

STRENGTHENING THE DIGITAL-BASED WASTE BANK AND MULTI-PARTY COOPERATIVE MODEL TO IMPROVE SUSTAINABLE WASTE MANAGEMENT IN JATINANGOR DISTRICT, SUMEDANG

**Ahmad Subagyo *, Widia Winata, Gofur Ahmad, Istikomah, Gulbudin Hekmatyar,
Lintang, Rifal**

Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM), Universitas Muhammadiyah Jakarta
Jl. KH. Ahmad Dahlan, Cirendeui, Ciputat, Tangerang Selatan 15419, Indonesia
Email: ahmad.subagyo@umj.ac.id

Abstract

The issue of waste management in Jatinangor, Sumedang, has increased rapidly following the trends of urbanization and consumption, while conventional management capacity has become increasingly limited. This PKM program aims to strengthen community literacy, adopt a digital-based waste bank, and encourage the formation of multi-party cooperatives to manage waste in an accountable and sustainable manner. The methods used include socialization, practical training, digital application implementation, mentoring, and impact evaluation with a participatory community approach. The training results showed an increase in understanding, the formation of waste bank management groups, and the development of a digital financial recording system, which has the potential to be replicated in other villages. In conclusion, community synergy, technological innovation, and multi-stakeholder cooperatives are effective in building a modern and inclusive waste management system, as well as supporting the circular economy and the achievement of SDGs.

Keywords: Waste Bank, Multi-Stakeholder Cooperative, Circular Economy, Digitization, Community Participation

INTRODUCTION

Jatinangor Subdistrict, as a strategic area in Sumedang Regency and a center of national higher education, has experienced rapid population growth, reaching approximately 100,961 people in 2023, accompanied by a predominance of migrants with high consumption. Urbanization and economic dynamics have significantly increased the volume of domestic waste production, with an estimated average daily waste generation of 107,019 liters or around 37.46 tons per day, mostly originating from households, apartments, and student boarding houses. Survey data on the behavior of the Jatinangor community shows that 63% of residents dispose of waste through village officials, but there are still 30% of households that choose to burn waste, especially in villages with limited sanitation facilities.

The main problems faced by Jatinangor are the limited number of final disposal sites

(TPA) and a conventional waste transportation system that is not yet environmentally friendly. The accumulation of waste in landfills poses a risk of soil and water pollution and worsens the quality of life of the community, while the practice of burning waste has a negative impact on health and the environment. Efforts to sort waste at the household level are still inconsistent, with only about 18-22 households per village actively participating in regularly sorting and depositing waste at local waste banks. Field surveys show low literacy and education among the community regarding the importance of sorting and recycling. Most respondents also stated that economic incentives for waste management and waste bank innovations are still not optimal.

Community-based waste management institutions, such as waste banks and cooperatives, have begun to develop in several villages, but the level of participation and institutional integration is still uneven. The potential for a circular economy, such as the sale of plastic bottles, compost production, and eco-bricks, has not been maximized, mainly due to limitations in facilities, technology, and village government support. Several partner groups, such as Artha Lestari and Jatinangor Bersih, consisting of PKK activists, academics, Karang Taruna, and community leaders, actively participate in sorting activities, but still need capacity building, access to education, and training in waste bank management and multi-party digital-based cooperatives.

According to the analysis by Simangunsong et al. (2018), the waste management system in Jatinangor is still inefficient, limited in terms of human resources, inconsistent in its operations, and lacks integration between stakeholders from households, the government, the business sector, and the community. The level of waste management by the community in Jatinangor has an average score of 0.11 on a scale of 1, which indicates that management is still very poor, while the preference for a better management system is relatively high (score of 0.65). The study by Khoeroni and Rahardyan (2023) confirms that the success of waste management programs is greatly influenced by knowledge, attitudes, motivation, and local norms, making education and technology-based interventions crucial.

These limitations drive the need for community-based management innovation through the integration of a legally established, digitally-based multi-party cooperative and waste bank model. The use of waste bank recording technology applications, the development of recycled products and digital marketing, as well as open data-based incentive systems are expected to increase transparency and operational efficiency. Multi-party cooperatives serve as a collaborative forum that brings together the community, village governments, MSMEs, waste management companies, and social communities, thereby creating an integrated waste management ecosystem oriented towards economic added value and environmental sustainability.

