

# Dynamic Governance Model Within Integrated Waste Management in Malang City: Agile People And Process In Action

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## ABSTRACT:

As an urban area, Malang City has waste management problems, with causes ranging from governance to the lack of supporting facilities. Therefore, this article aims to discuss waste management using a dynamic governance approach. A qualitative approach was employed and aimed at providing a more nuanced narrative of how and why urban waste management is performed, alongside the involved social phenomena. The result was a dynamic governance framework in waste management practices in Malang City, including waste facilities, the development of sanitary landfill methods, and partner-ships with international organizations. Although facilities, such as waste banks and Final Disposal Place (FDS), are still needed, efforts to apply agile principles with a citizen-centric approach in the development have not received great attention from the municipality. Meanwhile, household groups produce more waste due to the current condition of the city.

Keywords: Dynamic Governance; Agile Process; Agile people; Integrated Waste Management; Malang City

## ABSTRAK:

Sebagai kawasan perkotaan, Kota Malang memiliki permasalahan pengelolaan sampah, dengan penyebab mulai dari tata kelola hingga minimnya fasilitas penunjang. Oleh karena itu, artikel ini bertujuan untuk membahas pengelolaan sampah dengan pendekatan dynamic governance. Pendekatan kualitatif digunakan dan bertujuan untuk memberikan narasi yang lebih bernuansa tentang bagaimana dan mengapa pengelolaan sampah perkotaan dilakukan, di samping fenomena sosial yang terlibat. Hasilnya adalah kerangka tata kelola yang dinamis dalam praktik pengelolaan sampah di Kota Malang, termasuk fasilitas persampahan, pengembangan metode sanitary landfill, dan kemitraan dengan organisasi internasional. Meski fasilitas seperti bank sampah dan Tempat Pembuangan Akhir (TPA) masih dibutuhkan, upaya penerapan prinsip agile dengan pendekatan citizen-centric dalam pembangunannya belum mendapat perhatian besar dari pemerintah kota. Sedangkan kelompok rumah tangga lebih banyak menghasilkan sampah karena kondisi kota saat ini.

Kata kunci: Tata Kelola Dinamis; Proses Agile; Orang yang gesit; Terintegrasi Penanganan limbah; Kota Malang

## INTRODUCTION

Wastes are unavoidable products in modern communities ([Bortoleto & Hanaki, 2007](#)), and volume requiring handling increases yearly, based on the conditions in several developing countries ([Dangi et al., 2017](#)).

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According to a report from the World Bank entitled “What a Waste: A Global Review of Solid Waste Management,” urban populations worldwide generated twice as much solid waste, at 1.3 billion tonnes per year, in 2012. Meanwhile, value is expected to double by 2025, and 53% of this increase will be contributed by lower-middle-income countries. Indonesia is said to produce 151,921 tonnes daily, meaning that every inhabitant throws out an average of 0.85 kg of waste per day ([Hoornweg & Badha-Tata, 2012](#)). According to ([Banerjee & Sarkhel, 2020](#)), waste management efforts made by several developing countries, such as Indonesia, have failed due to the absence of waste separation, lack of government coordination with private third parties, and poor community outreach.

Reducing household waste is difficult to do ([Sudibyo et al., 2017](#)). The increase in household waste in Indonesia cannot be separated from the high flow of urbanization in several cities ([Wibisono et al., 2020](#)). Over the years, the issue of solid waste has become an important issue in several big cities in Indonesia. Even though they already have legal institutions to cooperate with the private sector in waste management ([Siagian et al., 2019a](#)). However in the fact, many local governments have a major role. So that this effort complicates the performance of local governments in managing waste, which continues to increase.

