

Community Empowerment and Circular Economy Implementation: Evidence from Waste Bank Programs

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ABSTRACT

Waste management remains an environmental problem in many urban areas, including Ciakar Village, Cibeureum District, Tasikmalaya City. Low public awareness of waste segregation and proper waste management has led to an increasing volume of waste ending up in landfills. The circular economy approach through waste banks addresses environmental issues and generates economic value for the community. This community service program aims to empower local residents by optimizing waste bank operations in line with circular economy principles. The implementation methods include socialization activities, education, waste segregation training, and assistance in waste bank management. The results indicate improved community understanding of the circular economy concept, increased community participation in waste bank activities, and the establishment of a more structured community-based waste management system. This program contributes to reducing household waste generation while simultaneously enhancing the economic value potential of managed waste.

Keywords:

circular economy; waste bank; community empowerment; waste management

Introduction

Solid waste management remains a significant challenge in many urban areas of Indonesia (Wikurendra et al., 2024), including Perumahan Quanta 5 located at RW 012, Ciakar, Cibeureum District, Tasikmalaya City. The prevailing waste management pattern is still linear, characterized by collecting, transporting, and disposing of waste, which contributes to the accumulation of waste volumes in both residential areas and final disposal sites. In addition to causing visual pollution and unpleasant odors, this method leads to soil, water, and air contamination and negatively affects public health and overall quality of life. One of the key challenges in waste management arises from weak community participation in effective waste handling, as well as limited governmental resources (Salsabila et al., 2024).

Traditional approaches to waste management often overlook the potential of waste as a resource with economic value. The circular economy concept offers a more sustainable alternative by emphasizing the principles of reduce, reuse, and recycle, thereby keeping resources within the utilization cycle, reducing waste generation, and creating economic opportunities for communities (Limanseto, 2021). In this context, waste banks represent a practical mechanism for implementing the circular economy, as they can transform public perceptions of waste from merely being a burden into a valuable asset.

Previous studies have demonstrated that waste banks play an important role in advancing the circular economy by improving environmental management while simultaneously fostering community-based economic and social empowerment (Suryani, 2014). For instance, a study of a waste bank program in Cipameungpeuk Subdistrict revealed that the initiative successfully shifted community mindsets from the conventional “collect–transport–dispose” approach to “sort–collect–sell,” increased awareness of waste segregation, established new organizational structures, and generated innovative

waste utilization practices that enhanced household income. Furthermore, research conducted in other contexts indicates that waste banks can function as effective instruments of rural and community empowerment by creating cleaner environments while building localized circular economy systems (Kirchherr et al., 2017).

Nevertheless, several studies also highlight the challenges associated with implementing circular economy initiatives through waste banks. Common barriers include low levels of community participation, limited knowledge of waste segregation practices, inadequate facilities, and fluctuations in the market prices of recyclable materials, which may reduce residents' motivation to engage in waste bank activities (Salsabila et al., 2024). These conditions suggest that planned, participatory, and sustainable interventions remain essential to strengthen the effectiveness of waste banks as productive and sustainable waste management models.

Based on preliminary observations, household waste segregation practices in Perumahan Quanta 5 located at RW 012, Ciakar, Cibeureum District, Tasikmalaya City remain limited, and most residents do not yet have a comprehensive understanding of the circular economy concept. This situation is further exacerbated by the lack of formal assistance from the government in managing waste banks as instruments of community empowerment. These circumstances underscore the urgency of conducting community service activities focused on education, training, and operational mentoring of waste banks as a platform for implementing the circular economy. This program aims not only to enhance community knowledge and skills in waste sorting and management but also to strengthen the institutional structure of waste banks to ensure their long-term sustainability and positive impacts on environmental, social, and economic dimensions. Accordingly, this initiative is expected to serve as a model of circular economy-based community empowerment that can be replicated in other areas with similar characteristics.

Methods

This community service program was conducted in Perumahan Quanta 5 located at RW 012, Ciakar, Cibeureum District, Tasikmalaya City. The program employed participatory and educational approaches, actively involving community members in all stages of implementation. These approaches were selected to ensure that the program was not merely informative but also capable of fostering behavioral change and promoting community self-reliance in circular economy-based waste management. The program design adopted a community empowerment model, emphasizing the enhancement of knowledge and skills as well as the strengthening of institutional capacity of the waste bank. The program focused on implementing circular economy principles through household waste management integrated with a waste bank system.

The participants consisted of residents of Perumahan Quanta 5 located at RW 012, Ciakar, Cibeureum District, Tasikmalaya City, including local government representatives, neighborhood leaders (RT/RW), and community members who were the primary targets of the waste bank program. The activities were centered in residential areas characterized by relatively high levels of household waste generation.

The program was implemented through several sequential stages:

1. Preparation Stage

This stage involved coordination with local administrators, specifically RW 012 and RT 004, as well as community leaders; scheduling of activities; and preparation of socialization and training materials. Preliminary observations were also conducted to identify existing waste management practices and to assess residents' baseline understanding of waste banks and the circular economy.

2. Socialization and Education Stage

Socialization activities were carried out through community meetings using interactive lectures and group discussions. The materials delivered covered the concept of the circular economy, the importance of waste segregation, categories of waste with economic value, and the role of waste banks in community-based waste management.

3. Training and Practical Stage

At this stage, participants received technical training on the segregation of organic and inorganic waste, proper storage techniques for recyclable materials, and operational mechanisms of the waste

bank (including weighing procedures, waste savings record-keeping, and price determination). Training was conducted through direct simulations to enable participants to practically understand the operational workflow of the waste bank.

