

Collaborative governance in waste management: a case study in the municipality of Yogyakarta, Indonesia

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Abstract: The increasing waste problem in Indonesia, especially in Yogyakarta, has encouraged the implementation of collaborative waste management efforts. This research examines the driving factors behind the collaborative governance of the “Mbah Dirjo” program in Yogyakarta City, using Emerson’s Collaborative Governance Regimes framework: Leadership, Consequential Incentives, Interdependence, and Uncertainty. Qualitative research methods were used, with data collection through interviews, participatory observation, and document analysis. The research findings revealed that leadership plays an important role in mobilising collaborative efforts among stakeholders, including the Environment Department, Forum Bank Sampah, surrounding communities, and Teak Plastic Enterprises. Consequential incentives, such as funding and resource sharing, encourage participation from each party involved in the waste management collaboration. Interdependence among stakeholders ensures effective coordination in the implementation of Mbah Dirjo, while uncertainty presents challenges, such as the difficulty of changing people’s behavior in waste management. Despite these challenges, the Mbah Dirjo program has significantly improved waste reduction efforts. This research contributes to the understanding of collaborative governance in environmental management and highlights the importance of stakeholder synergy in addressing urban waste issues

1. Introduction

Indonesia is faced with a fairly serious problem related to waste management that is increasingly out of control (Arie et al., 2022). This problem has become a national problem that needs to be addressed immediately, considering that this will hurt the health of the Indonesian people in the future. The Sustainable Waste Indonesia Institute states that the total national waste is produced yearly. Plastic waste in Indonesia accounts for 5%, or 3.2 million tons of total waste. Branded bottled drinking water (AMDK) products contributed 226 thousand tons or 7.06 per cent. As much as 46,000 tons or 20.3 per cent of the total waste generation of branded AMDK products was plastic glass packaging AMDK waste (Waluyo, 2023).

Based on data from the Ministry of Environment and Forestry’s National Waste Management In-

formation System, the input results in 2022 through 202 districts/cities throughout Indonesia show that the national waste generation reached 21.1 million tons. Of the total national waste production, 65.71% of (13.9 million tons) is managed, while the remaining 34.29% (7.2 million tons) is still not handled properly (Kemenko, 2023). The data shows that this is a serious problem, and there needs to be an effort to deal with issues related to waste management in Indonesia. The area that is experiencing issues related to waste management is the Special Region of Yogyakarta. This problem began after the closure of the Piyungan landfill, which was the last place to dispose of waste in Yogyakarta. This closure was carried out due to increased excess waste, so the Yogyakarta Regional Government closed the Piyungan Landfill (Tola, 2023). This problem shows that there is a need for collaborative efforts between the Yogyakarta Regional Government and parties who are experts in addressing this waste issue so that it can be resolved immediately.

One possible solution to this problem is the development of an integrated waste management system that involves waste reduction at the source, improved recycling programs, and the implementation of waste-to-energy technologies (Luthfi et al., 2023; Putra et al., 2023). The Yogyakarta Regional Government, in collaboration with environmental experts and private sector stakeholders, can establish community-based waste management programs that encourage residents to separate and recycle waste more effectively. Additionally, investment in alternative waste processing facilities, such as composting centers and incineration plants with proper environmental controls, could help reduce the burden on landfills (Dinata, 2023). By adopting these strategies, Yogyakarta can work towards a more sustainable and efficient waste management system, ultimately reducing the environmental impact of unmanaged waste.

In response to this problem, the Yogyakarta Special Government made a collaborative effort, working with the Forum Bank Sampah to address waste management issues. As a result, the *Mbah Dirjo* movement was initiated by the Yogyakarta Regional Government and the Forum Bank Sampah. *Mbah Dirjo* is a movement program that invites the community to manage organic waste through biopores either independently at the household level or communally using jumbo biopores. In addition, this program trained the community to sort organic and non-organic waste such as plastic waste to be processed independently or given to the Bank Sampah Induk for sale. This program is an effort to reduce the level of waste disposal to the Piyungan landfill (Pangaribowo & Rusiana, 2023). Meanwhile, the presence of *Mbah Dirjo* aims to manage waste starting from the source, namely households and also as an effort to reduce the volume of waste generated in the Yogyakarta area and its surroundings. With this program, it is hoped that it will be able to change people's behavioral habits in managing waste (Jogjakota, 2023).

