

# Integration of urban farming and waste management in realizing a sustainable environment in Dauh Puri Kaja Village

Made Dwi Kanaka Sarahswati<sup>1\*</sup>, Dew Ayu Trisna Adhiswari Wedagama<sup>2</sup>

<sup>1</sup>Fakultas Ilmu Sosial Dan Humaniora, Universitas Pendidikan Nasional, Bali, Indonesia

<sup>2</sup>Faculty of Engineering, Universitas Pendidikan Nasional, Bali, Indonesia

\*Corresponding Author (e-mail: [kanakasarahswati@gmail.com](mailto:kanakasarahswati@gmail.com))

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## Abstract

Due to the increasing amount of waste and the limited amount of green land in cities, environmental issues are becoming a significant challenge to realizing a sustainable environment. To raise public awareness about the importance of environmental management, this community service program combines the idea of urban farming with the concept of 3R-based waste management (reduce, reuse, recycle). The activity was held in Dauh Puri Kaja Village, Denpasar, and involved hands-on practice and training in waste sorting, processing organic waste into compost, and utilizing it for urban farming. The program began with training for residents at the Balai Banjar. Then, the processed compost fertilizer was distributed at the Waste Management Site (TPS), and instructions were given on how to use it for urban farming. The results show that the community better understands how to utilize compost for household-scale farming and properly segregate waste. In the long run, it is expected that this program will significantly impact the community by teaching them how to manage waste and make the best use of green spaces. This will encourage a cleaner and more sustainable environment.

Keywords: Urban Farming, Waste Management, Composing

## Abstrak

Akibat jumlah sampah yang meningkat dan jumlah lahan hijau yang terbatas di kota-kota, masalah lingkungan menjadi tantangan besar untuk mewujudkan lingkungan yang berkelanjutan. Untuk meningkatkan kesadaran masyarakat tentang pentingnya pengelolaan lingkungan, yang menggabungkan gagasan tentang peternakan kota dengan konsep manajemen sampah berbasis 3R (reduce, reuse, recycle). Kegiatan ini diadakan di Desa Dauh Puri Kaja, Denpasar, dan melibatkan praktik langsung dan pelatihan dalam pemilahan sampah, pengolahan sampah organik menjadi kompos, dan pemanfaatannya untuk peternakan kota. Program dimulai dengan pelatihan kepada warga di Balai Banjar. Kemudian, pupuk kompos hasil pengolahan dibagikan di Tempat Pengolahan Sampah (TPS) bersama dengan instruksi tentang cara menggunakannya untuk pertanian perkotaan. Hasilnya menunjukkan bahwa masyarakat lebih memahami cara memanfaatkan kompos untuk pertanian skala rumah tangga dan cara memilah sampah dengan benar. Dalam jangka panjang, diharapkan program ini memiliki dampak yang signifikan pada masyarakat dengan mengajarkan mereka cara mengelola sampah dan memanfaatkan ruang hijau sebaik mungkin. Ini akan mendorong lingkungan yang lebih bersih Dan berkelanjutan.

Kata kunci: Urban farmi g, managemen sampah, Kompos

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## 1. Introduction

Rapid population growth in cities causes residential areas to become larger and denser. Increased human activity also leads to more waste (Nurhidayati et al., 2022). The rapid development of urban areas, such as in Dauh Puri Kaja Village, Denpasar, has resulted in a number of complex environmental impacts. These problems include an increase in the volume of waste and the depletion of green spaces (Setiawan et al., 2022). The high amount of organic waste generated by households that is not managed properly is one of the main problems faced. This problem contributes to the burden of landfills and environmental pollution.

Waste management issues in coastal areas have become an urgent environmental concern that requires immediate attention (Maryati et al., 2024). The low level of segregation and reutilization of waste that is still useful is due to the lack of public awareness of the 3R principles in waste management. 3R waste management needs to be done from an early age until it increases awareness of the environment (Maryati et al., 2024). Public awareness of the importance of the 3R principles (Reduce, Reuse, Recycle) is still a major challenge in sustainable waste management in urban areas (Cantya & Rahmawati, 2024). Therefore, there needs to be something that encourages until raising awareness about waste management for the community, especially in urban areas.

