

## BEHIND THE GARBAGE PILES: Padang City's Waste Management Policy Innovation Model

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**Abstract:** Waste management is one of the problems considered to be damaging to the environment and disturbing to human health. The increasing population, consumption patterns, and low public awareness of participation in management, coupled with political factors, are considered triggers for the failure of waste management. In an era where waste continues to accumulate and its environmental impact is increasingly felt, the government's role in developing innovative policies is vital. This research aims to explain and analyze policy innovations in waste management in Padang City. The theory used is Allan McConnell's theory of policy innovation success and failure. The method employed is qualitative, utilizing a case study. The results of the study show that there are several programs in waste management in Padang City, starting with Regional Regulation No. 21 of 2012 concerning Waste Management, the integrated waste management program (PERSATU), the distribution of floating nets in various rivers, recycling waste entering malls, reducing the use of plastic bags in malls, thematic eco-enzyme villages, RDF technology, maggot cultivation, *One Community Unit*, *One Waste Bank*, *One Bentor for Each Urban Village*, Civil servants saving in waste bank, and Padang Bagoro. However, of the many waste management programs, the Padang City Government has not been able to reduce the amount of waste from year to year, this condition is caused by the sub-optimal political support from local political parties and this condition is exacerbated by the culture and participation of the community which does not support waste management programs in Padang City.

**Keywords:** Model; Policy Innovation; Waste Management

**Abstrak:** Pengelolaan sampah merupakan salah satu permasalahan yang dianggap merusak lingkungan dan mengganggu kesehatan masyarakat. Peningkatan jumlah penduduk, pola konsumsi, serta rendahnya kesadaran dan partisipasi masyarakat dalam pengelolaan sampah, ditambah dengan faktor politik, dipandang sebagai pemicu kegagalan dalam pengelolaan sampah. Di era dimana volume sampah terus meningkat dan dampaknya terhadap lingkungan

semakin dirasakan, peran pemerintah dalam merumuskan kebijakan inovatif menjadi sangat krusial. Penelitian ini bertujuan untuk menjelaskan dan menganalisis inovasi kebijakan dalam pengelolaan sampah di Kota Padang. Teori yang digunakan dalam penelitian ini adalah teori keberhasilan dan kegagalan inovasi kebijakan menurut Allan McConnell. Metode yang diterapkan adalah metode kualitatif dengan pendekatan studi kasus. Hasil penelitian menunjukkan bahwa terdapat berbagai program pengelolaan sampah di Kota Padang, antara lain: Peraturan Daerah No. 21 Tahun 2012 tentang Pengelolaan Sampah, program pengelolaan sampah terpadu (PERSATU), pemasangan jaring apung di berbagai sungai, daur ulang sampah yang masuk pusat perbelanjaan, pengurangan penggunaan kantong plastik pusat perbelanjaan, kampung tematik eco-enzyme, teknologi RDF, budidaya maggot, program 1 RW 1 Bank Sampah, 1 bentor 1 kelurahan, tabungan ASN di Bank Sampah, dan program Padang Bagoro. Namun dari sekian banyak program pengelolaan sampah yang telah dijalankan, Pemerintah Kota Padang belum berhasil menurunkan jumlah timbunan sampah dari tahun ke tahun. Kondisi ini disebabkan oleh dukungan politik dari partai politik lokal yang belum optimal, serta diperburuk oleh budaya dan tingkat partisipasi masyarakat yang belum mendukung secara maksimal program-program pengelolaan sampah di Kota Padang.

**Kata Kunci:** Model; Inovasi Kebijakan; Pengelolaan Sampah

## Introduction

Waste management is a global problem that requires effective and sustainable policy innovation.<sup>1</sup> In an era where waste production continues to rise, and environmental impacts are becoming more pronounced, the government's role in developing innovative policies is crucial.<sup>2</sup> Policy innovation in waste management can help reduce environmental impacts, encourage recycling and waste reduction, and foster community participation in waste

management.<sup>3</sup> Innovation is a tool for developing new ways to utilize resources and meet needs more effectively.<sup>4</sup> Fuga innovation can be used to create strategies and actions in public services.<sup>5</sup> Mulgan and Albury in Muluk note that successful innovation involves the creation and implementation of new processes, products,

<sup>1</sup> Alfian Deby Artha, Heru Nurasa, and Candradewini, "Collaborative Implementation of Nagari Waste Management Policy in West Pasaman Regency: Seeing Policy Opportunities and Innovations," *Matra Pembaruan: Jurnal Inovasi Kebijakan* 7, no. 1 SE-Articles (May 2023): 25–36, <https://doi.org/10.21787/mp.7.1.2023.25-36>.

