Governance in Constructing a Sustainable Waste Management System: The Jakarta Recycle Center Program Case Study

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Abstract. The waste reduction movement is presently underway due to the full landfill capacity in several major cities, including Jakarta, Indonesia. On the other hand, the perspective of the use of waste as a renewable resource has emerged and has created a resource loop that creates a circular economic cycle. With the amount of waste increasing and landfill space becoming critical, the government has undertaken numerous measures to reduce waste, including the installation of the Jakarta Recycle Centre (JRC) Program. An integrated and sustainable waste management system will depend on both the physical and the governance components, with the physical aspect focusing on technical problems and the governance aspect focusing on the humanities. Several critical features of governance in the Jakarta Recycle Centre program will be described in this article. The purpose of this study is to explain about the governance aspect that drives the JRC program. This study employs a semi-schematic analysis of relevant documents and a literature evaluation of waste management system governance. According to the study's findings, strong institutions, policy execution, community methods, and the presence of financial support all have an impact on governance. Therefore, implementing the JRC program with excellent governance can be sustainable and contribute to forming a circular management environment.

Keywords: Governance · waste management · integrated · sustainable · circular

1 Introduction

Changes in lifestyle with the increasing use of technology and human needs in a fast and instant time cause various good and negative impacts. Especially in urban areas, lifestyle changes are becoming more consumptive and then demands that all activities be carried out in a short time but remain hygienic. The Covid pandemic has also provided behavioral changes where there has been an increase in panic buying and the increase in the use of single use products has increased the demand for the production system, especially plastic production [1].

Global material extraction has grown three times compared to the previous four decades and until now the rate of material extraction continues to increase so that the risk

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of scarcity of natural resources is increasing [2]. Linear economy activities occur where large-scale exploitation of natural resources is carried out to meet the needs without considering the waste generated so that the amount of waste is extremely high. On the other hand, the perspective of the use of waste as a renewable resource has emerged and has created a resource loop that creates a circular economic cycle so in fact, this waste condition can still be used as a resource [3, 4]. Today, waste has different meanings for various groups due to a paradigm shift in the management of waste. Waste can be goods that are no longer valuable for a person, but valuable for others [5].

Waste management in urban cities in Indonesia is also experiencing a critical condition, and Jakarta is facing one. In addition, the condition of the Bantargebang landfill, as the only landfill for Jakarta's waste, which received 7.000 tons of waste daily, has reached a height of up to 40 m. Various policy initiatives and waste reduction programs have been issued by the government so that waste reduction can start immediately. Not only focusing on turning waste into energy, but Jakarta also has several polices on waste reduction activities. The implementation of Waste Reduction activities at the Source is the focus of government activities that prioritize the reduction of waste generation, for example, the policy of prohibiting the use of plastic bags for shopping. Other waste reduction activities that have been developed are the implementation of community-based waste management with a garbage bank mechanism and a Community-Based Waste Sorting mechanism. However, challenges in implementing the waste reduction system at this source continue to occur with the less-than-optimal waste management process and the absence of a good waste management system [6].

Jakarta has developed a Jakarta Recycle Center (JRC) program, which aims to change a linear waste management system, towards a system that can encourage utilization as a resource by increasing community participation and government commitment. The JRC program is then seen as one of the programs that can be an example of a well-integrated waste management system [7]. The flow of JRC scheme can be illustrated as follows:

This JRC program adapts the waste management system in Osaki Kagoshima Japan, where the solid waste management system is carried out both from a technical and governance perspective.

