

COMMUNITY EMPOWERMENT IN WASTE MANAGEMENT BASED ON REAL WORK LECTURE PROGRAM: A COMPARATIVE STUDY OF ORGANIC-INORGANIC WASTE MANAGEMENT IN BANTUL AND PLASTIC WASTE UTILIZATION IN KLATEN

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Abstract

Household waste management, both organic and inorganic, remains a challenge for many communities in Indonesia, leading to short term community service interventions through university KKN programs. This article aims to compare two community service programs addressing waste management, namely an organic and inorganic waste management program in Dukuh Sangkeh, Srigading, Bantul, and a plastic waste reuse program in Dukuh Gatak, Beteng, Klaten. A descriptive comparative analysis was applied to two published community service articles, comparing target participants, implementation methods, resulting products, and supporting or inhibiting factors of each program. The comparison shows that both programs share a similar implementation structure of socialization, hands on practice, and evaluation, while differing in target participants, waste type managed, and resulting outputs. The Bantul program emphasized composting and involved Karang Taruna youth, while the Klaten program emphasized children's creativity through the reuse principle applied to plastic containers. This article offers an initial overview of the variation in community empowerment approaches to waste management in rural contexts of Yogyakarta Special Region and Central Java.

1. INTRODUCTION

The waste problem is one of the environmental challenges faced by almost all regions in Indonesia in line with population growth and people's consumption patterns. The volume of household waste, both from food waste and single-use plastic packaging, continues to increase every year (Kurniari et al., 2025; Wulandari et al., 2025). The limitations of final management infrastructure, such as those in Final Disposal Sites (TPAs) in some regions, increase the urgency of waste management at the household and community level before the waste ends up in landfills (Kurniari et al., 2025). Regulatively, the obligation to manage waste by local governments and communities has actually been regulated through Law Number 18 of 2008 concerning Waste Management, which emphasizes the reduction and handling of waste from the source.

Evidence from abroad also confirms that the effectiveness of urban waste management is highly dependent on the level of citizen participation and collaboration with local governments. Cross-regional comparative studies show that citizen participation significantly increases the effectiveness of waste reduction and recycling, while local government collaboration plays an important role in creating supportive regulations and coordination systems (Anyanwu et al., 2025). Similar findings in the Indonesian context, particularly in DKI Jakarta, show that the level of individual participation in waste management is influenced by involvement in community social activities and the level of citizen empowerment (Brotosusilo et al., 2020), which indicates that community-based empowerment programs such as KKN have a direct relevance to increasing such participation.

At a more specific level, the two types of waste that are most highlighted in community empowerment programs are organic waste, which can be processed into compost, and inorganic waste, especially plastic, which takes a very long time to decompose naturally (Wulandari et al., 2025; Nasution, 2015). These two types of waste require different management approaches, so community service programs that target both tend to be designed with different methods and goals for participants.

Several community service programs have been implemented to respond to these problems. The program in Sangkeh Hamlet, Srigading, Bantul, for example, held community empowerment through the management of organic waste into compost and inorganic waste into handicrafts, by involving Karang Taruna youth and TPA children as participants, in line with the Bantul Clean Waste 2025 program (Kurniari et al., 2025; Kurniawan & Suripto, 2022; Isni & Mustanginah, 2023). Household-based empowerment programs with a similar spirit have also been reported in other hamlets in Bantul (Suharta, 2022; Puspitasari et al., 2022). On the other hand, the program in Gatak Hamlet, Beteng, Klaten, focuses on the use of used gallon plastic waste with the principle of reuse to increase children's creativity (Wulandari et al., 2025), in line with the findings that participatory recycling craft training is effective in increasing the creativity and environmental awareness of elementary school students (Yuningsih & Jaizul, 2025). Both programs use a participatory approach consisting of socialization, hands-on practice, and evaluation stages, but are reported separately without any attempt to compare approaches, objectives, or outcomes between the two.