Urban farming has emerged as an ecological solution that can help conserve waste. Urban farming practices are basically the same as general agricultural practices that require agricultural production factors in their activities (Nurhidayati et al., 2022). The utilization of urban farming through the eco-village concept can improve community food security while reducing organic waste that ends up in landfills (Wijaya et al., 2020a).

Urban farming, as a sustainable solution to food security and waste management, has gained significant attention in recent years. The 3R (Reduce, Reuse, Recycle) principle plays a crucial role in minimizing waste production and promoting environmental sustainability (Ghisellini et al., 2016). By integrating composting and urban farming, communities can actively participate in waste reduction while enhancing local food production (Wilson et al., 2006).

Several studies highlight the effectiveness of composting in organic waste management. Composting not only reduces the volume of solid waste but also provides nutrient-rich soil amendments that improve agricultural productivity (Hargreaves et al., 2008). However, challenges such as marketing and transportation constraints limit its profitability and large-scale adoption (Hoornweg & Bhada-Tata, 2012). Despite these challenges, community-driven composting initiatives have shown success in fostering environmental awareness and strengthening local economies (Wang et al., 2018).

The integration of urban agriculture with waste management is an emerging practice that addresses multiple urban challenges. Research suggests that cities adopting urban farming initiatives experience improved waste diversion rates and increased

community engagement (van der Schans, 2010). Additionally, composting initiatives empower local communities, particularly women, by providing economic opportunities and knowledge-sharing platforms (Drechsel & Kunze (Eds.), 2001; Harris et al., 2001)

Urban farming combined with the idea of the eco-village concept can help reduce organic waste through the 3R approach (reduce, reuse, recycle) and composting. This helps reduce the amount of waste that ends up in landfill (Wijaya et al., 2020). In addition, combining urban farming with 3R-based waste management provides additional benefits. Urban farming activities not only support economic and social aspects, but also play an important role in preserving the urban environment by using organic waste as compost (Dewi & Nugraha, 2022). The integration of urban farming in the community can encourage the use of the 3Rs waste sorting concept and allow the community to convert food scraps and organic waste into compost. This will reduce organic waste and increase green space in urban areas. It also reduces dependence on chemical fertilizers and improves environmental sustainability.

Processing waste into compost, aka composting, is said to be the most environmentally friendly waste treatment process (Suraya et al., 2021). Turning municipal waste into compost: the case of Accra" highlights the potential of composting municipal waste for urban agriculture (Orsini et al., 2013). Composting initiatives have proven to be effective in achieving environmental goals, yet their long-term sustainability depends on addressing broader socio-economic factors. Successful composting projects not only contribute to waste management but also support urban farming by empowering communities financially and fostering knowledge exchange among participants (Peters, 1998). The application of urban farming integrated with a 3R-based waste-to-compost management system has a positive environmental impact as well as other social and economic benefits. The integration of the two is a sustainable cycle (Cantya & Rahmawati, 2024). Not only does it encourage the utilization of organic waste and 3R-based waste management, it includes the creation of green spaces in urban areas, enhancing local food security, and encouraging community-based economy.

Thus, the implementation of 3R-based waste management integrated with urban farming can be an effective solution in reducing waste volume. To realize this and create a healthier and more productive ecosystem in the environment, a community service-based approach is needed to implement sustainable urban farming along with an efficient waste management system. It is hoped that by involving the community in this process, public awareness of the importance of managing waste and utilizing local resources will be optimized.

By implementing sustainable urban farming and composting strategies, cities can work towards a circular economy model where waste is minimized, and natural resources are effectively utilized (MacArthur, 2017). Future research should focus on optimizing composting techniques and developing policy frameworks to support urban farming initiatives in waste management.

## 2. Community development method

Lack of green areas, low public understanding of the 3R principle (Reduce, Reuse, Recycle), and difficulties handling organic waste are all problems in Dauh Puri Kaja Village. The initiative encourages composting, urban farming, and digital education to improve environmentally conscious behavior and sustainable waste management in order to address these problems. Training in garbage sorting, composting, and other urban farming methods like hydroponics and vertical gardening are all part of the program. In order to further integrate the community's lemongrass garden into sustainable agriculture, it will also be optimized.

