Community participation in urban waste management

Yusuf Hariyoko
Universitas 17 Agustus 1945 Surabaya, Email: yusufhari@untag-sby.ac.id
Eddy Wahyudi
Universitas 17 Agustus 1945 Surabaya, Email: ediwahyudi@untag-sby.ac.id
Arlissya Azza Kamila
Universitas 17 Agustus 1945 Surabaya
Muhammad Fadly Miftaqul Amirullah
Universitas 17 Agustus 1945 Surabaya

Abstract

Surabaya, one of Indonesia's largest cities, faces a significant problem related to the increasing volume of waste. Although there have been efforts from the city government through waste management initiatives and waste-to-energy processing technology, the waste problem still needs to be fully resolved. Community participation is considered an essential factor in the success of sustainable waste management. A qualitative descriptive method describes community participation in urban waste management in Surabaya. Data were collected through in-depth interviews, direct observation, and documentation of related policies. The study subjects included residents involved in the waste management program and government and private sector parties collaborating in waste management. The study results indicate that community participation through the Waste Bank program and other social innovations significantly reduces Surabaya's waste management burden. However, the varying levels of community participation are a challenge in themselves. Policies supported by the government and social innovations have been shown to increase the effectiveness of waste management but still require increased active participation and public awareness. A more effective and environmentally friendly waste management system can be created with a collaborative approach involving all parties.

Keywords: partisipasi masyarakat, pengelolaan sampah, sampah perkotaan

Introduction

Urban development in Indonesia continues to grow rapidly, with increasing population and economic growth. This high urbanization brings various new challenges, one of which is environmental problems, especially waste management. The issue of urban waste is becoming increasingly complex, with the volume of waste continuing to increase along with

population growth, increasing industrial activity, and changes in people's consumption patterns.

Various parties have strategic roles in urban waste management, including the government, the private sector, and the community. The government is responsible for providing adequate policies, regulations, and infrastructure to support sustainable waste management (Ma et al., 2023). The private sector plays a role through innovation in waste processing technology and partnerships in providing waste transportation and processing services. However, the most crucial role is community participation as the largest waste producer in everyday life.

Community participation in urban waste management dramatically determines the success of existing waste management programs (Hadi, 2010). Public awareness and concern for the importance of good waste management will help reduce the burden on the government and accelerate the achievement of sustainable development goals in urban areas. Through activities such as waste sorting from source, composting, recycling, and active involvement in community programs, the community has a central role in creating a cleaner and healthier urban environment.

Surabaya City, one of Indonesia's largest cities, also faces significant urban waste problems. With a growing population, waste production in this city reaches thousands of tons daily. Although the city government has made efforts through various waste management programs, such as the Benowo Final Disposal Site (TPA), which is equipped with waste processing facilities to become electrical energy, the waste problem still needs to be fully resolved. The main problem lies in the community's habits that could be more optimal in sorting waste from its source and limitations in waste management technology (Samsuri, Maulana, 2019). To overcome this problem, the Surabaya City Government has launched various initiatives, including the Surabaya Eco School campaign, the Waste Bank program, and improving waste management infrastructure. Community participation through these programs is very important, but the varying levels of participation are a challenge in themselves. More intensive efforts are needed in education and direct community involvement to make waste management in Surabaya more effective and sustainable.

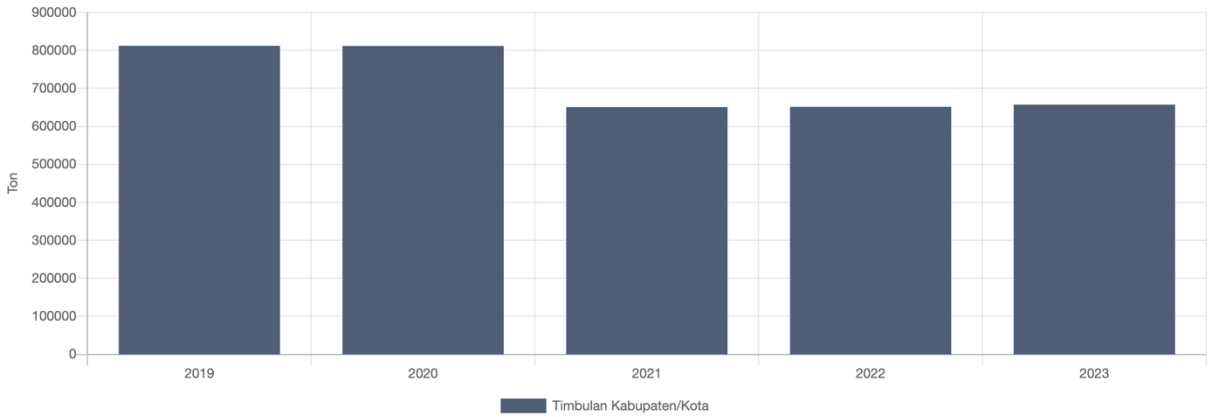

Figure 1. Surabaya city annual waste production
Source: (KLHK Indonesia, 2024)