Waste management in Indonesia is regulated in ([Law Number 18, 2008](#)) regarding waste management, which is expected to reduce the negative impacts on the environment and public health ([Siagian et al., 2019b](#)). In the scope of the regional government, especially the study of urban governance, it is a strategic issue that needs attention ([Davies, 2007](#); [Ganesan, 2017](#); [Murtadho & Roziqin, 2018](#); [Spoann et al., 2018](#)). Nationally, according to Law number 18 of 2008 concerning Waste Management, regions, including cities and regencies, have been given authority to execute this activity through local regulations compliant with the existing regional needs and conditions ([Yandra et al., 2020](#)). Further, Malang City, as one of the urban areas in East Java, produces 490 tonnes of waste daily ([Jatimtimes, 2020](#)), a volume still above the city’s capacity.

Currently, the waste problem in Malang City is quite complex, ranging from management infrastructure to limited human resources (HR). The waste management facilities in Malang are still minimal, as shown by the following data:



FIGURE 1. WASTE MANAGEMENT FACILITIES IN MALANG CITY

Based on the population of Malang in 2020, which reached 874,890 ([BPS Kota Malang, 2020](#)), the facilities shown in Figure 1 were unable to accommodate and manage the amount of community waste adequately. If these waste facilities are left unchecked, they will experience overcapacity. Moreover, with the continually increasing population density and rapid development in Malang, it has become the most popular urban area for people in East Java Province and other parts of East Indonesia.

Consequently, Malang municipality already has Regional Regulation No. 10 of 2010 concerning Waste Management in place to solve the waste problem. This regulation mentions official authorities who need to respond quickly to waste problems and other environmental issues in urban communities ([Banerjee & Sarkhel, 2020](#); [Ganesan, 2017](#); [Pradana, 2020](#); [Spoann et al., 2018](#))

. However, this impact is not sufficient to increase the waste reduction in Malang, and this failure is caused by several factors, such as institutional, social, and political factors. The increasing number of waste is not accompanied by the number of waste management facilities provided by the government. In addition, public awareness to sort waste at the household level is still low. Without ignoring the others, institutional factors are important points that discuss the implementer's capabilities and the execu-

tion of waste management policies ([Qodriyatun, 2015](#)).

Agile institutions in responding to the problem dynamics are needed for the city's waste management. Therefore, Dynamic Governance is the right concept for the complexity of social and institutional problems in urban areas. It was first introduced by ([Neo & Chen, 2007](#)) to reduce the complex public problems and social changes due to globalization and technological advances in Singapore. The concept of dynamic governance in the framework of waste management in Malang City is interpreted as a problem-solving model that does not depend solely on the government's power and managerial role. Rather, it also functions at the local level and includes the development of bureaucratic capabilities, cooperative relations, co-regulation, and strong collaboration in utilizing existing local resources and wisdom ([Rodia & Wilson, 2017](#)). Integrated waste management efforts in Malang are also expected to realize Sustainable City Development.

Since the announcement of the 21st-century agenda at the 1992 Rio Earth Summit, there have been many studies explaining urban strategies and practices in the transition to sustainable cities ([look at Chung & Lo, 2007](#)). Several cities in Indonesia have also implemented an urban strategy, waste management. According to ([Maryati et al., 2016](#)) in Bandung Raya, waste management services, are quite effective in urban housings compared to rural areas. Meanwhile, Jakarta, as the largest waste-producing metropolitan city in Indonesia, implements it through community-based sorting by type with waste banks ([Putri et al., 2018](#)), Reduce, Reuse and Recycle (3R) and Waste to Energy (WTE) ([Farizal et al., 2018](#)). ([Wibisono et al., 2020](#)) explained that the waste management problem in urban Indonesia varies according to the case. Surabaya city faces a complex waste problem due to urbanization and industry, while Mojokerto waste management still depends on the government and has institutional constraints ([Wibisono et al., 2020](#)). Conversely, Batu city implements a waste bank program ([Irkham et al., 2019](#)). ([Further,](#)

[Kusumaningrum & Haffsari, 2017](#)) emphasized the coordination of waste management in Malang city and regency.