As far as the publication of the two programs is concerned, there has been no study that explicitly compares how the different types of waste managed, the target of participants, and the regional context affect the design of methods and outputs of waste management-based community empowerment programs. Community service articles are generally reported as single case studies, so cross-program learning that can be taken to strengthen community empowerment practices in similar contexts is still limited. This condition shows that there is a methodological gap in the form of a lack of comparative analysis between community service programs that focus on the theme of waste management.

This article seeks to fill this gap by presenting a comparative descriptive analysis of two community service programs that have been published, namely the organic and inorganic waste management program in Bantul and the plastic waste utilization program in Klaten. This article does not generate new primary data, but rather synthesizes and compares information that has been reported in the two publications.

The purpose of this article is to compare the participants' targets, implementation methods, products or outputs, as well as the supporting and inhibiting factors of the two community service programs, so that similarities and differences in community empowerment approaches can be identified in the context of waste management in rural areas.

2. LITERATURE REVIEW

This section outlines the main concepts relevant to the comparison of the two programs, namely the 3R principles in waste management, community-based waste management and community participation, and children's creativity through recycling education. These three concepts serve as a frame of reference to compare the two community service programs in the results and discussion sections.

2.1 Waste Management and the 3R Principles

Waste management can be done using the 3R principle, namely reduce, reuse, and recycle. Reduce means reducing the use or purchase of goods that have the potential to become waste, reuse means reusing goods that can still be used, while recycle means recycling goods into new products (Wulandari et al., 2025). Plastic waste in particular requires more careful handling because the synthetic polymer material on which it is made is difficult to degrade naturally so it takes a very long time to decompose (Nasution, 2015). One of the reuse methods that is widely reported in the Indonesian community service literature is ecobricks, which is the compaction of plastic waste into used bottles as an alternative building material, which has been proven to be effective in reducing the volume of plastic waste at the household and community levels (Widiyasari et al., 2021; Nirmalasari et al., 2021; Istirokhatun, 2019). Organic waste such as food scraps and kitchen waste can be processed through the composting process into fertilizers that are beneficial for the agricultural sector, thereby reducing people's dependence on chemical fertilizers (Kurniari et al., 2025). The obligation to reduce and handle waste by the community and local government is formally regulated in Law Number 18 of 2008 concerning Waste Management.

2.2 Community-Based Waste Management and Community Participation

Community service programs are generally designed through preliminary study stages, participatory planning involving local community leaders and groups, implementation in the form of socialization and direct practice, and evaluation to see the progress and sustainability of the program (Kurniari et al., 2025). This participatory approach aims to ensure that the target community is not only an object, but also an active role in the learning process and waste management practice, so that it is hoped that the program can run independently after the mentoring period ends (Kurniari et al., 2025; Wulandari et al., 2025).

The international literature supports the importance of this community participation. Cross-regional comparative studies show that citizen participation consistently increases the effectiveness of waste reduction and

recycling, and that the success of community-based programs is also determined by effective leadership and transparent governance (Anyanwu et al., 2025). In the Indonesian context, the level of individual participation in waste management is proven to be influenced by the frequency of involvement in community social activities, education levels, and citizen empowerment (Brotosusilo et al., 2020). Several household-based community service programs in the Bantul area also reported that persuasive education and active involvement of residents increased people's understanding and willingness to manage waste independently (Suharta, 2022; Puspitasari et al., 2022; Isni & Mustanginah, 2023; Kurniawan & Suropto, 2022).

2.3 Children's Creativity through Recycling Education

In addition to the waste management aspect, a number of community service programs also target the development of children's creativity through recycling activities. Children's creativity is shaped by cognitive aspects, which are characterized by fluent, flexible, and original thinking skills, as well as affective aspects that are reflected in curiosity, imagination, and courage to take risks (Susanto, 2013). Curiosity and natural openness to the surrounding environment are also the roots of children's creativity growth (Muqodas, 2015). These findings are consistent with the results of participatory recycling craft training for elementary school students, which shows an increase in creativity in processing used goods into functional products as well as changes in children's behavior in sorting waste (Yuningsih & Jaizul, 2025).

