Implementation of Modern Waste Management Model Circular Economy 9R in Waste Management by Padang City Environment Services

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Abstract: Modern waste management can be interpreted as a waste management process with appropriate and unconventional paradigms/concepts/methods/strategies. In fact, Padang City has implemented modern waste management since 2018 with the 3R strategy. However, the results have not been optimal with the emergence of new problems such as increasing waste generation every year, the emergence of 670 illegal TPS points, and the projection of full TPAs in 2026. The aim of this research is to describe and analyze the implementation of modern waste management using the 9R circular economy model in waste management, as well as supporting and inhibiting factors for the implementation of modern waste management using the 9R circular economy model in waste management by the Padang City Environmental Service. This research uses descriptive qualitative research methods. Data collection techniques and tools in this research used interview techniques, observation and documentation studies. Data analysis techniques use Miles and Huberman, namely data collection, data presentation, and drawing conclusions. This research uses Novian's (2024) theory of implementing the 9R circular economy framework, namely reduce, reuse, recycle, replace, replant, recovery, rethink, repair, and reorganization. The research results show that the implementation of modern waste management policies with the 9R circular economy model in waste management by the Padang City Environmental Service consists of 3 main aspects, namely waste reduction, waste handling and managed waste. The supporting factors for the implementation of modern waste management with the 9R circular economy model are the commitment of the regional leadership of the Mayor of Padang through the issuance of Padang Mayor Regulation Number 15 of 2024 concerning the 2024-2044 Waste Management Master Plan and regulations from the central government through the Road Map and National Action Plan for the Indonesian Circular Economy 2025-2045. Meanwhile, the inhibiting factor in implementing modern waste management using the 9R circular economy model is the lack of quality and quantity of apparatus resources. In terms of quantity, the current number of DLH officers is approximately 375 (three hundred and seventy five) people, which is disproportionate to the area of Padang City. In terms of the quality of the apparatus, most of them have a high school education background or below with a total of 184 people and overall not all of the apparatus have been given technical guidance or training in implementing a circular economy.

1 INTRODUCTION

Waste management is one of the environmental issues that is quite urgent. The issue of waste management is not only an urban or national issue, but has also become an international issue. According to a report entitled What a Waste 2.0 by the World Bank, the world produces 2.01 billion tons of urban solid waste every year. The World Bank also projects that global waste will increase by 70% by 2050 – to 3.40 billion tons of waste per year (Mita, 2023). Current conditions in Indonesia still face many challenges in creating an ecosystem that is conducive to responsible waste management. So that problems in waste management in various aspects have not yet found a solution (Aisyiah, et al, 2019). Referring to data from the Ministry of Environment and Forestry, Indonesia produces 35.93 million tons of waste throughout 2022 (KLHK, 2023). This amount increased 22.04%

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annually from 2021 of 29.44 million tons (KLHK, 2022). As for the volume of waste generation in 2023, it will experience a significant increase with waste generated amounting to 69.9 million tons.

One of the largest waste contributors is in urban areas in Indonesia. The challenge of wast management is one of the main urban challenges today. Relying on the waste pattern of collect-transport-dispose makes waste only a form of problem transfer, which is different if the waste is processed further (Aisyiah, et al, 2019). Padang City as the largest city on the west coast of Sumatra Island has an area of 694.96 km² with a population of 942,938 people and a population density of 1,373 people/km² (BPS, 2023). The increasing activity in the city of Padang as the center of government, education center, trade center and tourist destination, as well as the instantaneous change in people's behavior is now the cause of the increasing volume, types and characteristics of increasingly diverse waste in the city of Padang.

In fact, the Padang City Government has issued various legal products related to waste management regulations, such as:

1. Padang Mayor Regulation Number 109 of 2019 concerning Guidelines for Implementing Padang City Regional Regulation Number 21 of 2012 concerning Waste Management.
2. Padang Mayor Regulation Number 36 of 2018 concerning Control of the Use of Plastic Shopping Bags, with the aim "to protect areas from pollution and environmental damage due to the use of plastic shopping bags".
3. Padang Mayor Regulation Number 39 of 2021 concerning Management and Marketing of Recycled Waste Products
4. Regulation of the Mayor of Padang Number 44 of 2018 concerning Policies and Strategies (Jakstrada) of the City of Padang in the Management of Household Waste and Similar Types of Household Waste, with the aim "to provide guarantees for the fulfillment of the right to a healthy environment for every member of society, while at the same time providing space for widest possible participation of the community and business actors in reducing and handling waste. In this Jakstrada Regulation it is also stated that the waste management paradigm has also been carried out in a modern way over a period of 8 years (2018-2025) through the 3R (Reduce, Reuse, Recycle) concept as explained in the image below.

