



Strengthening the Role of Youth Association (Karang Taruna) in Sustainable Waste Management Through Digital Literacy, Waste Bank, and 3R TPS (Waste Management Site)

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ABSTRACT

Waste issues pose a challenge in the environmental sector, especially in rural areas. Low public awareness of sustainable waste management demands the active involvement of youth as agents of change. This community service program aims to strengthen the role of youth organizations in sustainable waste management through digital literacy, the establishment of waste banks, and the optimization of the management of the 3R (Reduce, Reuse, Recycle) TPS. Activities are carried out through training, mentoring, and participatory actions involving 10 youth organizations and 20 local residents. Quantitative results show a 60% increase in digital literacy competency, a 45% increase in community participation in waste sorting, and a 50% increase in the effectiveness of 3R TPS management. This program has successfully empowered youth organizations as digital-based environmental education agents and strengthened the sustainable integrated waste management system at the village level.

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A. INTRODUCTION

Waste is a crucial issue facing almost all regions in Indonesia. According to data from the Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan, 2021), Indonesia produces more than 60 million tons of waste per year, and approximately 24% of it is not properly managed. This problem is exacerbated by low public awareness of waste sorting and processing at the source. This problem is exacerbated by low public awareness of waste sorting and processing at source. A similar situation exists in Baturejo Village, Sukolilo District, Pati Regency, where most residents still mix household waste and are unfamiliar with utilizing existing waste management facilities. Furthermore, the village's 3R Waste Management Facility (TPS 3R) is non-existent and underutilized, resulting in piles of waste frequently appearing in several residential areas.

As a youth organization, Karang Taruna plays a crucial role in encouraging community involvement in maintaining environmental cleanliness ((Rahman et al., 2024). However, before this program was implemented, Karang Taruna Baturejo Village still faced various



obstacles, such as limited understanding of the concept of sustainable waste management, lack of experience in managing environmental programs independently, and limited skills in utilizing digital media for public education. This is in line with the increasing ease of access to technology for young people, which suggests that digital approaches can be an effective strategy in environmental campaigns (Irhas & Reni, 2025). Furthermore, community participation in waste sorting remains low, and the village's 3R Waste Management Facility (TPS 3R) is currently unavailable and underutilized, making youth support essential.

Therefore, this activity is designed to strengthen Karang Taruna's capacity through: (1) increasing digital literacy so they can produce educational content; (2) establishing a youth-managed waste bank; and (3) optimizing the function of the 3R Waste Management Facility (TPS 3R) as an integrated waste sorting and processing center in the village.

The main objective of this program is to create a sustainable community-based waste management system and strengthen the role of youth as agents of environmental change in Baturejo Village, Sukolilo District, Pati Regency.

B. METHODS

This community service activity lasted for three months (July–September 2025) using a participatory and educational approach. The activity stages included:

1. Initial Survey and Socialization

An initial survey was conducted with 10 members of the youth organization (Karang Taruna) and 20 village residents. Results showed that only 15% of respondents sorted waste and 10% understood the 3R concept. Socialization was then conducted to build initial awareness of the importance of sustainable waste management and the role of Karang Taruna in its implementation.

2. Digital Literacy Training

This training focused on creating educational content using the Canva and CapCut applications. Participants were taught the basics of visual design, writing persuasive messages, and digital environmental campaign strategies. The training was structured using the learning-by-doing method recommended by (Budiarto et al., 2024), which emphasizes active learning to improve the digital competency of the younger generation.

3. Establishment of a Waste Bank and Village Clean-Up Action

A waste bank was established with the involvement of 10 members. The village clean-up activity was attended by 40 participants, using a system for weighing and recording the economic value of inorganic waste. This waste bank model adapts the circular economy concept as explained by (Palahudin et al., 2024) in their study of rural community empowerment.

4. 3R Waste Management Facility Mentoring

Mentoring was conducted over four sessions, including training on sorting, composting, and simple recycling. The approach used a participatory model, as proposed by (Made et al.,



2025), in which the community was encouraged to play an active role to foster a sense of ownership of environmental facilities.