In conclusion, urban waste management involves various parties, including the government, the private sector, and the community. Without active community participation in waste management, the efforts of the government and other parties will be less than optimal. With a collaborative approach and increased awareness, cities like Surabaya have the opportunity to address waste issues and create healthier, more environmentally friendly urban environments (Amritha & Anilkumar, 2016; Zhang et al., 2024).

Methodology

This study uses a qualitative descriptive method to describe in-depth community participation in urban waste management (Creswell, 2014). Data were collected through in-depth interviews, direct observation, policy documentation, and reports related to waste management (Miles et al., 2014). The study subjects included residents involved in waste management programs, such as the Waste Bank, and government and private sector parties. Data analysis was conducted using a thematic approach to find patterns of participation, obstacles faced, and the effectiveness of waste management programs involving the community. Community participation in waste management is crucial to creating a clean and sustainable urban environment. This form of participation can be in the form of community organizations, policies, and social innovations. Active community participation helps reduce the burden on the government and encourages the creation of a more effective and environmentally friendly waste management system.

Results and Discussion

Community organizations

This study shows that community organizations have a central role in waste management in the city of Surabaya. Community organizations, consisting of local groups such as Waste Banks, environmental cadre groups, and community residents at the RT/RW level, have become the main drivers in various waste management programs carried out at the local level. They facilitate waste sorting at the source and are active in educational programs and socializing the importance of good waste management to the community (Nurcahyo et al., 2024).

One concrete example is the Waste Bank, which has been established in various areas of Surabaya. Data from the Surabaya City Environmental Service shows that in 2023, more than 400 Waste Bank units will be operating, capable of processing up to 12,000 tons of waste each year. These organizations teach the community to sort organic and inorganic waste and provide financial incentives through recycling programs, where inorganic waste collected can be exchanged for money or goods (Mulya et al., 2021). Active community participation in this program has reduced the volume of waste disposed of at the Benowo Final Disposal Site (TPA).

Furthermore, community organizations such as environmental cadres also play a role in strengthening communication between the community and the city government. They act as liaisons in conveying information on waste management policies and ensuring that the community can understand and implement programs initiated by the government. In addition, they are also involved in the Surabaya Eco School program, which encourages active participation of school students in the environmental care movement. By 2022, the program had reached more than 300 schools in Surabaya.

However, although community organizations have a significant impact, this study also found several obstacles in their implementation. One main challenge is the need for more community participation in several areas. Some residents are still reluctant to sort waste at home, citing inadequate facilities or lack of awareness. On the other hand, limited funds and human resources in several community organizations also hamper their efforts to expand the scope and intensity of waste management programs.

In addition, data from the Surabaya City Environmental Service also shows that although the volume of waste processed through local programs continues to increase, the city still produces around 2,000 tons of waste per day. This means that, despite the significant role of community organizations, waste management challenges still need to be addressed comprehensively by involving more parties, including the private sector, and improving waste processing technology infrastructure. Surabaya community organizations have shown an important role in waste management, primarily through waste sorting activities at the source and recycling programs involving residents. The Waste Bank program and community involvement at the local level have contributed to reducing the volume of waste entering the landfill. However, these efforts require further improvement in public awareness and more optimal infrastructure and funding support so that waste management in Surabaya becomes more effective and sustainable.

Government-supported policies

This study reveals that government policy support plays an important role in waste management in Surabaya City (DLH Kota Surabaya, 2019). The Surabaya City Government has issued various regulations and policies supporting urban waste management efforts, including waste sorting policies at source, establishing and developing Waste Banks, and implementing the Surabaya Eco School program to increase environmental awareness among students (Ma et al., 2023). Surabaya City Regional Regulation (Perda) Number 5 of 2014 concerning Waste Management requires residents to sort organic and inorganic waste from households. This policy is supported by various programs in the field, such as the provision of Waste Bank facilities in each sub-district and waste management campaigns through the mass media.