However, neither the Regional Regulation products nor the modern 3R concept have been able to create significant changes in waste management in Padang City. Referring to the Ministry of Environment and Forestry's National Waste Management Information System (SIPSN), Padang City produces 236,296 tons of waste throughout 2023. This number increased by 9.94% compared to 2022 of 234,973 tons. This fact further exacerbates the waste problem in Padang City, which seems stagnant and there is no practical solution in managing it. This has become a scourge for the Regional Government because the people of Padang City still seem apathetic and have not taken an active role together with the Regional Government in maintaining environmental cleanliness to alleviate the urban waste problem.

On August 22 2023, at Padang City Hall, Hendri Septa as Mayor of Padang held a limited meeting with the Environmental Service which was attended by the sub-district heads as regional leaders and village heads throughout Padang City. In his direction, the Mayor of Padang pledged that the City of Padang was a waste emergency due to the increasing condition of waste generation at the end of his leadership. If this continues, the Cold Water Landfill is projected to be full in 2026 (Diskominfo Padang, 2023). The results of the researcher's interviews with informants during pre-research also confirmed that Padang City experienced an increase in waste generation as stated by the informant as follows:

> "…. Every day the City of Padang produces ± 600-650 tons of waste per day which is transported to the Cold Water Final Disposal Site (TPA) with waste recycling activities of only 100 tons per day. "Apart from that, Padang City DLH found 670 locations where waste was dumped carelessly due to a lack of public awareness of waste management." (interview with Mr. Fadel as Head of the Padang City Environmental Service, 03 September 2023).

From the results of the interviews, the researchers also strengthened the data through field observations, with documentation of a map of the locations of random waste disposal by the community in Padang City in 2023.

Therefore, the urgency of waste management in the city of Padang in this modern era must receive top priority in determining policies and their implementation. The aim of this research is to describe and analyze the implementation of modern waste management using the 9R circular economy model in waste management by the Padang City Environmental Service as well as supporting and inhibiting factors for its implementation.

2 METHOD

The type of research is qualitative research with a descriptive approach. The research location is the Padang City Environmental Service. To obtain data from the field, researchers used interview guidelines, field observations, and documentation using data collection triangulation techniques. to be further analyzed using the Miles and Huberman Model analysis technique, namely data reduction, data display, and conclusion drawing.

3 RESULTS AND DISCUSSION

3.1 Implementation of Modern Waste Management with the Circular Economy 9R Model in Waste Management by the Padang City Environmental Service

Novian (2024) stated that the circular economy concept in Indonesia is implemented using the 9R framework. The implementation of the 9R circular economy in Padang City has been regulated in Padang Mayor Regulation Number 15 of 2024 concerning the 2024-2044 Waste Management Master Plan. From the results of the researchers' findings, the implementation of the modern waste management model circular economy 9R by the Padang Environmental Service can be explained as follows:

1. **Reduce.** The application of reduce by the Padang City Environmental Service is PSP (Plastic Waste Reduction) activities such as not providing bottled mineral water during meetings or other gatherings. Padang city government has also established regulations for Padang Mayor Regulation Number 38 of 2019 concerning Controlling the Use of Plastic Shopping Bags to reduce the use of plastic waste in Padang City, so as to reduce the volume of waste generation.
2. **Recycle.** The application of recycling carried out by Padang City Environmental Service is modifying waste so that it can be reused into various kinds of products such as flower pots, dish soap, smagot, and other useful waste.
3. **Reuse.** The application of reuse carried out by Padang City Environmental Service is by reusing various kinds of waste without changing anything from the waste, such as reusing administrative error paper into employee record paper and so on.

