terang: Jurnal Kajian Ilmu Sosial, Politik dan Hukum*, 2(1), 10-19.
- Lingga, L. J., Yuana, M., Sari, N. A., Syahida, H. N., Sitorus, C., & Shahron, S. (2024). Sampah di Indonesia: Tantangan dan solusi menuju perubahan positif. *INNOVATIVE: Journal of Social Science Research*, 4(4), 12235-12247.
- Lusnita, N. (2019). Program pengurangan sampah plastik melalui kebijakan kantong plastik berbayar di ritel modern. *Journal of Servite*, 1(1), 12-24.
- Pilapitiya, P. N. T., & Ratnayake, A. S. (2024). The world of plastic waste: a review. *Cleaner Materials*, 11, 100220.
- Putra, M. N. A., Zahrani, N. A., Zahra, T. A., Bella, B. C., Hariyadi, A. G., Fadhila, D. S., Al Abiyyu, S. A., Firdausi, R. R. K., Justicio, M. N., Albar, A. K., & Firmansyah, P. (2025). Sampah plastik sebagai ancaman terhadap lingkungan. *Aktivisme: Jurnal Ilmu Pendidikan, Politik Dan Sosial Indonesia*, 2(1), 154-165.
- Putri, S. D., Addini, J. T., Heriyanti, A. P., & Fariz, T. R. (2022, August). Jeonju vs Semarang: Peran serta masyarakat dalam pengelolaan sampah. In *Proceeding Seminar Nasional IPA* (pp. 77-83).
- Rahmayani, C. A., & Aminah, A. (2021). Efektivitas pengendalian sampah plastik untuk mendukung kelestarian lingkungan hidup di Kota Semarang. *Jurnal Pembangunan Hukum Indonesia*, 3(1), 18-33.
- Saputra, K. A. K., Ekajayanti, L. S., & Suriani, N. N. (2024). Plastic waste reduction campaign at the traditional market in Nyanggelen Village, Panjer, Denpasar. *Akuntansi dan Humaniora: Jurnal Pengabdian Masyarakat*, 3(3), 184-189.
- Sari, F. L., & Salam, R. (2022). Partisipasi masyarakat melalui kewajiban penggunaan kantong belanja ramah lingkungan. *Jurnal Administrasi Negara*, 28(3), 318-339.
- Singh-Pillay, A. (2025). Technology Student Teachers Address Energy and Environmental Concerns on Plastic Usage and Disposal Through Experiential Challenge-Based Learning. *Sustainability*, 17(9), 4042.
- Suwandi, N. A. (2023). Plastic Pollution is a Global Problem, but Local Interventions are Critical to Address the Challenge. Retrieved from <https://www.thecirculateinitiative.org/blog/plastic-pollution-is-a-global-problem-but-local-interventions-are-critical-to-address-the-challenge/> at May 28, 2025.