The impact that occurred after the implementation of the *Mbah Dirjo* program was quite significant, this can be seen from September 4, 2023, where this program has managed more than 23,000 biopore points with a volume capacity of around 64 tons. This number is spread across waste banks and urban village locations as well as the Yogyakarta municipal government's regional infrastructure, which includes the tourism, trade, health, and education industries. Meanwhile, the Environment Department, which combs through piles of garbage that are not disposed of in their place such as those on the streets, the number is still fluctuating, but the volume continues to decrease. This can also be seen in the following data: on August 28, there were 25 points, and on September 2, there were 21 points. He said this was also influenced by the *Mbah Dirjo* movement in educating the public in managing waste (Rahadi & Setiawan, 2023).

2. Literature Review

Collaborative Governance

Collaborative Governance can be understood as a process of collaboration between stakeholders related to others. According to Dewi (2019) collaborative governance is a collaborative process and structure that involves various parties to describe cooperation to achieve the desired goals. Schommer and Guerzovich (2020) argue that Collaborative Governance is a process in which stakeholders work together and negotiate meanings, values and resources in overcoming a problem or carrying out public goals that are not achieved by just one actor but need many parties involved. This is a collective process which requires coordination, commitment and cooperation between non-traditional political actors such as the community and political elites such as local governments. Emerson et al. (2012) reveal that Collaborative Governance is the processes and structures of public policy decision-making and management that engage people constructively across the boundaries of public agencies, levels of government, and the public, private and civic spheres to carry out a public purpose that could not otherwise be accomplished (Emerson et al., 2012; Putra & Sajida, 2023). Then, another definition related to Collaborative Governance put forward by Ansell and Gash (2008) says that Collaborative Governance is a governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policies or manage public programs or assets. Ambrose and Siddiki (2024) argue that Collaborative Governance is the process of facilitating and operating in multi-organizational arrangements to solve problems that cannot be solved, or solved easily, by single organizations.

According to the point of view Emerson et al. (2012) defines Collaborative Governance Regimes is the particular mode of, or system for, public decision-making in which cross-boundary collaboration represents the prevailing pattern of behavior and activity. In the principle of Collaborative Governance Regimes put forward by Emerson, Tina Nabatchi and Stephen Balogh created an Integrative Framework which can be seen in the figure:

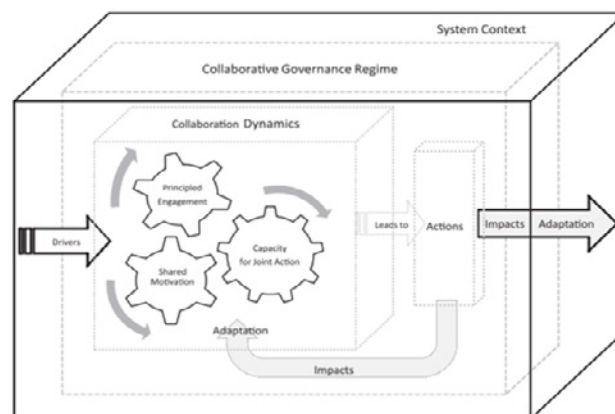


Figure 1. Integrative framework for collaborative governance regimes
Source: Processed from Emerson et al., 2012

In the figure 1, there are three important elements in the Collaborative Governance Regimes process which include The General System Context, the Collaborative Governance Regime and Collaborative Dynamics Actions. This context ultimately gives rise to The Drivers, which include Leadership, Consequential Incentives, Interdependence, and Uncertainty, which help initiate and determine the direction of a CGR (Dinata et al., 2022; Sadhana et al., 2023).

The Driver

According to Emerson et al. (2012) define the Drivers as a framework that separates contextual variables from the main driving aspects, without which Collaborative Governance would not work. These aspects include leadership, consequential incentives, interdependence, and uncertainty. On the other hand, Ulibarri et al. (2023) define that the collaboration process can be started from oneself, externally intensive through grants, and driven by authority. The drivers really need to be improved to strengthen the ability to start the collaboration process properly. Furthermore, according to Emerson and Nabatchi (2015), defining the Drivers in the collaboration process is a partnership that can organize itself to solve common problems and also provide services in overcoming all challenges. In the drivers, there are several indicators as follows:

Entering the indicator stage of The Drivers according to Emerson et al. (2012) Leadership is the first aspect that is quite important in the running of Collaborative Governance Regimes. Leadership is a major factor in the collaboration process because Leadership acts as a driving force in initiating and also to help find resources and support in making Collaborative Governance Regimes efforts (Agus Sholahuddin Guntur Talajan, 2019; Maulana et al., 2022). Leadership can be one of the actors who play a role in making decisions. Apart from that, Leadership must commit to addressing a problem collaboratively. In addition, leaders must also be prepared for everything, such as the high costs of providing staff, technology and other resources to strengthen the collaboration process (Ansell & Gash, 2018). According to Eppel and Allen (2020) revealed that the role of leadership in Collaborative Governance involves the ability to facilitate dialogue, foster trust, and also motivate the participation of all stakeholders involved. This aspect requires strong communication skills and the ability to overcome conflict and sensitivity to the power dynamics that exist in collaborative networks. Leadership in Collaborative governance also involves the willingness to always listen and learn from every perspective and the ability to coordinate joint efforts to achieve common goals. Leadership according to Mandell and Keast (2009) reveals that leadership in collaborative principles focuses more on the catalytic role of processes that provide or facilitate cooperation in achieving common goals rather than authoritarian leadership roles. This indicates a more inclusive and responsive approach to complexity in a collaborative context.

The second indicator is Consequential Incentives. Consequential incentives are the role of internal actors in the collaboration process in dealing with problems. According to Doberstein (2016) He argues that Consequential Incentives refer to the encouragement or incentives needed to assist the active participation of various parties in the collaborative process, which aims to encourage consensus in public decision-making. In the interest-based problem-solving framework, incentives for participation include recognition of each party's interests and needs. According to Zambrano-Gutiérrez et al. (2023) views Consequential Incentives as a driver of the active participation of various stakeholders in decision-making processes related to the environment. he also revealed the design of inclusive participatory processes and appropriate incentive mechanisms that can help increase stakeholder involvement and contribution in collaborative environmental decision-making. According Voets et al. (2021) Consequential Incentives are factors that encourage the active participation of various stakeholders in a joint or collaborative decision-making process. In this context, incentives can be anything that encourages individuals or groups to engage in cross-sector or cross-agency cooperation. By understanding and managing incentives well, it will create cooperation from Collaborative Governance actors to achieve results that are beneficial to all parties involved.

The third indicator in the aspect of the drivers is Interdependence. Interdependence is collaboration between stakeholders to achieve the desired goals. Meanwhile, this aspect is also quite important

in the Collaborative Governance process because Interdependence and organizations cannot achieve something alone and must work together. This aspect is a requirement that has been recognized by many experts in carrying out the collaborative process (Ansell et al., 2020). On the one hand, if a sector does not run collaboration, it will fail, as expressed by (Bryson et al., 2006). On the other hand, Ansell and Gash (2008) provide their views related to collaboration challenges, such as participation constraints. Stoker (2018) defines Interdependence in the context of Collaborative Governance as a relationship of mutual need between stakeholders in a collaborative action process. He highlights that in this context, Interdependence can be described as a process of cooperation in achieving common goals. Interdependence shows that solving complex problems requires good coordination and cooperation from each party involved so as to achieve optimal results. Therefore, Gerry Stoker assumes this aspect can reflect the importance of a collaborative approach that is inclusive and responsive to the complexity of Collaborative Governance.

The next indicator is Uncertainty. Uncertainty is an effort that cannot be achieved if we walk alone. However, it's an aspect that cannot be resolved internally but can encourage groups to carry out an act of collaboration to spread and reduce from sharing risks. Besides that there is also individual uncertainty regarding the extent to which conventional ways to get solutions or satisfaction can be relied on to get the results you want to achieve (Scott, 2015). According to Klijn and Koppenjan (2014) Uncertainty is a condition where stakeholders do not have sufficient information to carry out a collaborative action process. Uncertainty is also interpreted as a challenge in the decision-making process, so collaborative efforts are needed to overcome a problem in achieving the desired goal. According Douglas et al. (2020) describes Uncertainty in the principle of Collaborative Governance as a situation where Stakeholders do not understand the conditions related to problems that occur in the field. In this context, uncertainty can occur due to uncertainty related to the consequences of actions or policies implemented in the collaborative process. This aspect is also quite important in the practice of collaboration because it can build communication between stakeholders in carrying out collaborative actions to minimize problems during the collaboration process.

