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Strengthening Youth Roles in Environmental Management: A CBR Approach to Compost Production and Waste Banking in Bendungan Village

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Abstract

Purpose: The purpose of this service activity is to empower adolescents in Bendungan Village, Gondang District, Tulungagung Regency, through training in making compost and management of garbage banks based on Community-Based Research (CBR) approaches. The main problem raised is the lack of awareness and skills of adolescents in managing waste independently and sustainably.

Method: The method used in this activity is a participatory approach through CBR, which involves adolescents as active subjects in program planning, implementation, and evaluation. The stages of activities include identification of needs, environmental counseling, technical training in making compost, assistance in the management of waste banks, as well as monitoring and evaluation based on community involvement.

Practical Applications: This activity has a significant practical application, including increasing the capacity of adolescents in managing organic waste, the formation of clean and environmentally friendly living habits, as well as the economic potential of the use of compost and the results of waste management. In addition, this activity also encourages the active participation of the community in maintaining the environment in a sustainable manner.

Conclusion: The results of dedication show that this training is able to increase adolescent awareness and skills in waste management, as well as strengthen their role as agents of change in the village environment. The success of this program confirms that the CBR approach is effective in increasing the independence and social responsibility of the community, especially the younger generation.

Introduction

Environmental management is a crucial component of sustainable development, particularly in rural areas where challenges in waste governance remain acute (Fatmawati et al., 2025). Improper household waste disposal can trigger soil and water pollution, public health issues, and the degradation of environmental aesthetics (Auer, 2019; Serna-Lagunes et al., 2022). Conversely, waste has latent economic potential when processed into value-added products such as compost (Das et al., 2019). Therefore, structured and sustainable strategies for community empowerment in waste management are urgently needed.

Bendungan Village, Gondang District, Tulungagung Regency, exemplifies such challenges. Most residents continue to burn or discard waste indiscriminately without sorting, causing environmental and health risks and reflecting low community awareness about ecological preservation. Initial observations by the KKN team revealed, however, that the village also holds significant potential: its youth population possesses the energy, creativity, and social influence to drive changes in environmental behavior.

Youth are a strategic group with the capacity to act as agents of change, yet their involvement in environmental programs remains minimal due to limited access to training, mentoring, and spaces for actualization. Empowering youth requires more than technical training; it demands participatory and collaborative approaches that build both ecological awareness and a sense of ownership.

The Community-Based Research (CBR) approach offers an effective methodology in this context (Frabutt & Graves, 2023). By positioning the community as equal partners in problem identification, program design, implementation, and evaluation (Chupp et al., 2023). CBR ensures that solutions are rooted in local realities while simultaneously strengthening community capacity for independent program management (Blose et al., 2024). Within community service, CBR bridges academic knowledge with real-world action, producing tangible and sustainable impacts (Bello et al., 2023).

This service program specifically integrates composting training with the establishment of a CBR-based waste bank, targeting youth members of the village Youth Organization and related groups. The novelty of this initiative lies in its dual focus: on the one hand, providing youth with technical competencies in compost production and waste bank management, and on the other, cultivating their identity as agents of environmental change. Unlike conventional service models that treat youth merely as program beneficiaries, this approach positions them as leaders and

co-creators of sustainable solutions.

Through their active involvement in every stage of the program, youth participants not only acquire practical waste management skills but also foster ecological awareness, collective responsibility, and social solidarity. This integrated model—linking composting with waste banking under the CBR framework—offers an innovative contribution that can be replicated in other rural contexts. It demonstrates that youth empowerment in environmental governance is not limited to capacity building but extends to shaping generational leadership committed to ecological sustainability.

Moreover, applying the CBR method addresses a persistent challenge in community service activities: sustainability. Many initiatives fail once external facilitation ends, often due to a lack of community ownership. By involving youth and local stakeholders from the outset, this program seeks to embed sustainability within the community itself. The resulting empowerment reinforces local cultural values of mutual cooperation (gotong royong) and ensures that waste management practices are maintained and developed long after the program concludes.