Replace. The application of replace carried out by Padang City Environmental Service is by replacing items that have the potential to become waste with items that have a longer useful life, such as reusing used tires from official vehicles into seats.

4. **Replant.** The application of replanting carried out by Padang City Environmental Service is by carrying out activities to use existing plants for replanting to save or produce economic benefits such as growing vegetables, medicinal plants, kitchen spices and so on.
5. **Rethink.** The application of rethink carried out by Padang City Environmental Service is to hold staff meetings every month to think together again about how DLH Padang City as the agency with authority in environmental management has good performance and of course creates a clean, beautiful and comfortable Padang City.
6. **Recovery.** The implementation of recovery carried out by Padang City Environmental Service is the use of waste which is converted into an energy source with development assistance from the central government of TPST-RDF which can reduce 200 tons of waste per day which is converted into fuel instead of coal for PT. Semen Padang.
7. **Repair.** The implementation of repairs carried out by Padang City Environmental Service is to repair damaged components of facilities and infrastructure for reuse in waste management.
8. **Reorganization.** The implementation of the reorganization carried out by Padang City Environmental Service is by readjusting the nomenclature rules for the Padang City DLH agency according to the latest regulations issued by the central government to optimize the agency's performance such as the DLH institutional development plan by structuring the regulator's duties and operator functions, establishing a waste service UPTD, developing the UPTD by implementing financial management patterns for regional public service agencies (PPK-BLUD), delegating some waste management authority to sub-districts, and developing waste management cooperation.

3.2 Supporting and Inhibiting Factors for the Implementation of Modern Waste Management with the Circular Economy 9R Model in Waste Management by the Padang City Environmental Service

1. Supporting factors for the implementation of the circular economy carried out by DLH Padang City are the commitment of the regional leadership of the Mayor of Padang through the issuance of Padang Mayor Regulation Number 15 of 2024 concerning the Master Plan for Waste Management 2024-2044 and regulations from the central government through the Road Map and National Action Plan for Indonesia's Circular Economy 2025 -2045.
2. The inhibiting factor in implementing the circular economy by DLH Padang City is the lack of quality and quantity of apparatus resources. The current quantity of DLH personnel is approximately 375 (three hundred and seventy five) people which is disproportionate to the area of Padang City. The quality of the apparatus is that most of them have a high school education background or below, with the number reaching 184 people.

4 CONCLUSIONS

Based on the results of the analysis and discussion, the author draws several conclusions as follows:

1. Implementation of modern waste management policies with the 9R circular economy model in waste management by the Padang City Environmental Service consists of 3 aspects, namely waste reduction, waste handling, and managed waste: reduce, namely by socializing and implementing PSP (Plastic Waste Reduction), for example, mineral water packaging which is replaced with a tumbler during gatherings or conferences. Reuse is the reuse of spoons, paper from administrative errors to be reused. Recycling is making flower pots from used gallons, used shopping bags. Replace is making a sitting garden from used tires from official vehicles. Replant is planting plants that are useful and have economic value such as vegetables and medicines in the Padang City DLH office environment. Recovery, namely the use of waste which is converted into an energy source with assistance from the construction of TPST-RDF from the central government which can reduce 200 tons of waste per day which is converted into fuel as a substitute for coal for PT. Semen Padang. Rethink, namely conducting performance evaluations through monthly staff meetings to improve performance and achieve agency goals. Repair is repairing components of waste management facilities and infrastructure that can still be used through the maintenance budget. Reorganization, namely readjusting the nomenclature rules for Padang City DLH agencies according to the latest regulations issued by the central government to optimize agency performance.
2. Supporting factors are the commitment of the regional leadership of the Mayor of Padang through the issuance of Padang Mayor Regulation Number 15 of 2024 concerning the 2024-2044 Waste Management Master Plan and regulations from the central government through the Road Map and National Action Plan for the 2025-2045 Indonesian Circular Economy.
3. The inhibiting factor is the lack of quality and quantity of apparatus resources. In terms of quantity, the current number of DLH officers is approximately 375 (three hundred and seventy five) people, which is disproportionate to the area of Padang City. In terms of the quality of the apparatus, most of them have a high school education background or below with a total of 184 people and overall not all of the apparatus have been given technical guidance or training in implementing a circular economy.