Several studies have examined collaborative governance in waste management, highlighting various successful implementations. Gunanti, Permana, and Gama (2021) found that the collaboration between the Waste Bank and the community is going well, as seen from the creative community in managing waste into valuable goods. Eka, Setiawandari, and Kriswibowo Prodi (2023) revealed that collaboration at TPST Samtaku in Lamongan Regency is running optimally; this is characterized by frequent coordination and deliberation to increase the motivation of collaborative actors. Idris, Herdiana, and Mujtahid (2022) found that the collaboration process in waste management in Pulau Tiga Barat Subdistrict is going well, characterized by a collaborative process involving the community, government and private sector. Chotimah, Iswardhana, and Rizky (2022) see collaboration in dealing with plastic waste in the Thousand Islands using the Collaborative model by utilizing the concept of maritime domain awareness through multilayer governance from technical, operational and strategic aspects. Farah, Anwar, and Makmur (2022) found that the implementation of collaboration in waste management in Tembokrejo Village is running optimally; it can be seen from collaboration actors such as PT Systemiq and also the community playing an important role in the implementation of stopping ocean plastic and waste management at TPST 3R Tembokrejo.

Based on the results of the literature above, it shows that previous studies have only focused on Collaborative Governance in dealing with waste management problems. There is still a lack of research that examines the driving forces of Collaborative Governance actions in waste management (Luthfi &

Naufal, 2023). Therefore, this study aims to fill the research gap in this regard. This research uses a case study, namely the implementation of the *Mbah Dirjo* Program in Yogyakarta City. The implementation of the *Mbah Dirjo* program is quite effective, especially in waste management in Yogyakarta City, so it is interesting to examine more deeply the drivers of collaboration in the *Mbah Dirjo* program.

This article will explore more deeply the driving forces of the collaborative governance process, starting from the initial factors that made the actors finally make Collaborative Governance efforts in Waste Management in Yogyakarta City, then what actions were taken by the driving actors in overcoming problems regarding waste management analyzing the *Mbah dirjo* program in Yogyakarta City. In exploring this article, researchers will use the Collaborative Governance theory according to Emerson et al. (2012) to explore how the driving forces move to address Waste Management problems. This article takes a case study on a program initiated by the Yogyakarta City Government together with the Forum Bank Sampah, namely *Mbah Dirjo*, which was launched to deal with Waste Management problems in the Special Region of Yogyakarta.

3. Research Methods

This research uses a qualitative research approach with a case study. According to Al-Hamdi et al. (2020), qualitative research is an attempt to rationalize and interpret the reality of life based on what the researcher understands. The data collected in this study used primary and secondary data. The qualitative method used in this research is by using observation, interview and document analysis method techniques (Creswell, 2016). The observation method uses systematic observation and recording of the symptoms studied through direct observation and recording of a situation or behaviour in a case study (Qotrun, 2021). Meanwhile, the interview involves a conversation involving two or more people in which the interviewer asks the interviewee questions (Wicaksono, 2023).

Furthermore, this research also uses document analysis techniques. Document analysis is a systematic process of finding and compiling data from documents that have relevance to related research to produce valid conclusions (Salsabila, 2022). In conducting interviews, the interviewees involved several parties, including the Environment Department, Forum Bank Sampah, and the Communities and Businesses that buy litter from the Forum Bank Sampah as parties involved in implementing Collaborative Governance in waste management in Yogyakarta City. The reason for conducting interviews with these parties is that they have a role in helping to deal with waste problems in several areas in Yogyakarta. In addition, this research will also conduct observations on the case study, which is the implementation of the *Mbah Dirjo* programme. Meanwhile, the interview method was conducted with ten resource persons. The sources can be seen in the table:

Table 1. List of informants in collaborative waste management

No	Institution	N Total
1	Environment Department	2
2	Forum Bank Sampah	2
3	Community	4
4	Bussines Jati Plastic	2
	Total	10

The secondary data was obtained through document analysis. Document analysis is a systematic process for finding and compiling data from documents that have relevance to related research to pro-

duce valid conclusions (Salsabila, 2022). In this study, the documents used come from official records, articles, news, books, or other sources (literature review) relevant to the research under study related to applying the principles of Collaborative Governance (Putra & Sajida, 2023). Data collection techniques allow researchers to obtain the data or information needed to research the topic. The data obtained was analyzed using interactive modelling techniques, which included four stages of analysis: 1. The data analysis process begins with reviewing all data obtained (data processing stage), 2. Data reduction, namely mapping and selecting secondary data according to research needs, 3. Data presentation, namely writing the mapping results and choosing data focusing on research problems; 4. Conclusion.