Based on the above arguments, this article aims to discuss the governance of local agencies involved in Malang city waste management. The dynamics of waste problems in cities that continue to increase require dynamic governance by local governments. If today's waste problem is left unattended, it is feared that an environmental crisis will occur and threaten the life of the city community. This research is to examine the local government concerning how to waste management. Elements in the concept of Dynamic Governance were used as analytical tools with a focus on agile people and processes. This is based on urban environmental problems that also affect the legitimacy of local governments, including the ability of the bureaucracy as the leading sector in the process of implementing waste management policies in the city.

## RESEARCH METHOD

This research tries to examine Dynamic Governance regarding waste management in Malang City from the local institutionalism perspective, i.e., agile people and processes. The city was chosen as the study object because it is an urban area and a tourist destination for students from various regions in Indonesia, especially the eastern part. These features contribute to the increasing population growth in Malang city, which indirectly elevates the volume of domestic waste in the community. With a population of 874,890, according to ([Wibisono et al., 2020](#)). Malang can be categorized as a metropolitan city, causing the problem of waste management to be more complex.

Employing a qualitative approach, this research aims to provide a more nuanced narrative on the how and why urban waste is managed, alongside the involved social phenomena, by combining primary and secondary research data. Primary data was gathered by semi-structured interviews with key policymakers at city government for instance the Environment Agency of Malang

city. Other important bodies were the Department of Public Works and Spatial Planning, Housing and Residential Areas in Malang city, several environmental NGO representatives, and Final Processing Place (FDS) Managers. Meanwhile, the secondary data were obtained through official government reports, related research, previous publications, and other online sources, such as national online media. The data were analyzed qualitatively, first in narrative style and then in simple qualitative methods, regarding the effect of waste management in the city.

## RESULT AND DISCUSSION

### GOVERNANCE CAPABILITY WITHIN INTEGRATED WASTE MANAGEMENT

Governance is the relationship between governments and citizens that enable public policies and programs to be formulated, implemented and evaluated. In the broader context, it refers to the rules, institutions, and network that determine how an organization functions ([Bhatta, 2006](#); [Neo & Chen, 2007](#)). Governance is an important factor for a city in dealing with waste management problems ([Supriyadi et al., 2000](#)), especially as an institution ([Wibisono et al., 2020](#)). Currently, waste management is under the authority of local governments ([Chaerul et al., 2007](#)) with still referring to provincial and central government policies ([Siagian et al., 2019a](#)). Several studies have also explained that institutional factors that are less adaptive and responsive are the greater cause of the urban waste problem in Indonesia ([Chaerul et al., 2007](#); [Sudibyo et al., 2017](#); [Supriyadi et al., 2000](#); [Wibisono et al., 2020](#)).

Therefore, to face these institutional challenges, local governments are required to think innovatively in handling urban waste problems, and dynamic governance presents an ideal method ([Neo & Chen, 2007](#)). Based on the Law Number 18 2008 regarding Waste Management, the municipality undertakes the management of city waste according to the standards, procedures, and criteria established by the central government. Regional waste

management is inseparable from the strategies and policies set by the central and provincial governments, including the establishment of temporary disposal sites, integrated and/or final waste processing sites ([Siagian et al., 2019a](#)). Institutionally, the waste problem in Malang City is under the authority of several related agencies, with the leading sector being the Environment Agency, alongside the Ministry of Public Works and Spatial Planning, Housing, and Residential Areas.

The practice of waste management in several cities in other countries shows that local or municipality governments have an important role through waste management strategies and policies ([Agarwal et al., 2020](#); [Azevedo et al., 2020](#); [Esmaeili, 2019](#); [Ganesan, 2017](#); [Romano et al., 2021](#)). Hence, the municipality issued a juridical regulation titled Malang City Regional Regulation Number 10 of 2010 concerning Waste Management to deal with waste problems. It is supported by several technical regulations, such as Mayor Regulation Number 73 of 2016, concerning the formation, position, organizational structure, duties, and work procedures of the Technical Implementation Unit for Garbage Collection and Processing of Environmental Agencies. Malang Mayor Regulation number 7 of 2019 concerning the Establishment of a Waste Management Technical Implementation Unit at the Environmental Agency also supports these policies.