Data from the Surabaya City Environmental Service shows that since this policy was implemented, community participation in waste sorting has increased, and the volume of waste dumped into the Benowo Final Disposal Site (TPA) can be reduced by up to 15% annually (Mayangkara, 2016). In addition, the government also supports technological innovation programs in waste management, such as the construction of waste processing

facilities at the Benowo TPA that convert waste into electrical energy. This program collaborates between the local government and the private sector through the Public-Private Partnership (PPP) scheme (Tahir et al., 2024). Currently, it produces around 11 megawatts of electricity from the waste processing process.

However, the study's results also show that implementing this policy still faces challenges, such as some people need more awareness and discipline in complying with waste sorting regulations. In addition, the limited government budget for supporting waste management facilities and infrastructure at the local level is also an obstacle to implementing this policy (Filimonova et al., 2023). According to data from the Surabaya City Environmental Service, this city's waste reaches around 2,000 tons per day. Although government policies have helped reduce the burden on landfills, increasing community participation in complying with this policy is still needed to achieve the target of sustainable waste management. Strong and sustainable government policy support and increased public awareness are expected to make Surabaya a cleaner and more environmentally friendly city (C. Cui et al., 2020).

Social innovation

Social innovations emerging from the community have significantly contributed to urban waste management, especially in Surabaya. Social innovation in this context refers to initiatives directly from the community to increase awareness and participation in waste management (DLH Kota Surabaya, 2019). This innovation encourages behavioral changes in waste management and initiates various creative programs focusing on waste utilization and reduction (Jacques et al., 2024).

One of the most successful examples of social innovation is the Bank Sampah program, which community members manage at the RT/RW and school levels. This program allows residents to exchange sorted inorganic waste for money or goods, ultimately increasing community motivation to sort waste at the source (Gambi et al., 2024). Data from the Surabaya City Environmental Service shows that by 2023, there will be more than 400 active Bank Sampah in Surabaya, with total waste collected reaching 12,000 tons annually. This program has reduced the volume of waste entering the Benowo TPA and created economic benefits for the local community (Y. Cui et al., 2024).

Local communities in Surabaya have also developed various creative waste recycling activities, such as processing plastic waste into handicrafts with a selling value (DLH Kota Surabaya, 2019). Community groups in several areas have even succeeded in forming small recycling-based businesses that provide new jobs for the community. This reduces the volume of waste and has a positive economic impact locally. The challenge in implementing social innovation is the consistency of community participation, which is still fluctuating. Community enthusiasm for waste management programs has decreased in several areas due to the local government's lack of support or appreciation. In addition, limited facilities and supporting infrastructure, such as waste sorting tools and waste collection locations, are also obstacles faced by several communities (Sharp et al., 2024). Social innovations emerging from the community have played an essential role in urban waste management efforts in Surabaya. Programs such as the Waste Bank and Surabaya Eco School have not only contributed to

reducing the volume of waste entering the landfill but have also increased community awareness and participation sustainably. However, challenges such as fluctuations in community participation and limited facilities still need to be overcome. With continued support from the government and collaboration between communities, social innovation in waste management in Surabaya has the potential to create a cleaner and more sustainable environment.

Conclusion

Community participation through the Waste Bank program and other social innovations significantly reduces Surabaya's waste management burden. However, the varying levels of community participation are a challenge in themselves. Policies supported by the government and social innovations have been shown to increase the effectiveness of waste management but still require increased active participation and public awareness. A more effective and environmentally friendly waste management system can be created with a collaborative approach involving all parties.

Acknowledgments

Gratitude is given to the University of 17 August 1945 Surabaya for funding this research. Gratitude is also conveyed to the Surabaya City Government, which provides government data policy provisions. The people of Surabaya are also willing to provide interview information for waste management issues.

References

Amritha, P. K., & Anilkumar, P. P. (2016). Development of Landscaped Landfills Using Organic Waste for Sustainable Urban Waste Management. *Procedia Environmental Sciences*, *35*, 368–376. https://doi.org/10.1016/j.proenv.2016.07.016

Creswell, J. W. (2014). *Research Design pendekatan kualitatif, kuantitatif, dan Mixed* (Ketiga). Pustaka Pelajar.

Cui, C., Liu, Y., Xia, B., Jiang, X., & Skitmore, M. (2020). Overview of public-private partnerships in the waste-to-energy incineration industry in China: Status, opportunities, and challenges. *Energy Strategy Reviews*, *32*. https://doi.org/10.1016/j.esr.2020.100584

Cui, Y., Yin, M., Cheng, X., Tang, J., & He, B. J. (2024). Towards cool cities and communities: Preparing for an increasingly hot future by the development of heat-resilient infrastructure and urban heat management plan. *Environmental Technology and Innovation*, *34*. https://doi.org/10.1016/j.eti.2024.103568

DLH Kota Surabaya. (2019). *Renstra DLH Kota Surabaya Tahun 2019-2024*.