4. Mentoring Stage

Mentoring activities aimed to support the community in establishing and strengthening the organizational structure of the waste bank. The community service team facilitated the selection of management personnel, task allocation, and the formulation of simple operational procedures for waste bank management. Mentoring also included monitoring residents' participation in depositing waste at the waste bank.

5. Evaluation Stage

Evaluation was conducted to assess the effectiveness of the program by observing changes in residents' waste segregation behavior, levels of participation in waste bank activities, and community understanding of circular economy principles. Evaluation methods included group discussions, short interviews, and comparisons of conditions before and after program implementation.

Data were collected through field observations, activity documentation, and interviews with local administrators (RT/RW) and environmental activists. These data were used to describe the implementation process and outcomes of the community service program. Data analysis was carried out using a descriptive qualitative approach, focusing on changes in community knowledge, attitudes, and participation following program implementation. The results of the analysis were used to evaluate program success and to formulate recommendations for the sustainability of waste bank activities in the target area.

Results and Discussions

Improving Community Understanding of the Circular Economy and Waste Bank Systems

The implementation of the community service program in Perumahan Quanta 5 located at RW 012, Ciakar, Cibeureum District, Tasikmalaya City was carried out successfully and received a positive response from the community. The activities, which included socialization, training, and mentoring related to waste bank management, produced significant outcomes in terms of knowledge enhancement, behavioral change, and institutional development of community-based waste management.

Improvement of Community Understanding of the Circular Economy and Waste Banks

The results indicate a notable increase in community understanding of the circular economy concept and the role of waste banks in waste management. Prior to the implementation of the program, most participants perceived waste merely as useless residue and lacked awareness of the importance of waste segregation at the source. Following the socialization and educational sessions (Figure 1), the community began to recognize that waste—particularly inorganic waste—can be reused and has economic value when properly managed (Figure 2).

This shift in understanding was reflected in the increased level of community participation during discussion sessions as well as in participants' ability to articulate fundamental concepts of the circular economy, such as waste reduction, reuse, and recycling. These findings are consistent with previous studies suggesting that community-based environmental education can enhance public awareness and concern for sustainable waste management practices.

Behavioral Change in Waste Segregation and Management

From a behavioral perspective, the program encouraged community members to initiate household waste segregation by separating organic and inorganic waste. During the training stage, participants were directly engaged in practical waste sorting activities and simulations of waste bank operations. Observational results indicate that following the program, a proportion of residents began to apply waste segregation practices at home and to collect inorganic waste for deposit at the waste bank.

This behavioral change reflects a transition in waste management practices from a linear approach toward a circular approach. Waste that was previously disposed of directly is now being collected, sorted, and reutilized (figure 3). This condition supports the circular economy framework,

which positions waste as a resource that can be processed and reintegrated into production and consumption cycles.



Figure 1. Public Education on Circular Economy



Figure 2. Poster on Waste Sorting and Collection Mechanisms



Figure 3. Waste Sorting Process

Strengthening of Waste Bank Institutional Capacity

The program outcomes were also evident in the institutional dimension (Figure 4), marked by the establishment or reinforcement of the waste bank management structure at the community level. Community members participatorily appointed management personnel consisting of a chairperson, secretary, and treasurer, and collectively agreed on the operational mechanisms of the waste bank, including weighing schedules and waste savings record-keeping systems.

The implementation of a simple recording system enabled residents to directly observe the economic value of the waste they deposited. This transparency increased community motivation to consistently participate in waste bank activities. Institutional strengthening is crucial, as program sustainability is highly dependent on the presence of a clear organizational structure and strong social support from the community.



Figure 4. Community Deliberation, Awareness-Raising, and Institutional Strengthening of Waste Banks

Environmental and Socio-Economic Impacts

Figure 5 show transactions of recyclable waste with collectors, from an environmental perspective, the program contributed to reducing the volume of household waste disposed of at final disposal sites. The segregation and collection of inorganic waste through the waste bank helped minimize the accumulation of unmanaged waste within residential areas.

Socially, the program enhanced collective awareness of the importance of maintaining environmental cleanliness and strengthened social interaction through joint activities related to waste bank management. Economically, although the financial returns from waste sales were relatively modest, the benefits perceived by the community in the form of supplementary income and waste-based savings served as initial incentives that encouraged sustained community participation.



Figure 5. Transactions of Recyclable Waste with Collectors

Conclusion

The results of this program indicate that waste banks can function as effective instruments for implementing the circular economy at the community level. Through a community empowerment approach, the concept of the circular economy was not only understood theoretically but also practiced in everyday life. Waste management based on the waste bank system enables the recirculation of resources, thereby reducing dependence on final disposal facilities and encouraging the development of more responsible consumption patterns. Accordingly, this community service activity makes a tangible contribution to transforming waste management toward a more sustainable and participatory model.

Despite the generally positive outcomes, several challenges were encountered during program implementation. The primary constraints included the limited duration of activities, variations in community awareness and motivation, and inadequate supporting facilities such as waste storage spaces and weighing equipment. In addition, fluctuations in the market prices of recyclable materials may affect the consistency of community participation. These challenges suggest that waste bank-based community empowerment programs require continuous mentoring and sustained support from local governments, higher education institutions, and other relevant stakeholders in order to operate effectively and achieve long-term sustainability.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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