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REFERENCES

Allison, M., & Kaye, J. (2005). *Strategic Planning for Nonprofit Organizations: A Practical Guide and Workbook*. New Jersey: John Wiley & Sons, Inc Apriadi. (2021). *Menghindari, Mengolah dan Menyingkirkan Sampah*, (Jakarta: Abdi Tandur, 1989).

Bryson, J. M., & Alston, F. K. (2005). *Creating and Implementing Your Strategic Plan: a Workbook for*

Public and Non Profit Organizations. San Fransisco: Jossey Bass.

CSDF. (1998). *Strategic Planning Guidelines*. California: California State Departemen of Finance (CSDF).

David, A, dkk. (2019). *Recover, Recycle and Reuse: An Efficient*. International Journal of Mechanical and Production Engineering Research and Development 9, no. 3

Dohong., A. (2020). Persoalan Sampah Diatasi dengan Menjadikannya sebagai Sumber Daya. Tempo.co. Jakarta

Dyah E, dkk. (2012). *Analisis Komposisi, Jumlah, dan Pengembangan Starategi Pengelolaan Sampah di Wilayah Pemerintah Kota Semarang berbasis Analisis SWOT*.Jurnal EKOSAINS. Vol. IV.

European Council. (1991). *Council Directive 91/156/EEC of 18 March 1991 amending Directive 75/442/EEC on Waste Official*. Journal L 078, 26/03/1991 p. 32-37.

Gourlay, K.A. (1992). *World of Waste: Dilemmas of Industrial Development*. Zed Books Ltd.: London.

Hollander, J. (1998). *The waste remains and kills*. Social research 65(1): 3-6.

Kementerian PPN/Bappenas. (2021). Manfaat Ekonomi, Sosial, dan Lingkungan dari Ekonomi Sirkular di Indonesia.

Kementerian PPN/Bappenas. (2024). Peta Jalan dan Rencana Aksi Nasional Ekonomi Sirkular Indonesia 2025-2045.

Kodi Rina Mariani Gobai. (2021). *Pengelolaan Sampah Perkotaan*. Pustaka Almeida. Gowa, Sulawesi Selatan.

Lestari, A. P, dkk. (2019). *Tata Kelola Persampahan Indonesia – Bagian I Pemerintah Pusat*.Waste4 Change Press.Bekasi

Lestari, A. P, dkk. (2019). *Tata Kelola Persampaha Indonesia – Bagian II Pemerintah Daerah*.Waste4 Change Press.Bekasi

Lettieri, G. (2020). *Waste Management Suistanable*. Rtc.com.

Lox, F. (1994). *Waste Management - Life Cycle Analysis of Packaging. Final Report*. Vrije Universiteit Brussel, Vlaamse Instelling voor Technologisch Onderzoek, Belgian Packaging Institute, XI/A/4. 1994.

MacArthur, E Foundation. (2013). *Towards The Circular Economy*.

Mashudi, dkk. (2023). *Innovative Strategies and Techbologies in Waste Management in the Modern Era Integration of Sustainable Principles, Resources Efficiency, and Enviromental Impact*. International Journal of Science and Society. Volume 5, Issue 4

Masrudi Muchtar, dkk. (2016). Hukum Kesehatan Lingkungan (Kajian Teoritis Dan Perkembangan Pemikiran). Pustaka Baru Pers. Jakarta.

Mita Defitri. (2022). Metode Pengelolaan Sampah di Negara Maju. Waste4 Change Press.Bekasi

Moelong, L. J. (2015). *Metode Penelitian Kualitatif: Bandung*: PT Remaja Nabila Zahra, dkk. (2021). Pengelolaan Sampah dalam Konteks Pembangunan Berkelanjutan (*Waste Management in the Context of Waste Management*). HMGP. Geografi Universitas Gajah Mada

Naemi Denz. (2016). *Modern Waste Management Goals and Paths*. Michael Ludden, Sutco Recyling Technik GmbH

Nazir, M. (2014) .*Metode Penelitian*: Ghalia Indonesia Nawawi, H. (2005). Manajemen Strategik. Yogyakarta: Gadjah Mada Press

Nelson, S. (2009). *Implementing for Result Your Strategic Plan in Action*. Chicago: American Library Assocition.