Given the urgency of environmental issues, the community service program in Jatinangor is linked to national agendas such as Sustainable Development Goal (SDG) 11 on sustainable cities and SDG 12 on responsible consumption and production. This program is also relevant to the Key Performance Indicators (IKU) of higher education, encouraging the utilization of lecturers' work and students' experiences outside the campus in LPPM and MBKM-based activities.

The main objectives of PKM activities in Jatinangor are:

1. To improve the capacity and literacy of community waste management in an accountable and professional manner through training and mentoring based on evidence of best practices;
2. To encourage the digitization of record keeping and waste bank savings systems in a multi-party cooperative ecosystem;
3. To initiate the formation of a legal multi-party cooperative to facilitate sustainable cross-stakeholder collaboration;
4. Strengthening the participation of the community, MSMEs, village governments, and business actors in the circular economy and the implementation of SDGs 11 and 12 through education programs, technological innovation, and publication of activity results.

With a holistic, collaborative, and technology-based approach, this program is expected to significantly improve the waste management system in Jatinangor, create economic added value, and promote social and environmental sustainability for the local community.

IMPLEMENTATION METHOD

The method applied in this PKM refers to a collaborative and participatory model: **Socialization:** Dissemination of important information, the benefits of sorting and the concept of waste banks, through community meetings and social media.

- a. **Practical Training:** Direct education for residents with experienced resource persons; simulation of recording at waste banks using simple digital/manual applications.
- b. **Technology Application:** Implementation of digital waste bank financial recording applications, organic shredder capacity of 50–100 kg/hour.
- c. **Assistance and Evaluation:** Progress monitoring, pre-post testing, group strengthening, evaluation of output indicator achievements (number of participants, volume of processed waste, documents and publications).
- d. **Program Sustainability:** Establishment of a multi-party cooperative, integration with integrated waste management programs, and SKS recognition for participating students.

Team Assignments:

- a. Chair: Conceptualization, coordination, partnership relations;
- b. Literacy expert: Training module design;
- c. Management/technology expert: Technical implementation and monitoring;
- d. Students: Socialization, documentation, data analysis, and publication.

RESULTS AND DISCUSSION

Waste management in Jatinangor, Sumedang Regency, has long been a major challenge for the local community, especially amid dynamic population growth and economic activity. The main problems are the accumulation of household waste, the lack of a culture of waste sorting, and the inefficiency of the transportation and processing systems at the village level. In response to this, the UMJ Research and Community Service Center (LPPM) team has carried out a series of community service activities in the form of waste bank management training and strengthening of multi-party cooperatives in Sayang Village and around Jatinangor in August and September 2025.



Figure 1. Digital-based Waste Bank Management Training in Sayang Village on August 8, 2025

This training successfully increased residents' understanding of the importance of waste sorting and technology-based management. A total of 30-50 participants from each village, consisting of PKK cadres, Karang Taruna, students, and active community leaders, participated in training, focus group discussions, and digital waste bank recording practices. The main outputs of the activity included:

- a. The formation of active waste bank working groups in Sayang Village and other target villages;
- b. The implementation of waste bank financial recording simulations (manual and digital) that facilitate transparency and replication to other villages;
- c. An increase in the volume of waste processed into compost, briquettes, and paving blocks by up to 25% from the baseline, as well as the creation of locally marketed recycled products;
- d. An operational plan for a legal multi-party cooperative, with legal AD/ART documents and business process SOPs;
- e. Documentation of activities and ongoing assistance by UMJ students through MBKM and

SKS community service.

A survey of community behavior in Jatinangor shows that the majority of respondents have started sorting waste, although limited consistency and technological facilities remain a challenge. As many as 63% of households rely on village officials' facilities, while 30% still burn waste in limited areas. Literacy and understanding of waste management continue to be promoted through training, social media, and direct practice of waste bank and cooperative management. Economically-based education (waste bank savings, rewards, training in marketing recycled products) has been an effective driver for increasing community participation and motivation.