Waste management in Malang City is performed through several activities, including waste reduction and handling. Limiting landfills, recycling, and waste reuse are reduction activities, while handling consists of selection, collection, transportation, processing, and final processing. This governance is supported by collaborations with several other government agencies, central, and international organizations. The Malang municipality has also been appointed by the central government to become a pilot project for waste management.

To reduce and handle waste, the municipality has Temporary Disposal Site (TDS) facilities spread across all sub-districts, including the following:

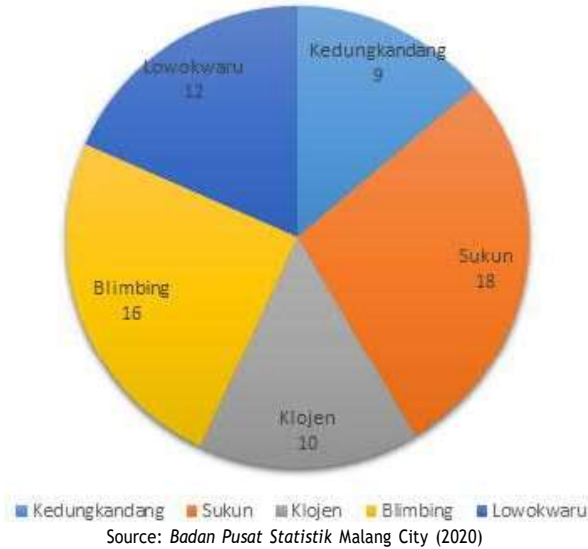


FIGURE 2. NUMBER OF TEMPORARY DISPOSAL SITE (TDS) MANAGED BY THE MALANG MUNICIPALITY GOVERNMENT IN EACH SUB-DISTRICT IN 2019

However, the existence of the dumpsites above cannot be a solution to the waste problem in Malang Municipality, given the population density and its impact on waste production. As explained by (Agarwal et al., 2020) and (Arie., 2013) the yearly increase in population has the potential to increase the waste volume. In the table below, Lowokwaru has the largest population.

TABLE 1. TOTAL POPULATION IN 2020 IN EACH SUB-DISTRICT

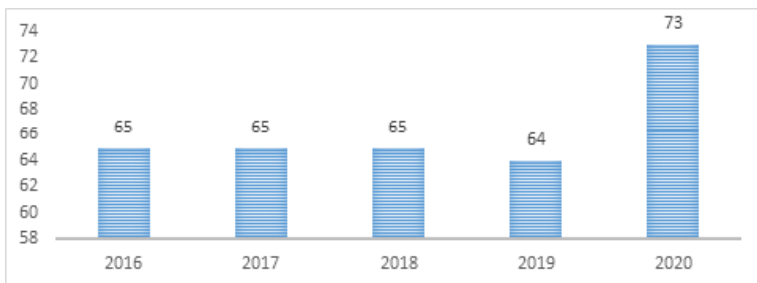
Subdistrict	Population
Kedungkandang	196.298
Sukun	196.917
Klojen	101.410
Blimbing	181.426
Lowokwaru	198.839
Total	874.890

Source: BPS- Malang City (2020)

Typically, the collected domestic waste is immediately taken to the Temporary Disposal Site (TDS) without a recycling strat-



egy. This is in contrast with the experience in Germany, where local governments collect a special tax for each household to support waste management financially ([Azevedo et al., 2020](#)). Other taxes are also used to pay third parties, particularly waste management companies, based on the collected and successfully recycled materials ([Alzamora & Barros, 2020](#)). The situation was different in Malang city until 2020, as not all urban villages have sorting, compost, and recycling (PKD) houses to reduce waste before entry into the Temporary Disposal Site (FDS), as shown in Figure 1. Hence, about thirty urban villages do not have PKD, which is an issue for the city in holistically handling waste problems from upstream to downstream at the regional and Temporary Disposal Site (TDS) institutional levels. To overcome this problem, the Malang municipality has provided a budget of IDR 31 billion to develop PKD in stages for the next few years ([Jatimtimes, 2019](#)). The existence in each sub-district is expected to spur public awareness in managing and reducing the volume of waste in the Final Disposal Places (FDS).