Table 1. Summary of the Literature Foundations and Their Contribution to Program Comparison

Study Aspects	Supporting Literature Sources	Contribution to Comparison
3R principles and plastic waste management	Nasution (2015); Widiyasari et al. (2021); Nirmalasari et al. (2021); Istirokhatun (2019)	Becomes the basis for assessing the principle of reuse in Program 2 (Klaten)
Community-based waste management	Puspitasari et al. (2022); Suharta (2022); Kurniawan & Suropto (2022); Isni & Mustanginah (2023); Brotosusilo et al. (2020); Anyanwu et al. (2025)	It is the basis for assessing citizen participation and sustainability in Program 1 (Bantul)
Children's creativity through recycling education	Muqodas (2015); Susanto (2013); Yuningsih & Jaizul (2025)	It is the basis for assessing creative outputs in both programs, especially Program 2
Legal basis for waste management	Law Number 18 of 2008	Becoming the regulatory framework behind the two programs

Source: Author (2026).

3. RESEARCH METHODOLOGY

This article uses a comparative descriptive approach by analyzing two community service articles that have been published as the main data sources, namely Kurniari et al. (2025) which report on organic and inorganic waste management programs in Sangkeh, Srigading, Bantul, and Wulandari et al. (2025) which report on plastic waste utilization programs in Gatak Hamlet, Beteng, Klaten. Both articles were chosen because they both discussed the theme of waste management through community service programs based on KKN with a participatory approach.

To enrich the analytical framework, this article also searches the relevant supporting literature through online academic databases (Google Scholar, ScienceDirect, and Indonesian community service journal repositories) using a combination of keywords "community-based waste management", "waste community participation", "3R principles", and "creativity of recycling children", limited to publications from 2013 to 2025. Supporting literature sources are included if (a) they are indexed journal articles or verifiable community service reports, and (b) are directly relevant to one of the aspects of comparison, namely the 3R principle, community participation, or children's creativity. Sources whose authorship or publisher cannot be verified are not included.

The analyzed units included the participants' targets, the type of waste managed, the management principles applied, the stages of the implementation method, the products or outputs produced, the reported success indicators, and the supporting and inhibiting factors for the implementation of the program. Information about both programs was extracted directly from the text of the source article without the addition of new data, while the supporting literature was used solely to reinforce the interpretation, not to change the data that had already been reported. If information is not explicitly reported in one of the source articles, it is marked as data unidentified and is not filled with assumptions.

4. RESULT AND DISCUSSION

4.1 Result

A comparison of the characteristics of the two community service programs is presented in Table 1.

Table 2. Comparison of Waste Management Programs in Bantul and Klaten.

Aspects	Program 1: Dukuh Sangkeh, Srigading, Bantul (Kurniari et al., 2025)	Program 2: Dukuh Gatak, Beteng, Klaten (Wulandari et al., 2025)
Focus on waste	Organic and inorganic waste (kitchen waste as well as plastic bottles, cans, paper)	Plastic waste (used gallons)

Key targets	Youth of Karang Taruna and children of the Baitussalam Mosque TPA	Children of Dukuh Gatak
Management principles	Kitchen waste composting and creative recycling	Principle giants (3R)
Method stages	Preliminary study, participatory planning, implementation (socialization and practice), evaluation	Socialization, creation, implementation, evaluation
Product/exterior	Compost fertilizer (8 kg of organic waste) and handicrafts from bottles, cans, paper	Flower pots and trash cans from used gallons painted by children
Reported indicators	success Increased awareness of residents, participation of Karang Taruna, and children's enthusiasm at product exhibitions	Increase children's creativity through color mixing and design initiatives
Supporting factors	Village government support and sustainable community participation	Availability of raw materials, tools, and cooperation between implementers and target communities
Inhibiting factors	Limited amount of organic waste and high wet waste content	Limited tools (brushes) and lack of distance between children when painting
Sustainability plan	Organic waste banks or community-based micro business groups	-

Source: Author (2026).

4.2 Discussion

Both programs show similarities in the implementation structure that follows the flow of socialization, direct practice, and evaluation, reflecting the general pattern of KKN-based community service programs in Indonesia (Kurniari et al., 2025; Wulandari et al., 2025). This equation shows that a participatory approach by directly involving target communities in waste management practices is seen as a relevant method in both contexts, both for youth and children, in line with the findings that active citizen involvement in decision-making and field practices increases the effectiveness of community-based waste management programs (Anyanwu et al., 2025).