4. Results and Discussion

Leadership

Leadership is a key aspect in running a collaborative action because it acts as a regulator and driver in achieving common goals. Therefore, leadership plays a crucial role in cooperative action. According to Emerson et al. (2012), leadership is a key aspect of running a collaborative effort because the leader is an actor who acts as a driving force in starting and helps find resources. As it relates to this research, namely regarding waste management in the city of Yogyakarta through the *Mbah Dirjo* movement, key actors in running this movement are involved in collaborative waste management. The leaders driving the implementation of *Mbah Dirjo* are the Mayor of Yogyakarta, the Yogyakarta City Government through the Environment Department and the *Forum Bank Sampah*.

Table 2. Leadership in collaborative governance

No	Actors	Roles
1	Yogyakarta City Environment Department	<ul style="list-style-type: none"> making a policy on waste management through a circular letter on handling waste emergencies in Yogyakarta City (Circular Letter 600.1.17.3/4438/SE/2023)
2	<i>Forum Bank Sampah</i>	<ul style="list-style-type: none"> Forming and Running the "<i>Mbah Dirjo</i> Movement" Providing socialization to the community
3	Community/Head of PKK	<ul style="list-style-type: none"> Mobilizing the community to implemented Mbah Dirjo Movement

Based on Table 2, it can be seen that each actor or leader in waste management in Yogyakarta City has its role, this can be seen through a letter issued from the Secretary of the Special Region of Yogyakarta number 568/8312 dated 21 July 2023 regarding the Closure of Piyungan Regional Landfill Services starting from 23 July 2023 to 5 September 2023. This regulation was made to respond to the condition of Yogyakarta City, which is in a waste emergency, to take further action immediately. After the issuance of the letter, the Yogyakarta City Government, led by the Mayor of Yogyakarta Singgih Rahardjo immediately followed up on the letter by issuing Circular 600.1.17.3/4438/SE/2023, this letter was issued to make efforts to manage waste independently, one of which was through the application of *Mbah Dirjo*.

through the Environment Department, chaired by Sugeng Darmanto, immediately responded by collaborating with the Waste Bank Forum to make collaborative efforts through the implementation of *Mbah Dirjo*. *Forum Bank Sampah* formed the *Mbah Dirjo* movement aimed at the community to manage waste through a more structured sorting of organic and non-organic waste, and it is hoped that the creation of this movement will help people manage waste starting from the household. Furthermore, the role of the *Forum Bank Sampah* led by Pak Iswadi as the head of the Education Working Group is to drive

the programme that the Environmental Service has made regarding the application of *Mbah Dirjo* to the community. Then, the role of the community through the head of the PKK is to mobilize the community to be able to sort organic and non-organic waste.

Based on the results of the analysis that has been carried out, it shows that researchers see the leadership role of each driving actor shown in carrying out collaborative waste management in the city of Yogyakarta. The most influential actor in the course of this waste management collaboration is the Yogyakarta City Government, together with the Yogyakarta City Environment Department, which immediately responded to by making collaborative efforts with various related stakeholders such as the Waste Bank Forum through the *Mbah Dirjo* application. in this application, each related party has dependencies and relationships in the continuity of collaboration, for example the government, which needs the role of the Forum Bank Sampah to carry out the policies that have been made to be applied to the community.