The novelty of this program lies in integrating composting training with a CBR-based waste bank while positioning youth not only as beneficiaries but as active agents of environmental change, offering a replicable empowerment model for sustainable waste management in rural communities.

Method

This community service program adopts the Community-Based Research (CBR) approach, which integrates participatory research with concrete community-driven action. Rather than positioning residents as passive recipients, the CBR method frames them as active partners throughout all stages—problem identification, planning, implementation, evaluation, and sustainability planning. This participatory model builds ownership, engagement, and program sustainability at the community level (Blose et al., 2024).

This community service program adopts the Community-Based Research (CBR) approach, which integrates participatory research with concrete community-driven action. Rather than positioning residents as passive recipients, the CBR method frames them as active partners throughout all stages—problem identification, planning, implementation, evaluation, and sustainability planning. The activity was carried out in Bendungan Village, Gondang District, Tulungagung Regency during

July 2023 by KKN students of UIN Sayyid Ali Rahmatullah Tulungagung, in collaboration with the Youth Organization (Karang Taruna), 38 residents, and 5 village officials as the main partners.

The first stage, identification of problems and potential, was conducted through field observations, semi-structured interviews with seven community leaders and five village officials, and informal discussions with 15 local youth. The findings revealed low awareness and skills in household waste management and the absence of a community-based management system. The second stage, participatory planning, took place in a Mini Village Deliberation Forum attended by 22 youth representatives, three village officials, and two community leaders. Through consensus-based discussions, the community agreed on two priority programs: training in compost-making and the establishment of a youth-led mini waste bank.

The third stage, program implementation, involved several activities: socialization on the importance of environmentally friendly waste management attended by 43 participants, hands-on training in composting techniques using organic waste, the formation of a youth-led waste bank committee with seven core members, and the distribution of 50 educational posters and 100 brochures to households. The fourth stage, reflection and joint evaluation, was carried out through a focus group discussion involving 25 participants, supported by evaluation questionnaires (Likert scale) and discussion transcripts. The feedback highlighted improved knowledge but also identified challenges, such as limited composting tools and low participation from older residents.

Finally, in the sustainability and follow-up plan, Karang Taruna, with support from the village government, prepared a concrete follow-up strategy. The students handed over training modules, bookkeeping templates, and administrative forms for the waste bank. In addition, a WhatsApp group was created, and facilitators scheduled monthly check-ins for six months to ensure continuous monitoring. This structured approach demonstrates how the CBR method not only delivered technical training but also fostered ownership, engagement, and long-term sustainability at the community level.

This structured and empirically supported implementation shows that the CBR framework not only provided technical training but also embedded participatory governance and sustainability mechanisms, ensuring that the program continued beyond the student's involvement.

Figure 1. CBR Method Flowchart

Results

The community service activities in Bendungan Village, Gondang District, Tulungagung Regency, successfully engaged active participation from local youth, particularly members of Karang Taruna, in community-based waste management initiatives. The findings, derived from both qualitative observations and quantitative measurements, are presented below.

1. Participant Participation

   A total of 35 adolescents actively participated in the program, consisting of Karang Taruna members, high school students, and other village youth. Their consistent involvement highlights the enthusiasm of local youth in addressing environmental issues when given structured guidance.

2. Composting Training Outcomes

   The composting training produced tangible results:

   a. 80% of participants were able to independently follow each step of composting.
   b. A total of 20 kg of compost was produced during the activity.
   c. Local materials such as dry leaves, vegetable waste, and livestock manure were used.

Table 1. Composting Training Results

Indicator	Value
Number of participants trained	35

% able to compost independently	80 %
Total compost produced	20 kg
Main materials used	Dry leaves, vegetable waste, manure

3. Establishment of Mini Waste Bank

A youth-led mini waste bank was successfully established with a biweekly collection system. The composition of collected waste is as follows:

Table 2. Composition of Waste Collected in Mini Waste Bank

Indicator	**Value**
Plastic	56%
Paper	21%
Light metal	11%
Others	12%

4. Pre- and Post-Test Results

To evaluate the program's impact, knowledge and attitude assessments were conducted before and after the training. The results indicate substantial improvement:

Table 3. Pre- and Post-Test Results of Participants (n=35)

Indicator	**Pre-Test (%)**	**Post-Test (%)**	**Increase**
Understanding of composting	42%	81%	+39%
Knowledge of waste sorting	38%	76%	+38%
Attitudes toward environmental care	45%	82%	+37%
Understanding of composting	42%	81%	+39%

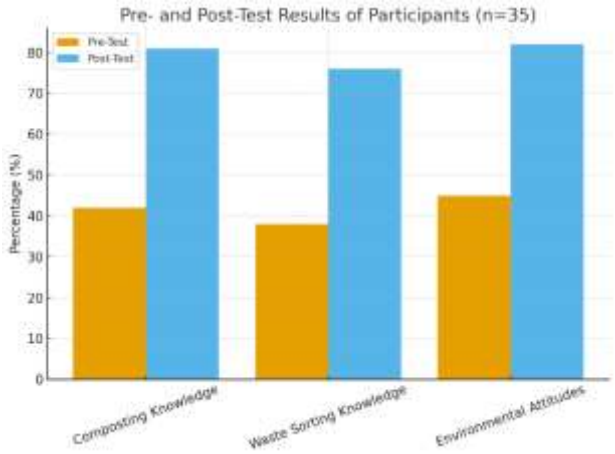

Figure 2. Comparison of Pre- and Post-Test Results

A bar chart can be added here showing improvements across three indicators: composting knowledge, waste sorting, and environmental attitudes

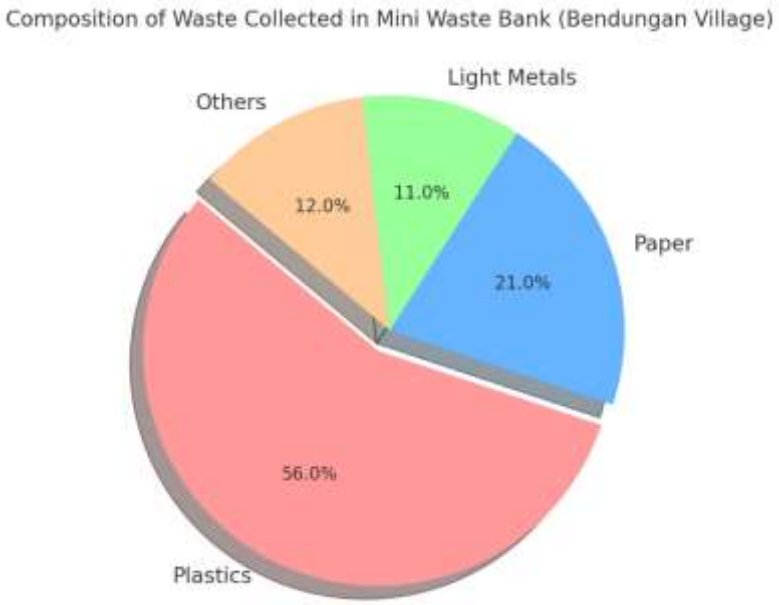

Figure 3. Composition of Waste Collected in Mini Waste Bank

A pie chart can be added here to visualize the distribution of waste types: 56% plastic, 21% paper, 11% light metal, 12% others.

These results demonstrate not only immediate outputs—such as the production of compost and establishment of a waste bank—but also measurable improvements in youth knowledge and attitudes. The integration of training with participatory evaluation methods strengthens the validity of the outcomes.

Moreover, the combination of compost-making and waste bank formation shows potential as a replicable model for youth-based environmental empowerment in rural contexts.

Discussion

The results of the community service activities demonstrate that the Community-Based Research (CBR) approach is effective in fostering active participation, particularly among the younger generation, in environmentally oriented programs. The involvement of participants from the problem identification stage to the final evaluation generated a strong sense of ownership over the implemented initiatives, confirming the assertion of Chupp et al. (2023) that CBR enhances engagement when communities are involved across all stages of program design.

