

Replication of Losida for Organic Waste Management in Yogyakarta

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ABSTRACT

Proper urban waste management in Yogyakarta, Indonesia, has emerged as a critical challenge, with upsurge in unmanaged waste levels resulting in devastating environmental and health problems. With the new waste management initiatives sprouting up, community programs and local universities have developed many in the recent past, keeping in mind the greener alternative in a bid to reduce their environmental footprints and embrace sustainability. This paper describes a community service project in designing and constructing losida (kitchen waste bin) that conducts several activities. The project activities are carried out with several local waste banks and waste facilitators from the City of Yogyakarta. The project activity was designing the losida, manufacturing the losida, education of kitchen waste with losida, presentation on household waste processing, and handover the losida to Bank Sampah Masdarling members. The output of project has implemented to create ten units of losida and has been channeled to the waste bank's members. In addition, the workshop of organic waste processing has been carried out in the local community and campus. This research concludes that, in one case, academies and community programs are in need of engaging in more collaborative activities to play significant roles in dealing with urban waste management problems in Yogyakarta, whereas, in another case, it is established that such collaborative activities have brought a significant stride in a sustainable and green waste management paradigm, with high potential for emulation elsewhere in urban centers facing waste management crises.

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A. Introduction

The Indonesian waste issues, including Yogyakarta, has become serious attention due to challenges in its management, both organic and inorganic. Waste management needs to be explored comprehensively to prevent detrimental effects on the environment and health. In Indonesia, waste pile has reached 69.2 million tons, with 35.48% remaining unmanaged. This issue is projected to increase by 70% in 2024 considering the country as the fourth most populous country in the world (Primantoro, 2023; Saipullah et al., 2023). In Yogyakarta, a waste disaster is characterized by unmanaged waste volumes reaching 700 tons per day in May 2023, leading to the closure of Piyungan landfill and indiscriminate waste disposal (Pertiwi & Mustika Sari, 2023). The local authority has even permanently closed the landfill and shifted towards waste sorting and processing at the district's waste treatment facilities. Therefore, waste management initiated from the household becomes a potential solution to reduce and address waste issues in Yogyakarta.

The issue of waste in Yogyakarta has become a serious focus, with various mitigation efforts undertaken. One iconic initiative is the Mbah Dirjo Movement (Yogyakarta-style Biopori Waste and Rubbish Management Movement), which has successfully created around 23,000 biopori holes with a total volume capacity of 64 tons. This movement aims to address the waste emergency in Yogyakarta to ensure it is more manageable. In addition to Mbah Dirjo, waste management in Yogyakarta also involves

the 'Stacked Bucket' method, provided to the Paguyuban Bank Sampah with a total of 1000 buckets. These buckets are used for the segregation of organic and inorganic waste, with the hope of reducing the amount of waste entering landfills and dumpsites, and to produce compost processed by the residents of Yogyakarta.

Additionally, approaches to waste management in Yogyakarta also include the 'SAMBAL PEDAS TERASI' method (SAMPah BALaikota PEngelolaan DARI Sumbernya TERAtaSI), implemented in 2022 for the optimization of environmental waste management. This action has brought significant changes in the management of office waste in Yogyakarta, including the handling of organic fertilizer from garden maintenance waste and the establishment of waste banks (adminwarta, 2022). Apart from the local government, the private sector also actively participates in waste management in Yogyakarta, with PT Biru Sistem Perkasa managing up to 60 tons of waste per day through environmentally friendly technology using incinerators (S. D. Setiawan & Assidiq, 2023).

Not only the government and private sector, but the involvement of academics from various universities also plays a crucial role in waste management. Innovations from campuses such as the implementation of the zero-waste concept by STKIP Kusuma Negara Jakarta and the use of ecoenzymes by Universitas Islam Malang demonstrate efforts to manage waste effectively (Andini et al., 2022; Junaidi et al., 2021). Additionally, breakthroughs such as the creation of biopori by Universitas Janabadra Yogyakarta and the application of the Takakura composting method by Universitas Gadjah Mada represent innovative steps in addressing waste issues in Yogyakarta (Fitria et al., 2024; R. N. B. Setiawan & Nugroho, 2023).