Consequential Incentives

In the context of collaboration, Consequence Incentives can be interpreted as incentives that are useful for encouraging participation in carrying out collaborative actions. These incentives can be material or non-material. Meanwhile, according to Emerson et al. (2012) Consequential incentives refer to either internal (problems, resource needs, interests, or opportunities) or external (situational or institutional crises, threats, or opportunities) drivers for collaborative action. This is related to this research on waste management through the *Mbah Dirjo* movement related to what incentives are given to encourage collaborative efforts in waste management. This can be seen from the interview with Iswadi as the Head of the *Forum Bank Sampah* Education Working Group and Marsono as the FBS Education Working Group Staff as follows:

Table 3. consequential incentives in collaborative governance

No	Actors	Incentives
1	Yogyakarta City Environment Department	<ul style="list-style-type: none"> Funds from APBD "Dana Istimewa" from Central Government
2	Forum Bank Sampah	<ul style="list-style-type: none"> Funds from Bank BPD DIY Funds from Bank Indonesia
3	Community	<ul style="list-style-type: none"> Get an organic shredding machine tool Get a tool for making biopores Knowledge in shorting types of waste
4	Bussines Jati Plastic	<ul style="list-style-type: none"> Get money from the waste plastic product from the Waste Bank

Source : Processed by Authors, 2024.

Based on Table 3, the actors driving the collaboration have received incentives to encourage collaborative action on waste management through implementing *Mbah Dirjo*. In the table, it can be seen that the Environmental Department gets incentives through APBD funds and also Dana Istimewa from the Central Government. Forum Bank Sampah received incentives from Corporate Social Responsibility, namely from Bank BPD DIY and Bank Indonesia. Furthermore, the community gets incentives in the form of tools for waste management, such as organic chopping machines and tools for making biopores. The community also gets educational socialization related to waste management. Then, the business Jati Plastic receives incentives in the form of money for the resale of plastic waste collected from the Waste

Bank. The results of this finding, the researcher analyses that in this collaboration effort shows that each related party involved gets an incentive because in carrying out collaboration requires incentives to help in carrying out waste management in the city of Yogyakarta so that collaboration in waste management in the city of Yogyakarta runs smoothly.

Interdependece

Interdependence is cooperation between stakeholders to achieve a desired goal. In this case, stakeholders cannot walk alone in solving a problem, they need involvement and collaboration with other stakeholders to solve the problem. According to Emerson et al. (2012), interdependence is important in the collaborative governance process because interdependence or organisations cannot achieve something alone and must work together. This aspect is a requirement recognised by many experts who carry out the collaboration process. As for this research, in realising the *Mbah Dirjo* movement, the Yogyakarta City government collaborates with several stakeholders whose collaboration has a reciprocal relationship, and there is an element of dependence and contribution between stakeholders in influencing the mbah *Mbah Dirjo* cooperation. This can be seen in the table below:

Table 4. Interdependece in collaborative governance

No	Actors	Roles
1	Yogyakarta City Environment Department	• Running a policy through "Circular Letter 600.1.17.3/4438/SE/2023" from the mayor of Kota Yogyakarta
2	Forum Bank Sampah	• Education to Community on waste management procedures
3	Community	• Sorting out waste to Waste Bank
4	Bussines Jati Plastic	• Picking up Plastic Waste from The Waste Bank

Based on table 4, waste management based on the *Mbah Dirjo* movement in Yogyakarta City has several stakeholders who contribute to each other and have reciprocal relationships and dependencies between one actor and another. In addition, each of the above actors has a role in initiating collaboration in waste management in Yogyakarta City. Each actor has a relationship with the other. That way, cooperation in waste management in Yogyakarta can occur. So that the contribution and reciprocal relationship between actors can significantly impact society in waste management, the relationship is found in the Provincial Government through the Environment Department, which forms a waste management policy. The policy is aimed at the community in Yogyakarta City to be able to manage household waste. After that, the Environment Department, through Forum Bank Sampah, will educate the community about waste sorting from Households. After that, the community will sort organic and inorganic waste. In addition, the role of Jati Plastic Business Manager Wahyu Jati Hermawan is as a party who takes non organic waste from the Waste Bank, especially plastic waste and also mobilises waste products, especially plastic waste, to be processed into something that has a selling value as a party who takes organic waste from the Waste Bank, especially plastic waste. The results of these findings show that in this collaboration effort, each actor involved has an interdependence on each other. This can be seen from the government, which makes waste management policies, then the Forum Bank Sampah, which plays a role in educating the community and also directing how to manage waste properly.