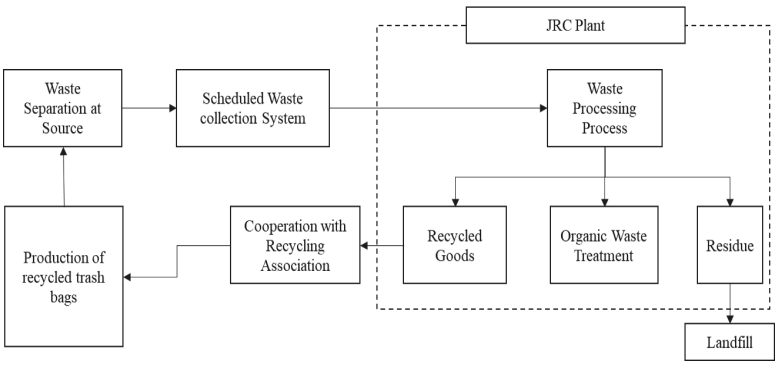

Fig. 1. JRC System Flow

1.1 Integrated Waste Management and Circular Economy

Circular economy (CE) is one of the efforts to prevent, reuse, and recycle waste which is still at the top of the waste management hierarchy so that it can contribute to creating clean production because the amount of waste produced or generated from manufacturing processes and natural resource processing processes is reduced [8]. The circular economy concept is one of the most important fundamental concepts which can link the use of resources, emissions, and waste to build a policy that supports the environment as well as the economy [9]. A circular economy (CE) is an economic model that aims to maximize resource efficiency through the reduction of waste, long-term value retention, primary resource reduction, and closed loops of goods, product parts, and materials while maintaining environmental and socioeconomic benefits [10].

Sustainable integrated waste management is a concept where waste management is carried out in an integrated manner where waste is considered a negative thing and as a useful material that provides a potential source of income. In a sustainable integrated waste management system, it is necessary to understand that waste management also prioritizes the hierarchy of waste management, so that waste is considered a resource that can still be recovered. As the implementation of integrated waste management system, it should be noted that there are three important aspects in waste management, namely (1) stakeholders, (2) waste management system, and (3) sustainability aspects [11].

The goal of sustainable waste management is to reduce resource consumption, reuse materials, and dispose of waste to a minimum. This goal is closely related to the circular economy so that sustainable waste management is the key to the success of implementing a circular economy [12]. In realizing the sustainability of an integrated waste management system, an assessment of the aspects involved in waste management is needed which is not only an assessment of the operational process of waste processing, but also an assessment of waste management governance consisting of institutional, legal basis, acceptance social, and others [11].

In the analytical framework to assess integrated solid waste management, UN Habitat then formed a concept of "Two Triangles" as set out in Fig. 2. The second triangle focuses on waste management governance, whereas the first triangle is primarily concerned with the actual working tools for the waste management system. The completeness of the waste management system is therefore determined by these two triangles [13].

It is also clear that in order to execute CE, governance support is required, and stakeholders' roles are crucial. There are still issues with governance management for CE adoption, particularly when it comes to controlling the supply chain to recover resources. The engagement of the government, the public, and the corporate sector in preserving the usage of materials is necessary governance for implementing CE since it enables a seamless recovery process [14].

1.2 Governance in Integrated Waste Management and Circular Economy

The waste management system in urban areas requires various resources which then require a governance related to creating economic and social sustainability [15]. Governance in the waste management system is one of the most important aspects to achieve sustainable waste management that will connect the roles between parties so that they

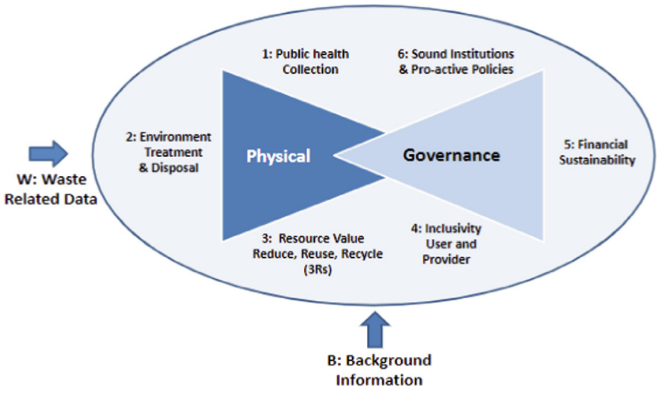

Fig. 2. The Integrated Sustainable Waste Management (ISWM) Framework

can operate the waste management system properly. For example, households will be responsible for sorting the waste, and the local government is required to support the provision of these facilities, which is related to planning, applicable policies, and budget management [15]. Several factors, including waste management institutions, inclusion of the public and private sectors, financial viability, as well as the availability of rules and legislation, must be considered to maintain good waste management governance [6, 13, 16].