In the composting session, participants were introduced to low-cost composting techniques using simple equipment such as a composter bucket, a small shovel, and an organic scale. Methods taught included cutting organic waste to accelerate decomposition, adjusting the ratio of green to brown materials, and turning every 3–5 days to maintain aeration. Additionally, participants were guided in practicing composting using straw and corncob waste, which are commonly found in rural areas. This was done in accordance with the conditions in Baturejo Village.

C. RESULTS AND DISCUSSION

1. Improving Karang Taruna's Digital Literacy

The average digital literacy score of participants before the training was 20%, increasing to 60% after the training. Fifteen of the 25 members actively created and uploaded environmental campaign content.

These results are consistent with research by (Ayuningtyas et al., 2025), which showed that youth digital literacy can expand the impact of environmental campaigns through social media.

Furthermore, community engagement increased, with average social media interactions increasing from 20 to 100 per post. This demonstrates the effectiveness of digital media as a tool for transforming environmental behavior, as stated by (Sumarni Zainuddin et al., 2024) in his study of digital-based environmental communication.

2. Waste Bank Implementation and Its Impact

The Waste Bank successfully collected 50 kg of inorganic waste in the first three weeks, increasing to 100 kg after two months. The proceeds from sales reached IDR 700,000, which was used for social activities and the procurement of cleaning equipment.

The survey showed a significant increase in citizen participation in sorting waste: from 10% to 45%, and understanding of the 3R concept increased from 15% to 50%.

These results align with (Cahyaningsih et al., 2025), who stated that waste banks increase environmental awareness while providing economic benefits to the community. Furthermore, a study by Yuliani et al. (2022) also showed that waste bank programs can reduce household waste volume by up to 40%.

3. Optimization of 3R Waste Management Sites

Before the program, 3R Waste Management Sites only served as temporary disposal sites. After mentoring, effectiveness increased from 15% to 70%. Youth organizations (Karang Taruna) now manage waste sorting and composting.

This finding reinforces (Athaillah et al., 2021) view that youth participation in 3R Waste Management Sites (TPS) management plays a crucial role in maintaining the facility's sustainable function. The 3R Waste Management Sites (TPS) in Baturejo now also serve as environmental education centers for elementary school students and Family Welfare Movement (PKK) groups, as recommended in the Ministry of Environment and Forestry, (Kementerian Lingkungan Hidup dan Kehutanan, 2021) on optimizing community-based 3R facilities.



4. Social Impact and Sustainability

80% of respondents reported greater concern for environmental cleanliness, and 70% expressed pride in the activities of Karang Taruna. Collaboration between youth, village officials, and the community strengthens sustainable environmental social networks.

This program confirms (Muhammad Tafsir et al., 2025) findings that Karang Taruna effectively functions as a catalyst for community-based social movements. In addition, the results show the potential for the formation of an eco-village ecosystem through youth empowerment, as proposed by (Susilo Reni & Prasetyo, 2025).

D. CONCLUSION

This community service program has successfully strengthened the role of youth organizations (Karang Taruna) in sustainable waste management. Through digital literacy, youth are empowered to become effective agents of environmental education and campaigning. The establishment of waste banks and the optimization of 3R waste disposal sites (TPS 3R) have demonstrated a tangible impact in increasing community awareness and independence in waste management.

Quantitatively, there has been a 60% increase in digital literacy, a 45% increase in community participation in waste sorting, and a 50% increase in the effectiveness of 3R waste disposal sites (TPS 3R) management. This empowerment model can be replicated in other villages to support inclusive and sustainable environmental development.

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F. AUTHOR CONTRIBUTIONS

Henny Prasetyani played a role in designing the community service program, coordinating with the village government and youth organizations, implementing digital literacy training, and writing and editing the article manuscript. Diah Nugraheni contributed to the implementation of field activities, technical assistance in establishing a waste bank and managing the 3R waste disposal site (TPS 3R), as well as collecting and analyzing quantitative data. Tangguh Prakoso played a role in developing the activity evaluation instrument, documenting and publishing the activity through digital media, and preparing the results and discussion sections of the article.

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