Uncertainty

Uncertainty is a condition where stakeholders do not have sufficient information in the collaborative action process. According to Emerson et al. (2012), uncertainty is also interpreted as a challenge in

the decision-making process, so collaborative efforts are needed to overcome a problem in achieving the desired goal. In this research, waste management in Yogyakarta City based on *Mbah Dirjo* encountered several challenges in its implementation. The challenges can be seen in the table below:

Table 5. Uncertainty in collaborative governance

No	Actors	Challenges
1	Yogyakarta City Environment Department	<ul style="list-style-type: none"> • Needs collaboration with academic • The amount of waste is increasing over
2	Forum Bank Sampah	<ul style="list-style-type: none"> • Changing people's habits in waste management
3	Community	<ul style="list-style-type: none"> • Lack of running the <i>Mbah Dirjo</i> movement optimally • Lack of understanding regarding waste management regulations • Mobilizing the community in managing waste • Mobilizing the community in managing waste
4	Bussines Jati Plastic	<ul style="list-style-type: none"> • Lack of workers (there are still few companies engaged in waste management)

The implementation of the *Mbah Dirjo* program in Yogyakarta City faces various uncertainties or challenges in collaboration between the parties involved. From the government side, the Yogyakarta Environmental Department needs closer collaboration with academics to support research and development of more effective waste management methods. In addition, the increasing volume of waste is a major challenge, requiring more efficient and sustainable management solutions.

At the Forum Bank Sampah, the main challenge faced is changing people's habits in managing waste. Despite various educational efforts, the implementation of a good waste management system is still uneven, indicating the need for a more intensive and innovative socialization approach. Meanwhile, the community has also experienced obstacles in optimally running the *Mbah Dirjo* movement. The community's low understanding of waste management regulations hinders their participation in the program. In addition, mobilizing the community to be active in waste management is still a challenge, especially in building a culture of recycling and sorting waste from the household.

On the business sector side, such as plastic recycling company Jati Plastic, Meanwhile, in the business sector, such as Jati Plastic, the uncertainty experienced is that there are still few companies engaged in waste management. This is a challenge experienced by the Jati Plastic business company. Even the manager of Jati Plastic said that the existence of new competitors is not a competition but rather helps the company to achieve its goals.

The challenges faced include the lack of incentives for the recycling industry as well as labor limitations. The lack of incentives can hinder the development of this industry, even though its existence is very important in supporting the reduction of plastic waste. Meanwhile, the difficulty of finding labor in the recycling sector indicates that work in this field is not yet attractive enough for the community, so strategies are needed to increase the attractiveness and welfare of workers in this industry.

From the various challenges that exist, solutions that can be applied include increasing the role of academics in supporting waste management innovations, expanding education to the public to better understand the regulations and the importance of waste management, providing incentives for the recycling industry to grow, and improving community mobilization strategies by involving community leaders and local organizations. With a more comprehensive approach, collaboration in the *Mbah Dirjo* program can run more effectively and sustainably, thus having a positive impact on waste management in Yogyakarta City.

5. Conclusion

The study on collaborative governance in waste management, particularly through the implementation of the Mbah Dirjo program in Yogyakarta City, highlights the critical role of stakeholder synergy in addressing urban waste challenges. Using Emerson's Collaborative Governance Regimes framework, the study identifies four key driving factors: Leadership, Consequential Incentives, Interdependence, and Uncertainty. The findings show that strong leadership, particularly from the Yogyakarta City Government, the Environment Department, and the Forum Bank Sampah, plays a crucial role in mobilizing collective action. The government actively responds to waste issues by formulating waste management policies and collaborating with the Forum Bank Sampah to educate and involve the community in implementing Mbah Dirjo. Additionally, incentives such as financial support, resource sharing, and technical assistance significantly enhance stakeholder participation. The interdependence among stakeholders ensures an effective waste management system where the government, waste banks, and businesses rely on each other to facilitate waste collection, processing, and recycling. Lastly, uncertainty in the collaboration process, such as community resistance to waste management practices, further highlights the necessity of multi-party cooperation.

To improve the effectiveness of collaborative governance in waste management, stakeholders should focus on continuous community engagement and education programs. While leadership, incentives, and interdependence have been key drivers, long-term change in waste management behavior requires sustained efforts to shift public attitudes and habits. Government agencies, waste banks, and private companies should collaborate with educational institutions and social organizations to conduct workshops, campaigns, and hands-on training on waste segregation and recycling practices. Moreover, digital tools like mobile apps and social media campaigns can help track waste reduction progress and encourage broader participation. These initiatives will not only reinforce existing collaborative efforts but also drive long-term behavioral changes necessary for sustainable waste management in Yogyakarta and beyond.

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