1. Increased Knowledge and Skills

   Through compost-making training, participants not only acquired theoretical insights but also developed practical skills. This was evidenced by the fact that 80% of participants were able to produce compost independently, yielding approximately 20 kg during the training. Notably, several participants initiated composting practices at home, suggesting a transfer of knowledge into daily life. These findings are consistent with Blose et al. (2023), who argue that experiential learning within CBR frameworks tends to produce higher sustainability of knowledge retention compared to purely lecture-based approaches.

2. Changes in Mindset about Waste

   Informal interviews revealed a marked change in participants' perceptions of waste. Previously regarded as useless, waste began to be seen as a resource with both ecological and economic value. This shift parallels the findings of Blose et al. (2024), who documented similar changes in rural youth communities when exposed to participatory environmental education. The Tunggulsari experience confirms that involving youth directly in waste transformation activities accelerates attitude shifts and strengthens eco-literacy.

3. Challenges and Solutions

   Despite these achievements, several challenges emerged, particularly regarding the lack of supporting tools for composting and the organizational structure of the waste bank. Temporary solutions were provided through village

officials' support, including designated storage spaces and basic waste collection racks. To enhance institutional sustainability, collaboration with the local Environmental Agency was suggested. Similar challenges were also reported by Frabutt & Graves (2023), who observed that rural environmental initiatives often struggle in their early stages without multi-stakeholder support. Thus, the Bendungan program reflects a common pattern while also highlighting the critical role of village government in bridging structural gaps.

4. Potential for Sustainability

The enthusiasm of participants and the proactive support of village government demonstrate the potential for sustainability. Karang Taruna's medium-term plans include partnerships with local waste collectors and regular environmental education campaigns. This long-term orientation aligns with studies by Maclure (2023), which emphasize that youth-led environmental movements tend to achieve sustainability when coupled with institutional backing and routine educational reinforcement.

Empirical Evidence

Table 1 summarizes the compost training and waste bank establishment results, while Figure 1 presents the composition of waste collected through the mini waste bank program. These data show that plastics dominated collection (56%), followed by paper (21%), light metals (11%), and others (12%). Compared to Serna-Lagunes et al. (2022), who found plastics to represent over 60% of unmanaged waste in rural Mexico, the Bendungan case reveals a similar global trend of plastic dominance in community waste profiles.

Tabel 1. The results of compost training activities and garbage banks

No	Types of Activities	Indicators of Success	Capaian
1	Compost Training	The Number of Active Participants	35 Persons
2		Participants can make compost	80% Participants
3		Jumlah kompos yang dihasilkan	± 20 kg
4	Establishment of a garbage bank	Type of Bank Establishment Activities	4 main type
5		Collection Frequency	Once in two weeks
6		Recording System	Simple manual based

Conclusion

Training in compost-making and waste bank management based on the Community-Based Research (CBR) approach in Bendungan Village, Gondang District, Tulungagung Regency, has had a significant impact on youth empowerment and environmental awareness. This program not only enhanced adolescents' understanding of the importance of waste management but also equipped them with practical skills to convert organic matter into compost that benefits agriculture and the local ecosystem. Beyond immediate outcomes, the initiative demonstrates how active youth engagement can foster a culture of environmental responsibility within rural communities.

The practical implications of this program are noteworthy. For village governments, the initiative underscores the importance of providing institutional and logistical support—such as facilities, storage infrastructure, and partnerships with local waste collectors—to sustain waste management efforts. For educational institutions, the program highlights the role of universities in transferring knowledge and mentoring communities through structured, participatory approaches like CBR. At a broader level, this initiative contributes to the development of a replicable model of community service, showing that integrating compost training and waste bank management can be applied in other rural contexts, provided there is strong collaboration between youth organizations, local authorities, and academic institutions.

To ensure sustainability, it is recommended that Bendungan Village formalize the waste bank institution, supported by clear administrative structures and long-term cooperation with the local environmental agency. Additionally, embedding this model into future village programs and fostering continuous campus–community partnerships could strengthen the resilience of waste governance practices. Such measures would not only sustain the momentum achieved in Bendungan but also serve as a blueprint for other villages seeking innovative and participatory solutions to environmental challenges.

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