The transformation of community-based waste management and multi-party cooperatives has yielded tangible results in Jatinangor. Collaboration between academics, village governments, students, and various local communities has created an inclusive and professional circular economy ecosystem. The multi-party cooperative model integrates households, recycling entrepreneurs, social leaders, PKK, and Karang Taruna into official institutions, increasing business process efficiency, legal access, and marketing networks for compost, briquettes, and handicrafts made from processed waste.

Testimonials from residents and training participants show significant behavioral changes. The PKK and Karang Taruna groups acknowledge that the digitization of cooperatives and waste banks facilitates data management, transaction recording, online member meetings, and expands access to the sale and purchase of recycled products to markets outside the city. Students involved in the mentoring and documentation process also play a role as agents of change and field assistants, strengthening the sustainability of the program through research and scientific publications.

The implementation of two stages of training—waste bank management and cooperative management—became an important momentum for Sayang and Jatinangor villages, marking the community's transformation towards environmentally friendly, digital-based waste management and circular economy institutions. These practices of digitalization and community empowerment have had an impact on:

- a. Active participation of at least 40 families in each village in waste sorting and digital waste bank transactions;
- b. A reduction in the volume of waste sent to landfills by around 25-30%.
- c. The creation of new jobs (machine operators, craftsmen, marketers) in the community waste bank cooperative;
- d. Increased environmental literacy and awareness among residents and students

The program will continue with mentoring, advanced digital training, and the publication of success stories in the national media. The multi-stakeholder cooperative in Jatinangor is expected to become a role model for integrated waste management innovation, not only for Sumedang but also for other regions in Indonesia.

The Jatinangor waste management movement, based on multi-stakeholder cooperatives, digital communities, and cross-sector collaboration, greatly contributes to the achievement of the SDGs (Sustainable Development Goals), particularly SDG 11 on sustainable cities and SDG 12 on responsible consumption and production. The success of this program is supported by educational practices, digital transformation, and strong cooperative governance, which are key

drivers in accelerating behavioral change and environmentally-based local economic development.



Figure 2. The atmosphere of the cooperative management training for the Jatingor Waste Awareness Community, August 29, 2025

The training activities on waste bank management and cooperative strengthening in Sayang Village, Jatinangor, successfully increased residents' understanding of the importance of waste sorting and technology-based waste management. Main outputs:

- a. Training was held for 20–30 participants
- b. Formation of an active village waste bank working group
- c. Implementation of digital/manual waste bank financial recording simulations that facilitate replication in other villages
- d. Increase in the volume of processed waste and recycled products (compost, briquettes, paving blocks)
- e. Integrated multi-party cooperative operational plan, legally established, supported by legal documents, articles of association, and bylaws

Survey evaluations show that the majority of respondents have started sorting waste, although the level of consistency and facility technology is still limited. The driving force of education and economic incentives is key. The adoption of digital waste bank applications and the multi-party cooperative model strengthens participation and transparency in management. Documentation and publication activities, as well as the presence of students as field assistants, support the sustainability of the program

CONCLUSION

The PKM program for waste management based on waste banks and multi-party cooperatives in Jatinangor has successfully transformed the waste management system from conventional to digital and sustainable. This program has increased the volume of processed waste by around 25% and reduced waste sent to landfills by 25–30%. The waste bank institution has been successfully established and equipped with a legal cooperative plan as well as clear articles of association and SOPs. The implementation of a digital recording application has increased transparency and efficiency and enabled replication in other villages. Community participation also increased through training, which encouraged behavioral changes in waste sorting. In addition, the program created economic impacts in the form of new jobs and value-added recycled products, as well as contributing to the achievement of SDGs 11 and SDGs 12.

To maintain the sustainability of the program, it is necessary to conduct regular mentoring and digital training, publish good practices of the program in the national media to encourage replication, and strengthen cooperative institutions through the support of local government policies. In addition, the marketing network for recycled products needs to be expanded in order to provide greater economic benefits to the community.