On the other hand, a governance system is required for the circular economy in two different forms: public governance, which relates to the government system as a party that ensures the community's access to services, and networking governance, which relates to private parties and individual commitments [17]. The governance of CE implementation is divided into three phases in the Governance Capacity Framework, which are carried out since the process of introduction, manufacture, and implementation. The three processes lead to the conclusion that enhanced stakeholder participation, management ambition, agents of change, multi-level potential, financial viability, and implementing capacity are the prerequisites for CE [18, 19].

Based on this explanation, we can conclude that governance system for establishing Integrated Waste Management and Circular Economy have similarities. To conduct this study, some aspects we categorized as the important factor of governance as follows:

a. Inclusivity of Stakeholder (Public and Private Sector)
b. Financial Sustainability
c. Institution and Policy

The purpose of this study is to analyse the governance in JRC system, especially about those three points, where it has not been analysed in the previous study. Hopefully, this study may give more holistic analysis on the model of one-of-a-kind waste management system in Jakarta, so it can support to implement this system in another cities.

2 Methods

The research location is in the Pesanggrahan Sub-district of South Jakarta. This location is picked as the research location because this location was the first area which has been set up as the model of JRC implementation area. This study used a qualitative approach through official reports, field observation, and an interview with the important stakeholders such as officials in Environmental Agency, especially who are in charge for JRC operation and citizen representatives in JRC Model Area that has been served by JRC Waste Management Program. The interview has been done to five citizen representatives, as the JRC program has been implemented in five Model Area. As for the officials in Environmental Agency, the interview has been done to three superiors, who oversee the JRC program. The interview has been conducted according to guideline of Wasteaware Benchmark Indicators, specifically on governance aspects.

After that, the data were analyzed using descriptive content analysis method. The results of the analysis are the evaluated by interrelating the results with the basis of governance in waste management system from literatures.

3 Results

3.1 Inclusivity of Stakeholder (Public and Private Sector)

The extent to which the community and the commercial sector engage in the JRC program's execution demonstrates inclusivity. According on the findings of the observations and community interviews, it seems that one of the most crucial factors in putting this program into action is community engagement. People in one community are required by this program to sort their waste. The potential to educate citizens about the value of garbage sorting arises from this commitment. The emphasis in this JRC program is on categorizing waste by kind rather than taking the economic value of waste into account, in contrast to the Waste Bank approach. This approach then accepted by community because this makes waste separation easier.

Based on the findings of the interviews, it is known that a variety of approaches are adopted to start a conversation with the community and share knowledge of garbage sorting. In this community approach technique, the neighbourhood leader (RW) is intensively approached before being joined by the official in approaching all neighbours. Residents are involved in an interactive discourse during this process so that they can express their ideas as well. The significance of this increases because it seems that the community approach system can consider all the community's viewpoints and not leave anyone behind.

The Corporate Social Responsibility (CSR) program frequently serves as a vehicle for private sector participation in the JRC program. When this happens, the business sector can play a role in promoting the dissemination of information about the waste sorting system and raising public awareness of environmental issues. Since the government is responsible for the transportation, this waste transportation process necessitates a significant amount of government resources. Private companies operate a variety of garbage transportation services in Jakarta, but their differing business models make it difficult to work together to deliver waste to homes directly.

The community is recognized to be welcoming and open to the JRC program based on the findings of the interviews. Additionally, the community's awareness of waste sorting significantly increased, which positively impacted the success of waste sorting.