Efforts to address waste issues include developing Losida, targeting the management of a large number of organic household wastes that need proper follow-up. Losida is an innovation for utilizing organic waste, especially kitchen refuse. The innovation is utilizing the waste by putting it into PVC pipes or buried bins near plants. In the bin, organic kitchen waste is deposited to decompose as compost useful for the fertility of plants. This method is implemented to manage the residuals of kitchen waste, driven by improper allocation and utilization of such waste. In Yogyakarta, Sleman, and its surroundings, one of the concerns shows that there is a lot of organic waste that is not utilized. This non-utilization occurs because, in general, the public does not know how to turn the kitchen waste, which is produced every day, into something useful, and thus it just dumps it and pollutes the environment. If the kitchen waste was utilized, then it might change into organic fertilizers and give benefits to people and less environmental pollution. Based on the background described, this community service program partners with Bank Sampah Masdarling (environmentally aware community) located at RT 41 RW 11 Muja Muju, Kota Yogyakarta.

B. Literature Review

Several researchers have designed different remedies for the different waste types, including the zero-waste approach developed by STKIP Kusuma Negara, Jakarta, Indonesia. Zero waste is a resource recovery from chemical waste to remove useless and unwanted waste from every product and stage of lifecycle. The product made from it is used for reuse according to the demands (Andini et al., 2022). Eco-enzyme has been innovated for waste processing that goes a step forward from zero waste. It is used in community empowerment developed by Universitas Islam Malang, which plays a role in household waste management to reduce costs at the home level. The fermentation product of ecoenzymes is employed as a natural floor cleaner, toilet cleaner, and even capable of opening water pathways. The leftover organic waste produced from fermentation acts as cleaner and is as good as organic fertilizer. The cost is economical and less in preparation (Junaidi et al., 2021).

Other innovations in waste management on the campuses include the modern Teba technique in processing organic waste from Universitas Pendidikan Nasional. The modern Teba technique comprises the creation of special waste pits constructed from cement, with a diameter of 80 cm, a 300 cm depth, and a pit height of 80 cm. The process is capable of processing household organic waste (Dikse Pancane et al., 2023). Petra Christian University in Surabaya innovated a Sieving Machine for compost produced

from organic waste. This Sieving Machine supports the production of compost from organic waste, making the process easier and useful (Amelia et al., 2023).

Another is the processing of organic waste into Liquid Organic Fertilizer (POC) through the use of the Soluble Liquid (SL) technique that Universitas Lampung had innovated. Hence, waste management is more effective, and at the same time, organic fertilizer is produced as valuable products for farmers and home gardens (Bahri et al., 2023). In Yogyakarta, the universities are also engaging in the managing of waste. An innovation is through the biopori production by Universitas Janabadra Yogyakarta. The innovation uses leftover land or yard land to create pores in PVC pipes buried in the soil to ferment organic household waste to decrease the stack of organic household waste. This innovation resolves the problem of a high stack of household organic waste and the risk of flooding and can also produce organic fertilizer to improve the economics of the community (R. N. B. Setiawan & Nugroho, 2023). Universitas Gadjah Mada has processed organic waste into compost and manure through the Takaruka composting technique. This method accelerates the decomposition process by microbes from the finished Takakura compost combined with 1:1000 diluted ecoenzyme solution put in a small basket medium. Compost can be harvested in four weeks, making this approach very effective and efficient in the processing of organic waste and harvesting organic fertilizer compared to traditional composting that requires nine weeks to process organic waste into manure (Fitria et al., 2024).

C. Method

This community service program involves the creation and utilization of Losida through training, waste management educational seminars, and the distribution of Losida. The method used in its creation is as follows:

1. Designing Losida
The first step involves designing the losida to identify and prepare the necessary equipment for its creation.
2. Manufacturing Losida
After the design phase, considering shape and materials, the next step is the actual construction of the losida.
3. Education on Utilizing Kitchen Waste with Losida
The production of Losida requires education, which will be provided to Bank Sampah Masdarling. This education aims to enlighten the community about the importance of managing previously unutilized kitchen waste and to inform those unfamiliar with Losida about its functions and benefits, namely that kitchen waste can be transformed into compost or organic fertilizer. With the education provided, it is hoped that kitchen waste will offer benefits and not pollute the environment.
4. Presentation on Household Waste Processing
In fact, household waste, both organic and inorganic, can be transformed into useful materials. For example, plastic waste can be used to make woven bags, cardboard can be utilized for crafting photo frames, and old bottles can be repurposed as ecobricks or environmentally friendly building blocks. Apart from inorganic waste, organic waste, including kitchen residues, can also be utilized as compost, particularly through the innovative use of losida.
5. Handing Over Losida to Members of Bank Sampah Masdarling
The Losida, after being produced and well-educated for society, will be delivered to the public who are members of Bank Sampah Masdarling. These losida are expected to be used by the community in managing kitchen waste that has long been a problem in its treatment. In conducting this handover, the new discussion of waste issues, particularly around Jl. Kusumanegara and its environment, will later be positively influenced.

D. Results and Discussion

Design and Manufacture of Losida

Household waste, closely tied to waste production, especially from food preparation to consumption, necessitates innovative solutions for managing organic waste to prevent environmental pollution and utilize waste

beyond mere disposal. To address this, the losida system has been developed as a solution for processing organic waste, particularly kitchen residues, using PVC pipes or bins buried near plants. This system allows organic waste to decompose into compost, enriching plant fertility and offering broad positive impacts on household management, health, and the environment. Losida helps households manage waste efficiently without needing transport to waste disposal facilities, effectively reducing health hazards and environmental impact by improving soil and plant health around homes. The system transforms waste characteristics, composition, and volume to facilitate further processing, utilization, or safe reintroduction into the environment, producing compost, fertilizer, biogas, energy potential, livestock feed, and other recycled outputs. Additionally, losida promotes community involvement in environmental cleanliness, contributing to waste management solutions. Losida is user-friendly, suitable for spacious grounds or pots of any size, working by filling the pipe with household kitchen waste and allowing it to decompose over approximately two months, resulting in compost and leachate that serves as liquid fertilizer for surrounding soil and plants. The steps for constructing a losida are as follows:

- Preparing the Tools: The primary tool required is a saw, used to cut the PVC pipe to the predetermined size. Additionally, a drill is needed to make holes in the bottom of the pipe, allowing waste to exit into the soil and reach the plants.
- Cutting the PVC Pipe: The PVC pipe is sawed to a length of 140 cm and holes are drilled into it.
- Preparing the Site: A hole-making tool is used to bore into the soil, after which the PVC pipe is buried to a depth of 40 cm, ensuring that the drilled bottom part is covered by soil.
- Adding Kitchen Waste: Kitchen waste is inserted into the top of the PVC pipe and covered with a PVC cap. After about two months, the waste decomposes into compost.



Figure 1. PVC Pipe Perforation



Figure 2. Soil Perforation



Figure 3. Inserting PVC Pipe into Pre-perforated Soil



Figure 4. Inserting Household waste

Outreach on Organic Household Waste Processing

This activity is a community service initiative focused on waste management empowerment. The subject of this service is organic household waste, with emphasis on solutions for processing this waste due to the increasing volume of organic waste in Yogyakarta. Thus, this initiative serves as a form of community participation and concern for mitigating or reducing organic household waste in the local area. The implementation of this activity took place near Kusumanegara street, ensuring that the purpose of the service was fully conveyed to the local residents in managing household organic waste beneficially.

The aim of this community service activity is to foster new approaches for the local community in managing organic household waste, which had not been previously implemented. The objectives of this activity include:

- e. Educating the community about the importance of waste processing to prevent future adverse impacts.
- f. Providing training on how to process household organic waste using losida, along with explaining the benefits of Losida.
- g. Demonstrating social responsibility among the local community in efforts to reduce household organic waste.

The event also featured experts in waste management from the local government, Sri Sumaryanti and Fraksiyanti. The activity was attended by local residents around the Kusumanegara street as the primary target of the service, cleaning service team to enhance understanding in managing campus waste, and university students. The event was structured from explanations about organic waste and its importance in management to demonstrations of using Losida, a tool for processing household organic waste. Participants were highly enthusiastic about the implementation, given the background of previously unmanaged and unimplemented waste issues.