Notoatmodjo, S. 2010. Metodologi Penelitian Kesehatan. Jakarta:Rineka Cipta.

Novian Dika, S. (2024). Pengelolaan Sampah Berbasis Ekonomi Sirkular dan Implikasinya bagi Indonesia. Kajian KPBU Kementerian Keuangan Republik Indonesia.

Peraturan Daerah Kota Padang Nomor 21 Tahun 2012 tentang Pengelolaan Sampah

Peraturan Walikota Kota Padang Nomor 15 Tahun 2024 tentang Rencana Induk Pengeloaan Sampah 2024- 2044

Pongrácz, E. (2002). *Re-defining the Concepts of Waste and Waste Management: Evolving the Theory of Waste Management*. Doctoral Dissertation. University of Oulu, Department of Process and Environmental Engineering. Oulu University Pres: Oulu.

Pranatasari Dyah, dkk. (2023). 10 R: Konsep *Eco Efficiency* dalam Standar Indutri Hijau Batik. Standar: *Better Standard Better Living* 2, no. 2

Ramli, M. (2014). Manajemen Stratejik Sektor Publik. Alauddin University, Makassar.

Recycling Bulgaria Group (2024). *The Role of Technology in Modern Waste Management*. Linkedin.com

Richard Jatimulya, dkk. (2023), Studi Komparatif Ekonomi Sirkular Dalam Arah Kebijakan Hukum Pengelolaan Sampah Kemasan Plastik di Indonesia dan Jerman, Nusantara: Jurnal Ilmu Pengetahuan Sosial Vol. 10 No. 5

Riyadi dan Deddy Supriyadi. (2004), *Perencanaan Pembangunan Daerah*, PT. GramediaPustakaUtama, Jakarta Nabila Zahra, dkk. (2021). Pengelolaan Sampah dalam Konteks Pembangunan Berkelanjutan (*Waste Management in the Context of Waste Management*). HMGP. Geografi Universitas Gajah Mada

Naemi Denz. (2016). *Modern Waste Management Goals and Paths*. Michael Ludden, Sutco Recyling Technik GmbH

Nazir, M. (2014). *Metode Penelitian*: Ghalia Indonesia Nawawi, H. (2005). Manajemen Strategik. Yogyakarta: Gadjah Mada Press

Nelson, S. (2009). *Implementing for Result Your Strategic Plan in Action*. Chicago: American Library Assocition.

Notoatmodjo, S. 2010. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta.

Novian Dika, S. (2024). Pengelolaan Sampah Berbasis Ekonomi Sirkular dan Implikasinya bagi Indonesia. Kajian KPBU Kementerian Keuangan Republik Indonesia.

Peraturan Daerah Kota Padang Nomor 21 Tahun 2012 tentang Pengelolaan Sampah

Peraturan Walikota Kota Padang Nomor 15 Tahun 2024 tentang Rencana Induk Pengeloaan Sampah 2024- 2044

Pongrácz, E. (2002). *Re-defining the Concepts of Waste and Waste Management: Evolving the Theory of Waste Management*. Doctoral Dissertation. University of Oulu, Department of Process and Environmental Engineering. Oulu University Pres: Oulu.

Pranatasari Dyah, dkk. (2023). 10 R: Konsep *Eco Efficiency* dalam Standar Indutri Hijau Batik. Standar: *Better Standard Better Living* 2, no. 2

Ramli, M. (2014). Manajemen Stratejik Sektor Publik. Alauddin University, Makassar.

Recycling Bulgaria Group (2024). *The Role of Technology in Modern Waste Management*. Linkedin.com

Richard Jatimulya, dkk. (2023), Studi Komparatif Ekonomi Sirkular Dalam Arah Kebijakan Hukum Pengelolaan Sampah Kemasan Plastik di Indonesia dan Jerman, Nusantara: Jurnal Ilmu Pengetahuan Sosial Vol. 10 No. 5

Riyadi dan Deddy Supriyadi. (2004), *Perencanaan Pembangunan Daerah*, PT. GramediaPustakaUtama, Jakarta Pengabdian kepada Masyarakat 4, no.1