Other private parties play the role of an off taker from the waste processing output produced at the JRC site. Recycled materials are delivered to the waste recycling organization, as shown in Fig. 1. The recycling sector will thereafter have a great opportunity to further the Circular Economy's implementation due to this shipment. Because transportation to these groups needs a substantial amount of material, for the time being this material is sent to informal recycling events or associations.

3.2 Financial Sustainability

The Jakarta Regional Government runs the JRC program, which is given a fixed budget with funds that are adjusted to the plan and approved by the legislative. The legislature has a favourable attitude when spending for the JRC program with the goal of delivering improved waste management services. The entire city of Jakarta's budget was planned one year in advance; thus, this planning must be done well. The JRC's budget includes funding for the community's requirement for equipment to help with waste sorting in addition to funding for waste processing operations. The community's suggestion is then incorporated into the planning.

Jakarta's budgeting system already has a strict monitoring and accounting system, so that all use of the budget is properly monitored. In addition, as a government program, the JRC program can receive assistance or other access to further investment. As one example, the JRC program received a grant in the context of developing technology so that it can provide maximum processing services. The process of acquiring this investment is then carried out in accordance with the procedures of the applicable regulations.

3.3 Institution and Policy

The JRC program is implemented by the Jakarta Environment Agency under the Integrated Waste Management Unit (UPST). This unit is responsible for the implementation of the JRC, starting from planning, budgeting, operations, and reporting. The work procedures and organization of UPST have been regulated in Governor Regulation Number 600 of 2016. This stipulation then strengthens UPST in carrying out tasks for waste management in Jakarta, one of which is the JRC program.

In JRC operations, UPST establish a separate work team. This team is then divided into divisions in line with the scope of work, beginning with public outreach, data collecting on waste sorting success, sorting organic trash, sorting inorganic waste, team reporting team, and team other supporters. The existence of this organizational structure thus allows for a distinct division of work, enabling it to offer the highest level of service.

The JRC program was subsequently put into place using Jakarta's waste reduction policy as a guide. Jakarta has issued Governor's Regulation Number 77 of 2020 concerning Waste Management within the RW Scope as an impetus to socialize the importance of community participation in waste sorting by making reference to the Indonesian Law Number 18 of 2008 on Waste Management and its various derivatives to realize sustainable waste management. The JRC program is one of those that is encouraged to decrease

trash and treat garbage optimally so that it is not disposed of in landfills, in addition to the set target for reducing and handling waste in Jakarta.

4 Discussion

The results show that the JRC program has tried to create thorough governance and involve a variety of stakeholders. The obligation to sort waste has been placed on the community, along with the right to voice an opinion on how the waste management system should be implemented. Residents can have a comprehensive understanding of waste sorting through being directly informed about the waste sorting actions taken by the JRC socialization team, either door to door or via a discussion system. This demonstrates that informing the local population directly about waste sorting has a more beneficial effect [20]. Additionally, in order to sustain waste sorting's success, data gathering on waste sorting has been done in order to assess citizen performance, which can then be positively welcomed. Residents also value the JRC program because it demonstrates the government's genuine commitment to garbage sorting through the timely transportation of each separated waste. As a result, the relationship between the government and the community is encouraged and maintained. One of the keys to maintaining the quality of materials when implementing the Circular Economy is the residents' dedication to sorting waste. One of the most crucial steps in the implementation of CE is the waste sorting process, which makes subsequent processing more effective [21–23].

There is still room to grow the private sector's contribution to the JRC program. The government's method of transporting waste may put a strain on its financial resources. The implementation of the waste transportation process through a public-private partnership ("PPP") is then a potential approach to improving waste transportation services. Public Private Partnership, or known as PPP, is a scheme where government can cooperate with private sector in more holistic way so this can improve the performance of services to citizen. This scheme will help government to increase service while keeping budget low as government and private sectors will share the risks. This PPP method is feasible because it is already covered by some policies in Indonesia. As this PPP mechanism has been applied in many nations [24–26], it can therefore be used in Jakarta. By giving the private sector possibilities, this can then promote the delivery of best services and is believed to save the government budget.