<sup>2</sup> J K Low et al., "Encouraging Circular Waste Economies for the New Zealand Construction Industry: Opportunities and Barriers," *Frontiers in Sustainable Cities* 2 (2020), <https://doi.org/10.3389/frsc.2020.00035>.

<sup>3</sup> L Xiao et al., "Promoting Public Participation in Household Waste Management: A Survey-Based Method and Case Study in Xiamen City, China," *Journal of Cleaner Production* 144 (2017): 313–22, <https://doi.org/10.1016/j.jclepro.2017.01.022>; René Kemp, "Technology and Environmental Policy—Innovation Effects of Past Policies and Suggestions for Improvement," *Innovation and the Environment* 1 (2000): 35–61.

<sup>4</sup> Gaby Umbach and Igor Tkalec, "Evaluating E-Governance through e-Government: Practices and Challenges of Assessing the Digitalisation of Public Governmental Services," *Evaluation and Program Planning* 93 (2022): 102118, <https://doi.org/https://doi.org/10.1016/j.evalprogplan.2022.102118>.

<sup>5</sup> Khairul Muluk, "Knowledge Management: Kunci Sukses Inovasi Pemerintahan Daerah," *Malang: Bayumedia Publishing*, 2008.

services, and service methods that result from genuine improvements in terms of efficiency, effectiveness, or quality of results.

There are at least five typologies of innovation, namely first, product innovation or also called service innovation, namely innovation that comes from changes in the form and design of products or services; Second, process innovation, namely innovation that comes from quality updates carried out on an ongoing basis by referring to a combination of organizational changes, procedures, and policies; Third, service method innovation, which is innovation in terms of interaction with customers or in terms of providing services; Fourth, strategic innovation or also called policy innovation, which is innovation that refers to the vision, mission, goals, and new strategies as well as the reasons for the innovation where this departs from the existing reality; and fifth, system innovation, which is innovation in governance or innovation related to how to interact with other actors.<sup>6</sup>

Halvorsen divides the types of innovation into six categories, namely, a new or improved service, which is a change in the form of new services or improvements to existing services;<sup>7</sup> process innovation is a change in terms of processes such as changes in the providing processes services/products; administrative innovation is a change in the use of new policy instruments that are the result of changes in old policies; system innovation is a change from a fundamental thing from the existing system or in the form of a new system such as by establishing a

new organization or a new way of carrying out cooperation and interaction<sup>8</sup>. Conceptual innovation is a change in conceptual matters, namely in the form of changing the views of actors, accompanied by the use of new concepts; and radical change of rationality is a change in the general or mental view of employees.<sup>9</sup> Innovation, according to Muluk, can also be categorized based on its level. The level of innovation can be seen in the impact or influence it causes. First, incremental innovation refers to innovation that has a minimal effect on processes or services. Second, the level of radical innovation refers to innovations that bring fundamental changes to organizational processes or service processes. Third, transformative or systemic innovation refers to innovations that bring about changes to social, cultural, and organizational structures.<sup>10</sup>

The level of innovation according to Halvorsen, namely incremental innovations-radical innovations are updates to existing products, processes or services; top-down innovations-bottom-up innovations, namely the level of innovation seen from who pioneered the innovation, if managers or higher organizations pioneer the innovation then the innovation is called top-down innovations and vice versa if employees or lower organizations pioneer the innovation then the innovation is called bottom-up innovations<sup>11</sup>; and needs-led innovations and efficiency-led innovations, namely the

<sup>6</sup> N S Utami et al., "Conflict Resolution in the Customary Village Governance Administration of Baduy, Tengger, and Samin Ethnic Groups in Indonesia," *Journal of Infrastructure, Policy and Development* 8, no. 8 (2024), <https://doi.org/10.24294/jipd.v8i8.6371>.