Planning, coordination, observation, preparation, execution, and evaluation are the six main phases of implementation. While coordination guarantees cooperation with village officials, TPS managers, and nearby farms, planning entails recognizing issues and organizing work plans. Surveys and observations aid in honing strategies based on existing waste management techniques and community involvement. Creating instructional materials, digesting compost, and running simulations to foresee problems are all examples of preparation.

A community-based waste management program can help improve people's understanding of the importance of sorting and recycling organic and inorganic waste (Desai, 2023). Therefore, it is necessary to have community cooperation in realizing the integration of urban farming with this waste processing. Residents participate in composting and garbage sorting training sessions at the Balai Banjar during implementation. The process of turning organic waste into compost is demonstrated through educational materials and live demonstrations. To promote urban gardening, free compost is given out along with further instruction on how to use it correctly. In order to promote sustainable agriculture, the initiative also involves planting a variety of crops at the village's PKT. Through education, training, and resource distribution, this initiative promotes a cleaner, greener environment by combining organic waste management with urban gardening, guaranteeing sustainability and long-term community involvement.

## 3. Results community development

In Dauh Puri Kaja Village, the results show that combining urban farming with waste management greatly improves sustainability: According to field observations, more than 60% of household waste in the village is organic, and if properly managed, could be compost for urban farming projects; 75% of respondents support using organic waste for urban agriculture, citing economic and environmental benefits; the composting process has shown significant improvements in soil fertility, which contribute to higher crop yields and better food quality.

Inadequate waste segregation at the household level has been noted as a significant concern. Composting is ineffective because of the way garbage is currently disposed of, which mixes organic and inorganic trash. Structured waste management strategies, such as educational initiatives and rewards for waste segregation, may



increase community involvement in sustainable practices, according to interviews with local authorities. Broader adoption has also been impeded by financial limitations and a lack of technical expertise about composting techniques.



Figure 1. Waste Management Site in Dauh Puri Kaja Village

In Dauh Puri Kaja Village, experimental urban farming projects using composted organic waste have shown enhanced local food security, higher crop yields, and increased soil fertility. Composting organic waste has lessened landfill loads and given urban farms new revenue streams when compared to conventional waste disposal techniques. In an effort to promote sustainable farming methods and make extra money, a number of community members have started selling fertilizers made from compost.



Figure 1. Dauh Puri Kaja PKT Urban Farming and Waste Management in the TPS

According to international comparisons, waste-to-agriculture initiatives have been effectively implemented in cities like Singapore and Tokyo with the help of government assistance and technology improvements. The results indicate that community involvement is a critical success factor, even though comparable approaches might be

modified in Indonesia. It is advised that the government step in and work with neighborhood non-governmental organizations to make sure integrated urban farming and waste management projects are sustainable.

Additionally, raising public awareness through training courses and workshops can improve how well waste management integration works. Creating urban farming hubs in residential neighborhoods can boost involvement even more and guarantee sustained involvement. Sustainability initiatives may also be strengthened by policy incentives like subsidies for community-led garbage recycling programs and tax breaks for urban farmers.

Dauh Puri Kaja Village's combination of waste management and urban farming is a workable example of sustainable urban growth. However, for implementation to be successful, infrastructure investments, community education, and policy backing are required. Future studies should examine cutting-edge technology for enhancing composting effectiveness and urban agriculture productivity, as well as long-term monitoring of these programs to evaluate their effects on trash reduction and urban food security.

#### **4. Conclusion**

In urban places like Dauh Puri Kaja Village, combining waste management and urban farming may greatly improve environmental sustainability. According to research, a significant amount of home garbage is organic, which makes composting a practical way to lessen landfill waste and enhance soil quality for urban farming. Reduced reliance on chemical fertilizers and more revenue prospects through urban agricultural businesses are further economic advantages. However, issues including poor waste segregation, a lack of funding, and a lack of technical expertise must be resolved for implementation to be effective. To ensure long-term viability, active government action, community involvement, and policy backing are essential. For other metropolitan towns dealing with comparable waste management issues, this integration model can provide a replicable framework by encouraging cooperation between local government representatives, citizens, and private entities. In order to improve the efficacy of waste-to-agriculture initiatives, future studies should concentrate on cutting-edge composting technology and financial feasibility analyses.

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