Given that both the administration and the legislature have a same degree of knowledge regarding the significance of waste management in Jakarta, it is believed that the JRC program may remain financially sustainable. Given that UPST and the Environmental Agency both play significant roles in providing waste management services, the availability of this funding can be ensured. The PPP mechanism, which was previously explained, can also be a way to increase investment in the development of services from both a technical and social standpoint [27].

In Jakarta, there are quite a few regulations and legal frameworks for waste management, but there are still so few implementation and supervision procedures. The Governor's Regulation can be implemented as planned by the JRC program, but a tool that can more absolutely required incentives and disincentives/punishments for people who break the rules is still needed. The enforcement of waste sorting remains subject to

appeal since the procedure of providing incentives and disincentives that are not yet clear leads to misunderstanding in enforcement. This result may categorize as public governance, where this may push implementation of CE. The establishment of the regulation is one of way to show that Jakarta is committed to bring CE into action [28].

The work stream for JRC operation has great division and clear working scope. The development that should be done is to provide competency improvement for workers related to their duties on a regular basis. This can then grow the competence of workers in accordance with the development of technology and information [11].

5 Conclusion

Based on the three aspect of governance, JRC program demonstrates how governance elements have been applied. The governance at JRC has been deemed to be competent, while there is always space for improvement. This is demonstrated by the community's generally positive engagement and acceptance, the significant connections to the private sector, and the financial resources available to support the JRC's implementation from beginning to end. Additionally, the UPST institution, which is the party organizing the JRC, is powerful enough and has the power to execute planning, budgeting, and operational tasks. With strong institution and policy that has been running, The JRC program is stated to have good governance and can be an example for various existing waste management programs. The development that can be done is by opening opportunities for the private sector to cooperate more deeply, such as through the PPP scheme. This can be implemented to provide a much better and comprehensive waste management service and provide benefits to the community and the government. However, future research is needed, especially in measuring the sustainability of JRC program comparing with other waste management program, to see the effectiveness of program in handling waste problem in Jakarta.

References

1. Sarkodie, S. A., Owusu, P. A.: Impact of COVID-19 pandemic on waste management. Environment, development and sustainability 23(5), 7951-7960 (2021).
2. Iacovidou, E., Millward-Hopkins, J., Busch, J., Purnell, P., Velis, C. A., Hahladakis, J. N., ... Brown, A.: A pathway to circular economy: Developing a conceptual framework for complex value assessment of resources recovered from waste. Journal of cleaner production 168, 1279–1288 (2017).
3. Sariatli, F.: Linear economy versus circular economy: a comparative and analyzer study for optimization of economy for sustainability. Visegrad Journal on Bioeconomy and Sustainable Development 6(1), 31-34 (2017).
4. Kalmykova, Y., Sadagopan, M., Rosado, L.: Circular economy–From review of theories and practices to development of implementation tools. Resources, conservation and recycling, 135, 190-201 (2018).
5. Goel, S.: Solid and Hazardous Waste Management: An Introduction. in Advances in Solid and Hazardous Waste Management, Goel, S. Ed. Springer International Publishing, 1–27 (2017).