<sup>7</sup> Bettina Distel and Ida Lindgren, "A Matter of Perspective: Conceptualizing the Role of Citizens in E-Government Based on Value Positions," *Government Information Quarterly* 40, no. 4 (2023): 101837, <https://doi.org/https://doi.org/10.1016/j.giq.2023.101837>.

<sup>8</sup> N Tresiana, N Duadji, and A Damayantie, "Deliberative Democracy Innovations at Citizen Level: Challenges of Local Government in Indonesia," *Lex Localis* 21, no. 4 (2023): 807–32, [https://doi.org/10.4335/21.4.807-832\(2023\)](https://doi.org/10.4335/21.4.807-832(2023)).

<sup>9</sup> Thomas Halvorsen et al., "On the Differences between Public and Private Innovation," 2005.

<sup>10</sup> Muluk, "Knowledge Management: Kunci Sukses Inovasi Pemerintahan Daerah."

<sup>11</sup> H R Adnan, A N Hidayanto, and S Kurnia, "Citizens' or Government's Will? Exploration of Why Indonesia's Local Governments Adopt Technologies for Open Government," *Sustainability (Switzerland)* 13, no. 20 (2021), <https://doi.org/10.3390/su132011197>.

level of innovation seen from whether the innovation is made to solve problems or to make a product, service or procedure more efficient than before.<sup>12</sup>

As cities grow and expand, municipal waste management becomes a critical challenge. The increasing population and industrial activities have led to a significant rise in waste generation, posing environmental and public health risks.<sup>13</sup> Population growth and socioeconomic activities in a region are positively correlated with an increase in the amount and type of waste, posing a threat to the region's ecosystem.<sup>14</sup> The pace of urbanization, population growth, and economic development is expected to result in a 70% increase in waste over the next 30 years.<sup>15</sup> Waste has become a fundamental problem due to its continuous increase, making its management a significant challenge for local governments.<sup>16</sup> Local governments are responsible for waste management even with limited resources in planning, administration, and supervision capacities.<sup>17</sup> Increasing waste production

necessitates the implementation of efficient waste management to ensure optimal resource utilization. Waste management is a local problem with global impacts.<sup>18</sup>

The problem with waste management in developing countries, including Indonesia, is that waste management systems are inadequate, posing risks to human health, the environment, livelihoods, and the conservation of natural resources.<sup>19</sup> Indonesia, one of the countries experiencing rapid growth and development, generates approximately 65 million tons of waste annually. Waste production is directly related to material consumption, meaning that the more material consumed or used, the greater the volume of waste generated. This statement suggests that the waste problem in Indonesia is closely tied to the increase in people's consumption activities. Improving waste management and achieving the goals of sustainable development encourage policymakers and practitioners to adopt appropriate systems for environmental protection across all sectors.<sup>20</sup> Indonesia, the largest producer of municipal solid waste in Southeast Asia, continues to rely on open dumping as its primary method of waste management.<sup>21</sup> According to data from the Ministry of

<sup>12</sup> Halvorsen et al., "On the Differences between Public and Private Innovation."

<sup>13</sup> N Bansal, "Industrial Development and Challenges of Water Pollution in Coastal Areas: The Case of Surat, India," in *IOP Conference Series: Earth and Environmental Science*, vol. 120, 2018, <https://doi.org/10.1088/1755-1315/120/1/012001>.

<sup>14</sup> Diana Hertati, "Penta Helix Collaboration Model in Handling Problems of Waste Management," *Nusantara Science and Technology Proceedings*, 2023, 371–77.

<sup>15</sup> A Maalouf and P Agamuthu, "Waste Management Evolution in the Last Five Decades in Developing Countries – A Review," *Waste Management and Research* 41, no. 9 (2023): 1420–34, <https://doi.org/10.1177/0734242X231160099>.

<sup>16</sup> Novrianus Dede Bulu, Muhammad Rifa'i, and Agung Suprojo, "Policy Implementation Regarding Regional Waste TPA of Southwest Sumba Regency (Study at Southwest Sumba District Environmental Service)," *Journal of Social Research* 2, no. 12 (2023): 4274–84, <https://doi.org/10.55324/josr.v2i12.1571>.