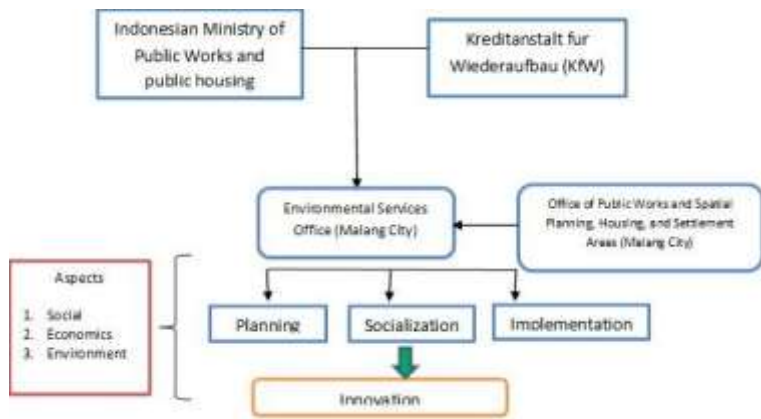


Source: Badan Pusat Statistik Malang City (2020)

FIGURE 3. NUMBER OF TEMPORARY DISPOSAL SITE (DTS) BETWEEN 2016-2020

As a pilot project, Malang was selected from other cities in Indonesia and offered the opportunity to collaborate with an international institution, named Kreditanstalt für Wiederaufbau (KfW), in Germany. Several partnership activities focus on environmental sustainability, such as the Waste to Energy innovation, which processes waste into renewable energy. The implementation is the Landfill Gas technology used at FDS Supit

Urang, Malang city. This partnership certainly corresponds with the vision and mission of the Malang city Environment Agency, which wants private involvement in dealing with urban problems. The existence of institutional partnerships is expected to generate innovation in waste management.



Source: Primary Data (2021)

FIGURE 4. THE INSTITUTIONAL FRAMEWORK FOR INTEGRATED WASTE MANAGEMENT

The municipality through the Environmental Agency is assisted by the Public Works and Spatial Planning, Housing, and Settlement in implementing several waste management programs, especially in providing technical facilities for solid waste. Although planning, socialization, and implementation are expected to produce innovation, it is influenced by the social, economic, and environmental conditions around the community (Birkmann et al., 2014). In development, it involves converting waste into gas, as explained in the following interview;

*“Innovation through gas installations can be realized at the Supit Urang’s Final Disposal Site (FDS). This was inspired by the Talangagung Final Disposal Site (FDS), which succeeded in building a methane gas pipeline installation pioneered by Mr. Koderi” (Interviews, 20/5/2020)*

The municipality is also developing a sanitary landfill, which is a management system, involving piling waste up in a sunken location and then filling it with soil. This project at Supit Urang's Final Disposal Site (FDS), which has been existent for two years, has many advantages compared to a controlled landfill system, particularly that it is more environmentally friendly. Meanwhile, the government provided the best facilities by building a new well-coordinated exhaust system. This project cost IDR 195 billion and the large budget for this development was successfully covered by partnerships forged with the central government and international organizations.

Although some of the activities and innovations mentioned above have been implemented, Malang City needs to develop and perform continuous education about clean cultures, such as sorting waste types starting at the household level, taking out refuse on time, and not engaging in littering.

### **AGILE PEOPLE AND PROCESS IN WASTE MANAGEMENT**

Basically, Dynamic governance emphasizes two main components, which are dynamic capabilities and organizational culture. Meanwhile, the two driving components are human resources and the process of changing various adaptive policies towards dynamic governance (Figure 5). Therefore, the core driving or instrumental forces are agile people and the process of forward and repeated thinking, which is done across mindsets to produce adaptive and innovative policies ([Pajri, 2018](#)).