REFERENCES

- LPPM UMJ. (2025). Laporan Kegiatan Pelaksanaan PKM Pelatihan Manajemen Bank Sampah dan Koperasi Multi Pihak di Jatinangor, Sumedang.
- LPPM UMJ. (2025). Proposal PKM Pengolahan Sampah di Jatinangor.
- Tim Survey UMJ Jatinangor. (2025). Hasil Survei Perilaku Masyarakat Jatinangor dalam Penanganan Sampah.
- BeritaKoperasi.com. (2025, 2 September). Pelatihan Manajemen Koperasi Kuatkan Transformasi Komunitas Sampah Jatinangor.[beritakoperasi](#)
- BeritaKoperasi.com. (2025, 24 Juni). Inisiasi Koperasi Multi Pihak untuk Atasi Persoalan Sampah di Jatinangor.[beritakoperasi](#)
- WartaKoperasi.com. (2025, 23 Juni). Jatinangor Bergerak: Kolaborasi Komunitas Peduli Sampah Menuju Lingkungan Bersih dan Ekonomi Berkelanjutan.[wartakoperasi](#)
- WartaKoperasi.com. (2025, 2 September). Transformasi Komunitas Sampah Menuju Ekonomi Sirkular Berkelanjutan Berbasis Koperasi.[wartakoperasi](#)
- [www.adekmi.id](#). (2025). Transformasi Bank Sampah Digital Jatinangor.[wartakoperasi](#)
- Badan Pusat Statistik. (2023). Statistik Kependudukan Kabupaten Sumedang 2023. Sumedang:
- Simangunsong, F., et al. (2018). Analisis sistem pengelolaan sampah di wilayah peri-urban: Studi kasus Kecamatan Jatinangor. Jurnal Lingkungan dan Pembangunan Berkelanjutan.
- Kementerian Lingkungan Hidup dan Kehutanan. (2022). Laporan kinerja pengelolaan sampah nasional. Jakarta: KLHK.
- Schenck, C., et al. (2022). Impact of improper waste disposal on environmental sustainability in South Africa. *Frontiers in Sustainability*, 2, 51386047.
- Ivakkalam, F., Far, M. (2022). Integrative waste management strategies: A case study in

- Indonesia. *Sustainability Science*, 17, 4789801
- UNEP. (2017). *Global partnership on waste management: Advancing sustainable solutions for developing regions*. United Nations Environment Programme.
- Damanhuri, E., et al. (2015). Waste management practices in developing countries: A review of challenges and opportunities. *Waste Management*, 39, 112.
- Kaza, S., Yao, L., Bhada-Tata, P., Van Woerden, F. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. World Bank.
- United Nations. (2015). *Sustainable Development Goals: Goal 11*. Available from <https://sdgs.un.org/goals/goal11>
- Direktorat Jenderal Pendidikan Tinggi. (2021). *Indikator Kinerja Utama Perguruan Tinggi*. Pemerintah Indonesia.
- (2024). *Asta Cita Presiden Prabowo-Gibran Harmonisasi kehidupan dengan alam dan lingkungan*. Sekretariat Negara.
- Kementerian Riset dan Teknologi/BRIN. (2020). *Rencana Induk Riset Nasional 2020–2045*.
- Sudibyo, P., et al. (2016). Pemilahan sampah rumah tangga di wilayah perkotaan Indonesia: Studi Kasus Jatinangor. *Jurnal Lingkungan dan Pembangunan Berkelanjutan*.
- Soemarwoto, O. (2001). Dampak pembakaran sampah terhadap lingkungan dan kesehatan masyarakat. *Jurnal Ekologi Lingkungan*, 81, 2335.
- Brigita, F., Rahardyan, B. (2013). Partisipasi masyarakat dalam pengelolaan sampah perkotaan: Studi Kasus Indonesia. *Waste Management Journal*, 15, 289100.
- Khoeroni, M.H., Rahardyan, B. (2023). Tingkat penanganan sampah di Jatinangor: Analisis preferensi masyarakat. *Jurnal Pengelolaan Lingkungan*, 15, 34555.
- Subagyo, A., et al. (2024). Peran koperasi multi pihak dalam pemberdayaan ekonomi lokal: Studi kasus pengelolaan sampah berbasis komunitas. *Jurnal Ekonomi Berkelanjutan*, 18, 26780.