Figure 5. Some photos of the Losida workshop

E. Conclusion

This community service project has successfully designed and replicated the use of Losida for the local community. Additionally, cleaning services and students were involved in the construction and educational aspects of implementing Losida, thereby enhancing awareness of organic waste management among various stakeholders. Consequently, waste reduction is no longer merely a topic of discussion, but the community and various parties have begun to take action on a fundamental level.

F. References

- Adminwarta. (2022, May 13). *Sambal Pedas Terasi Ciptakan Bebas Sampah di Balaikota*. <https://warta.jogjakota.go.id/detail/index/20869>
- Amelia, Rahardjo, J., Anastasia, N., Yuke, S., & Wynet, C. (2023). Kontribusi Mesin Pengayak Untuk Peningkatan Kualitas Pupuk Kompos dalam Mendukung Keberlanjutan. *Prosiding Konferensi Nasional Pengabdian Masyarakat*, 356, 356–363.
- Andini, S., Saryono, Fazria, A. N., & Hasan. (2022). Strategi Pengolahan Sampah dan Penerapan Zero Waste di Lingkungan Kampus STKIP Kusuma Negara. *Jurnal Citizenship Virtues*, 2(1), 273–281.
- Bahri, S., Hendri, J., Laila, A., Satria, H., & Ambarwati, Y. (2023). Konversi Sampah Organik di Lingkungan Fmipa Universitas Lampung Menjadi Pupuk Organik Cair (Poc) Dengan Teknik Soluble Liquid (SL). *Jurnal Abdi Insani*, 10(3), 1786–1792.
<https://doi.org/10.29303/abdiinsani.v10i3.1055>
- Dikse Pancane, W., Nareswari, N. P. G., & Alexandro, I. (2023). Penerapan Teknologi Pengolahan Sampah Organik dengan Teba Kekinian dalam Menjaga Kelestarian Alam. *Abdimas Galuh*, 5(1), 752–758.
- Fitria, L., Rarafifi, C. A., Islami, P. D., Lonardo, A., Salsabila, T. A. S., & Prayogo, E. (2024). Pendampingan Pengolahan Sampah Organik Menjadi Pupuk Kompos Dan Pupuk Kandang. *JMM (Jurnal Masyarakat Mandiri)*, 8(1), 818.
<https://doi.org/10.31764/jmm.v8i1.20062>
- Junaidi, M. R., Zaini, M., Ramadhan, Hasan, M., Ranti, B. Y. Z. B., Firmansyah, M. W., Umayasari, S., Sulisty, A., Aprilia, R. D., & Hardiansyah, F. (2021). Pembuatan Eco-Enzyme Sebagai Solusi Pengolahan Limbah Rumah Tangga. *Jurnal Pembelajaran Pemberdayaan Masyarakat*, 2(2), 118–123.
- Pertiwi, D., & Mustika Sari, R. (2023). Peran Pekerja Sosial dalam Mendukung Kebijakan Pengelolaan Sampah di Yogyakarta. *KOLONI: Jurnal Multidisiplin Ilmu*, 2(4), 246–258.
- Primantoro, A. Y. (2023, April 7). *Tiga Permasalahan Mendasar Sampah yang Tidak Kunjung Selesai*.
<https://www.kompas.id/baca/humaniora/2023/04/06/tiga-permasalahan-mendasar-sampah-yang-tidak-kunjung-selesai>
- Saipullah, Muzaffar, & Yusran, M. (2023). Hubungan Tingkat Pengetahuan dan Sikap dengan Perilaku Ibu dalam Pengelolaan Sampah Rumah Tangga. *Jurnal Promotif Preventif*, 6(4), 547–551.
<http://journal.unpacti.ac.id/index.php/JPP>
- Setiawan, R. N. B., & Nugroho, J. P. (2023). Pelatihan Pengelolaan Sampah dengan Pembuatan Biopori Untuk Kesejahteraan Masyarakat Dan Lingkungan di Dongkelan, Panggungharjo Sewon, Bantul Yogyakarta. *Jurnal Pengabdian Masyarakat*, 2(2), 803–808.
- Setiawan, S. D., & Assidiq, Y. (2023, October 18). *Pengolahan Sampah Berteknologi Ramah Lingkungan di Yogya Libatkan Swasta*.
<https://rejogja.republika.co.id/berita/s2pd00399/pengolahan-sampah-berteknologi-ramah-lingkungan-di-yogya-libatkan-swasta>