6. Naldi, A., Herdiansyah, H., Putri, L. S.: Good Governance Role for a Sustainable Solid Waste Management in Rural Community. In 2nd International Conference Earth Science and Energy, IOP Conference Series: Earth and Environmental Science 819(1), p. 012033. IOP Publishing, (2021).
7. Muhashiby, M. I. N., Hasibuan, H. S., Wahyono, S.: Waste management in Jakarta recycle centre: Case study of Pesanggrahan, Jakarta. In IOP Conference Series: Earth and Environmental Science 940(1), p. 012034. IOP Publishing, (2021).
8. Luttenberger, L. R.: Waste management challenges in transition to circular economy–case of Croatia. Journal of Cleaner production 256, 120495 (2020).
9. Mayer, A., Haas, W., Wiedenhofer, D., Krausmann, F., Nuss, P., Blengini, G. A.: Measuring progress towards a circular economy: a monitoring framework for economy-wide material loop closing in the EU28. Journal of industrial ecology 23(1), 62-76 (2019).
10. Morseletto, P.: Targets for a circular economy. Resources, Conservation and Recycling 153, 104553 (2020).
11. Wilson, D. C., Velis, C. A., Rodic, L.: Integrated sustainable waste management in developing countries. In Proceedings of the Institution of Civil Engineers-Waste and Resource Management 166(2), pp. 52–68. ICE Publishing, (2013).
12. Hettiarachchi, H.: The peak of sustainable waste management assures the sustainability of natural resources, but only in a circular economy. In Proceedings of the International Conference on Sustainability of Natural Resources, Qassim, Saudi Arabia pp. 5–6. (2019).
13. Wilson, D. C., Rodic, L., Cowing, M. J., Velis, C. A., Whiteman, A. D., Scheinberg, A., ... Oelz, B.: 'Wasteaware' benchmark indicators for integrated sustainable waste management in cities. Waste management 35, 329–342 (2015).
14. Lewandowski, M.: Designing the business models for circular economy-towards the conceptual frame-work. Sustainability (Switzerland), 8(1), 1-28 (2016).
15. Rodić, L., Wilson, D. C.: Resolving governance issues to achieve priority sustainable development goals related to solid waste management in developing countries. Sustainability (Switzerland), 9(3), 404 (2017).
16. Bridging the Gap in Solid Waste Management Governance Requirements for Re-sults.
17. Cramer, J.: Effective governance of circular economies: An international comparison. Journal of Cleaner Production 343, 130874 (2022).
18. Koop, S. H. A., Koetsier, L., Doornhof, A., Reinstra, O., Van Leeuwen, C. J., Brouwer, S., ... Driessen, P. P. J.: Assessing the governance capacity of cities to address challenges of water, waste, and climate change. Water resources management, 31(11), 3427–3443 (2017).
19. Ddiba, D., Andersson, K., Koop, S. H., Ekener, E., Finnveden, G., Dickin, S.: Governing the circular economy: Assessing the capacity to implement resource-oriented sanitation and waste management systems in low-and middle-income countries. Earth System Governance, 4, 100063 (2020).
20. Ruliana, V., Soemantojo, R. W., Asteria, D. (2019). Assessing a community-based waste separation program through examination of correlations between participation, information exposure, environmental knowledge, and environmental attitude. ASEAN Journal of Community Engagement 3(1), 1–27 (2019).
21. Social Circular Economy. Social Circular Economy - opportunities for people, planet and profit. (2017), www.socialcirculareconomy.com.
22. Pires, A., Martinho, G.: Waste hierarchy index for circular economy in waste management. Waste Management 95, 298-305 (2019).
23. Fulgenzi, A., Brouwer, S., Baker, K., Frijns, J.: Communities of practice at the center of circular water solutions. Wiley Interdisciplinary Reviews: Water 7(4), 1-15 (2020).
24. Oduro-Kwarteng, S.: Private Sector Involvement in Urban Solid Waste Collection. (2011).

25. Bartone, C. R., Leite, L., Triche, T., Schertenleib, R.: Private sector participation in municipal solid waste service: experiences in Latin America. Waste Management & Research, 9(1), 495-509 (1991).
26. Pinupolu, P., raja Kommineni, H.: Best method of municipal solid waste management through public-private partnership for Vijayawada city. Materials Today: Proceedings 33(xxxx), 217–222 (2029).
27. Siagian, E. S., Sumaryana, A., Widianingsih, I., Nurasa, H.: Public-private partnerships in solid waste management: arrangements in Indonesia. Asia Pacific Journal of Public Administration 41(1), 56-62 (2019).
28. Fatimah, Y. A., Govindan, K., Murniningsih, R., Setiawan, A.: Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia. Journal of Cleaner Production, 269, 122263 (2020).

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