The human resource capacity of managing and adapting the waste management mechanism determines the success of waste reduction in Malang city. A more agile transformation of human resources will impact agile work culture and vice versa. The agile principle first appeared as a response to changes in information technology, and the framework was implemented by private organizations or companies ([Jovanoviæ et al., 2017](#)). Although the application of this framework in an organization is expected to increase work creativity and reduce environmental impact

(Bouguerra et al., 2019), use in public organizations is currently unclear (Hong & Kim, 2020).

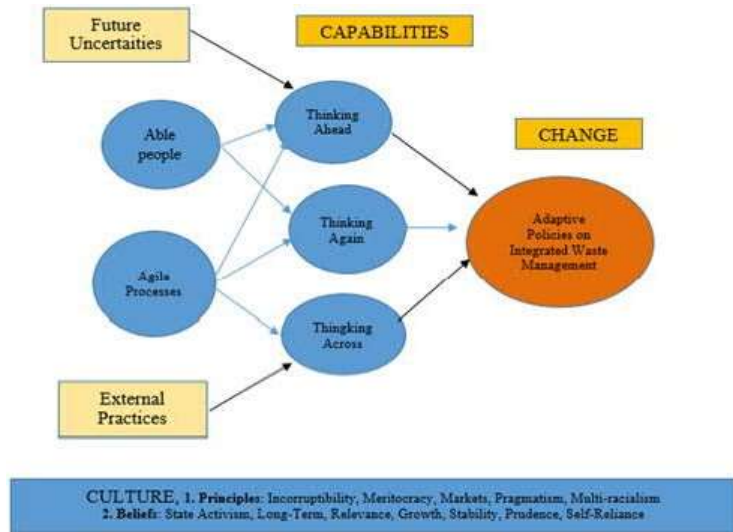


FIGURE 5. DYNAMIC GOVERNANCE OF INTEGRATED WASTE MANAGEMENT

Source: Adopted from (Neo & Chen, 2007)

Based on the description above, agile people and processes are two important factors in realizing adaptive policies, and are influenced by external and future conditions. (Hong & Kim, 2020) described that the application of agile government has been explained by scholars. They generally agreed that although the agile government is a global agenda, its main attributes were yet to be formed. There are two major views, among others, which are business agility studies and agile development studies (Hong & Kim, 2020). Consequently, the point of drawing an agile framework in waste management is to create better services and policies through improving bureaucratic structures, processes, behavior, and culture (Purwanto, 2019).

Changing behavior and work culture is difficult, as there are many influencing factors, one of which is the education level of the concerned human resources, who are important actors and

the main driving force of change. Based on these facts, the authors present information about the condition of human resources in two leading waste management office sectors in Malang city.

TABLE 2. THE NUMBER OF CIVIL APPARATUS AND EDUCATION BACKGROUND

Institution	Number of Civil Apparatus	Undergraduate Degree Percentage
The Office of Environmental Services	835	70 %
Office of Public Works and Spatial Planning, Housing, and Settlement	108	75 %

Source: Badan Pusat Statistik Kota Malang, (2020) and other resources

The data above encompasses only employees of the state civil apparatus and does not include contract or casual daily employees (THL). At the Malang City Environmental Service Office as of May 2020, there were 108 Non-Permanent Employees (PTT) and 410 Operational Support Personnel (TPOK). In Table 1, it can be seen that the percentage of workers with undergraduate degrees ranges between 70-75%. Although it is not the only main factor, it affects human resources viewing waste management as a new and innovative paradigm. For the record, an agile waste management policy lies in the bureaucracy's ability to change ([Purwanto, 2019](#)). It means, the human resource capacity of implementing policies is a key actor in changing the current conditions.

As an effort to change the old paradigm of discarded waste, several breakthroughs were made by the government through GASS or the Movement for Waste and Sediment Disposal. This movement invites all elements of the community and civil apparatus (ASN) in Malang to clean up or pick up trash and sediments at river points where trash is often found. It is reinforced by one of the agile principles in waste management, which is adopting a citizen-centered approach ([Purwanto, 2019](#)). Good cooperation between government apparatus and the community

provides optimism for reducing waste in the city. The government also has the authority to force its citizens to agree with rules ([Sudibyo et al., 2017](#)). Meanwhile, waste management in Malang has used sanitary landfill technology at Supit Urang’s Final Disposal Site (FDS).