The main difference lies in the type of waste that is the focus and target of the program participants. The program in Bantul targets the management of organic waste into compost by involving the youth of Karang Taruna as the main partner, as well as involving landfill children in recycling inorganic waste into handicrafts (Kurniari et al., 2025), a pattern that is in line with other household empowerment programs in Bantul that also place the participation of adults as the key to success (Suharta, 2022; Puspitasari et al., 2022). Meanwhile, the program in Klaten focuses on the utilization of used gallon plastic waste with the principle of reuse, and places children as the main subjects to increase their creativity (Wulandari et al., 2025), which is consistent with the findings that participatory recycling craft training is effective in shaping the creativity and environmental awareness of elementary school-age children (Yuningsih & Jaizul, 2025; Muqodas, 2015). This difference in goals seems to affect the orientation of program outputs, namely Bantul which emphasizes functional results in the form of compost fertilizer and Klaten which emphasizes expressive results in the form of children's creative products such as flower pots and painted garbage cans.

In terms of inhibiting factors, both programs face technical and small-scale obstacles, such as limited organic waste volume and high water content in the program in Bantul (Kurniari et al., 2025), as well as limited tools and difficulties in maintaining distance between children during painting practices in the program in Klaten (Wulandari et al., 2025). The similarity of these constraint patterns indicates that small-scale community service programs generally face limited operational resources, rather than purely community resistance to the program itself, a pattern that is also reported in studies of community participation in the broader urban context (Brotosusilo et al., 2020).

It should be noted that the two source articles are community service reports with a limited scale of activities, for example the processing of 8 kilograms of organic waste as a sample of activities in the program in Bantul (Kurniari et al., 2025) and the involvement of 13 children in the program in Klaten (Wulandari et al., 2025). Therefore, the results of the comparison in this article are descriptive and are not intended to generalize the effectiveness of one approach over another, considering that the two programs were implemented in different contexts of regions, number of participants, and periods.

5. IMPLICATIONS AND FOLLOW-UP PLAN

The results of this comparison open up opportunities for the development of an independent waste management program that adopts the strengths of both programs, namely a functional orientation to composting as applied in Bantul (Kurniari et al., 2025) and a creative orientation based on reuse as applied in Klaten (Wulandari et al., 2025). As a follow-up to this article, the author plans to prepare a proposal for the adoption of a community-based independent waste management program, which will be discussed further with the University of Muhammadiyah Yogyakarta as a potential partner in the development and assistance of the sustainability of the program. This plan is in line with the findings that the sustainability of community-based waste management programs requires consistent

institutional support, both from the government and educational institutions (Anyanwu et al., 2025; Brotosusilo et al., 2020).

6. CONCLUSION

A comparison of the two community service programs shows that the organic and inorganic waste management program in Sangkeh Hamlet, Bantul, and the plastic waste utilization program in Gatak Hamlet, Klaten, have a similar implementation structure in the form of socialization, direct practice, and evaluation, but differ in the type of waste managed, the target of participants, and the orientation of the outputs produced. The program in Bantul emphasizes functional results through composting by involving youth of Karang Taruna, while the program in Klaten emphasizes more on developing children's creativity through the principle of reuse. The contribution of this article is to provide an initial comparative overview of the variation of community empowerment approaches to waste management in rural contexts, which is reinforced by a review of the supporting literature on the 3R principles, community participation, and children's creativity.

The limitation of this article is that the main data is sourced from two small-scale community service reports so that it cannot be generalized in other regional contexts. Some information, such as the program's sustainability plan in Klaten, is not explicitly reported in the source article. Further research or studies are recommended to compare more community service programs with the theme of waste management with a more systematic evaluation design, for example through pre- and post-program measurements of the level of community awareness and behavior, as well as following up on the plan to adopt an independent waste management program to be developed with the University of Muhammadiyah Yogyakarta.

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