Filimonova, I. V., Krivosheeva, O. I., & Mishenin, M. V. (2023). The economic effect of public–private partnerships in the implementation of climate projects for the disposal of municipal solid waste. *Energy Reports*, *9*, 996–1002. https://doi.org/10.1016/j.egyr.2022.11.042

Gambi, L. G. O., Junior, R. A., Vanzela, L. S., Tagliaferro, E. R., Vazquez, G. H., da Silva Ueda, P. R., & Navarrete, A. A. (2024). Technosol made with urban and industrial waste: Potential for improving soil quality and growing tree seedlings. *Soil Advances*, *2*, 100009. https://doi.org/10.1016/j.soilad.2024.100009

Hadi, A. P. (2010). Konsep pemberdayaan, partisipasi dan kelembagaan dalam pembangunan. *Yayasan Agribisnis/Pusat Pengembangan Masyarakat Agrikarya (PPMA)*.

Jacques, E., Neuenfeldt Júnior, A., De Paris, S., Francescatto, M., & Siluk, J. (2024). Smart cities and innovative urban management: Perspectives of integrated technological solutions in urban environments. In *Heliyon* (Vol. 10, Issue 6). Elsevier Ltd. https://doi.org/10.1016/j.heliyon.2024.e27850

KLHK Indonesia. (2024). *timbulan sampah tahunan*. Https://Sipsn.Menlhk.Go.Id. https://sipsn.menlhk.go.id/sipsn/public/data/timbulan

Ma, W., de Jong, M., Zisopoulos, F., & Hoppe, T. (2023). Introducing a classification framework to urban waste policy: Analysis of sixteen zero-waste cities in China. *Waste Management*, *165*, 94–107. https://doi.org/10.1016/j.wasman.2023.04.012

Mayangkara, A. P. (2016). Evaluasi Kebijakan Pengelolaan Sampah Di Tpa Gunung Panggung Kabupaten Tuban. *JPAP: Jurnal Penelitian Administrasi Publik*, *2*(02), 427–444. https://doi.org/10.30996/jpap.v2i02.1001

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: a methods sourcebook* (Third). SAGE Publications, Inc.

Mulya, Aswandi, & Sunarti. (2021). Faktor-Faktor Yang Mempengaruhi Sistem Drainase Yang Berkelanjutan Berbasis Partisipasi Masyarakat (Study Kasus Kawasan Jl Pancasila Kecamatan Pondok Tinggi Kota Sungai Penuh). *Jurnal Pembangunan Berkelanjutan*, *4*(2), 17–23.

Nurcahyo, R., Wibowo, N., Gabriel, D. S., Sopha, B. M., & Ma'aram, A. (2024). Model development of community-based willingness to recycle for urban mining. *Cleaner Engineering and Technology*, *19*. https://doi.org/10.1016/j.clet.2024.100732

Samsuri, Maulana, L. H. (2019). MODEL PENGELOLAAN SAMPAH PERKOTAAN (Survey Pada Pengelolaan Persampahan Kota Bogor) URBAN WASTE MANAGEMENT MODEL (Survey on Waste Management in Bogor City) Program Management Studies Faculty of Economics , University of Djuanda Model Pengelolaan Sampa. *Visionida*, *5*(2), 54–61.

Sharp, D., Raven, R., & Farrelly, M. (2024). Pluralising place frames in urban transition management: Net-zero transitions at precinct scale. *Environmental Innovation and Societal Transitions*, *50*. https://doi.org/10.1016/j.eist.2023.100803

Tahir, J., Atkinson, M., Tian, Z., Kassem, M., Ahmad, R., & Martinez, P. (2024). A critical analysis of public private partnership model in energy from waste projects. *Sustainable Futures*, *8*. https://doi.org/10.1016/j.sftr.2024.100240

Zhang, L., Hu, Y., Li, P., Wei, R., Pang, H., de Kreuk, M., Qu, S., Lam, K. L., van der Meer, W., & Liu, G. (2024). Maximizing eco-environmental gains: Exploring underground wastewater treatment plants in Beijing for sustainable urban water management. *Resources, Conservation and Recycling*, *207*. https://doi.org/10.1016/j.resconrec.2024.107698