A sanitary landfill was an effort by Malang Municipality to think strategically in realizing environmental sustainability ([Bouguerra et al., 2019](#)). It was implemented to manage a large amount of waste in FDS Supit Urang, as shown in Table 4, and is renewed by implementing Waste to Energy (WTE), which is much more beneficial for the surrounding community.

TABLE 3. MALANG CITY WASTE PER YEAR

No.	Year	Total volume per year	Waste per year
1.	2016	378,746 m3	3.220,22 tonnes
2.	2017	379,413 m3	3.226,13 tonnes
3.	2018	295,784 m3	4.488,54 tonnes
4.	2019	303,456 m3	4.044.00 tonnes

Source : Technical Implementation Unit of Supit Urang Final Disposal Site, 2020

In various waste management practices in several countries, waste disposal has two methods ([Banerjee & Sarkhel, 2020](#)) : 1). The first level is the household waste collection, WDS, and FDS without processing via dumping, sanitary landfill, incineration, or converting waste into energy even though sanitary landfills and WTE mechanisms have been developed. Meanwhile, the implementation of waste to energy is the support result from the Office of Public Works and Spatial Planning, Housing, and Settlement, and the energy generated from waste processing is used by Mulyorejo villagers through a generator pipe.

Processing waste into energy is also supported by the Mayor’s commitment, which is an interest because the volume of waste is considered large enough by the government, in this case, the mayor. They appealed for the waste to not only become landfills but also for the execution of processing efforts, such as waste recycling centers, compost houses, and a waste bank. Although

the implementation is still suboptimal, these efforts must be encouraged, as has been done by the Iranian city government, which manages waste into renewable energy using three methods, recycling, composting, and landfilling ([Esmaeili, 2019](#)).

The most city people still litter, mostly by producing household waste, which is collected to the Waste Dump Site due to the absence of sorting or processing. In a study conducted by ([Alzamora & Barros, 2020](#)), it was found several cities in developed countries are required to pay back certain amounts of waste produced by every individual to increase public awareness about community waste management. Meanwhile, the waste management practice in Kampala, Uganda, has a policy that every community is required to report their waste production via SMS every week ([Buntaine et al., 2020](#)). This method is different from the waste management characteristics in Indonesia, which finances it through general taxes, and involves no other special obligations for the community. Meanwhile, this technique is difficult to practice in the Malang community.

It was noted from observations that there is still much household waste dumped in several rivers in Malang city and the waterways are also subject to waste disposal by the community. At the neighborhood or hamlet level, there are not many waste banks that can separate the types of community waste, which makes it easier to process. The impact often occurs when heavy rains on the highway and several residential areas in some small areas in Malang experience flooding. Therefore, regarding the agile framework, the citizen-centered approach requires more attention from the municipality to reduce waste problems.

## CONCLUSION

The optimal application of the Dynamic Governance model in Malang city's waste management, through an emphasis on agile people and process, can contribute to solving the solid waste problems in the community. Malang municipality, as a waste management pilot project, has the opportunity to partner with

an international organization from Germany (Kwh) to use sanitary landfill technology. It has also issued several policies, such as increasing the provision of solid waste facilities, and so on, to solve the problem. However, in practice, waste banks are some of the facilities that are improperly attended, and the approach to the community has also not been optimal in reducing waste from the smallest scope, which is the household.

Although the practice of agile government in Malang waste management has been implemented with several principles, it will not be able to significantly reduce the waste problem. Therefore, municipalities need to increase solid waste facilities by providing waste banks in each neighborhood and adding new FDS facilities in the city. Furthermore, municipalities need to learn from several waste management processes in other countries and make laws obliging that waste is a personal responsibility to be managed optimally. Even if the community cannot afford it, the government can enforce it by automatically imposing a special waste tax on each payment. Finally, the citizen-centered approach must be continuously improved to increase the community's collective awareness.

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