<sup>17</sup> Nika Saputra et al., "Capacity Building for Organizational Performance: A Systematic Review, Conceptual Framework, and Future Research Directions," *Cogent Business & Management* 11, no. 1 (December 2024).

<sup>18</sup> Maalouf and Agamuthu, "Waste Management Evolution in the Last Five Decades in Developing Countries – A Review."

<sup>19</sup> Harry, Musleh, and Nur Janani. "Problematisasi Pengendalian Konversi Tanah Pertanian Untuk Mewujudkan Keadilan Lahan Pangan Berkelanjutan di Kota Malang/The Problems of Controlling Agricultural Soil Conversion to Achieve Sustainable Food Land Justice in Malang City." *De Jure: Jurnal Hukum dan Syari'ah* 12.2 (2020): 227-240.

<sup>20</sup> U A Umar, N Shafiq, and F A Ahmad, "A Case Study on the Effective Implementation of the Reuse and Recycling of Construction & Demolition Waste Management Practices in Malaysia," *Ain Shams Engineering Journal* 12, no. 1 (2021): 283–91, <https://doi.org/10.1016/j.asej.2020.07.005>.

<sup>21</sup> P Agamuthu and S Babel, "Waste Management Developments in the Last Five Decades: Asian Perspective," *Waste Management and Research* 41, no. 12 (2023): 1699–1716.

Environment and Forestry in 2023, Indonesia's waste generation reached 17,027,843.29 tons per year (SIPSN, 2023a). The most significant contributor to waste generation is household waste at 44.64%. According to Law Number 18/2008, household waste management is carried out through reduction and handling. Waste reduction in 2023 reached 16.14% and waste handling reached 50.61%. Therefore, the total managed waste in 2023 amounted to 66.74%. This data provides an overview of waste management efforts in Indonesia, focusing on the effectiveness of reducing and managing household waste and similar types of waste.

Waste in urban areas is the most significant contributor to waste generation. According to Malek's findings, a statistically significant relationship exists between the urban population and the amount of waste disposed of in landfills.<sup>22</sup> The city of Adm. East Jakarta has the highest waste generation, at 2,333.18 tons per day. At the same time, the Anambas Islands Regency is the region with the least waste generation at 13.36 tons per day. The amount of waste generated does not indicate effective management, but rather the level of consumption activity among residents in the region. In 2023, Banyumas Regency was named the best waste management in Southeast Asia in the Smart Green ASEAN Cities (SGAC) Program's 2nd City Windows Series. Banyumas successfully implemented an application-based zero waste to landfill strategy, leveraging integrated waste disposal sites (TPST), and achieved a 9% reduction in waste disposal to landfills compared to total waste generation. In 2022, Cilegon City also succeeded in converting waste into briquette/co-firing fuel and

became the first Waste Management Pilot City in Indonesia. The Cilegon City Government is collaborating with PT Indonesia Power to process waste into energy substitutes for coal, having successfully replaced 5% of the coal needs of the Suralaya PLTU. These two cities are urban areas that have successfully managed waste optimally, resulting in a reduction in urban waste generation.

West Sumatra, a contributor to the highest waste generation among Indonesia's top 10 cities, needs to evaluate its current waste management practices. As the provincial capital, Padang City generates the most significant amount of waste, at 647.39 tons per day. As much as 72.4% or around 478 tons/day is directed to the Aia Dingin landfill. In comparison, the success rate of recycling is still only around 7%, and the remaining 20.2% suffers the unfortunate fate of being burned, dumped, or leaked into the environment. Waste management in Padang City faces several serious problems that require immediate attention and action. It is estimated that the Aia Dingin landfill will reach its maximum capacity in 2026 due to an increase in mixed waste generation without segregation at source. This not only results in a shorter lifespan of the landfill but also wastes a lot of resources in waste that has economic value.

Another problem is the behavior of people who still litter or even burn it, causing air and water pollution that is detrimental to health and the environment. Temporary 3R Shelters (TPS3R) also face significant obstacles due to the lack of community participation and limited operational funding. Weaknesses in the structure and governance of waste management across different stakeholders indicate the need for improvements in cross-sector coordination and management. The complexity of the waste problem in Padang City requires systematic management. Over the past four

<sup>22</sup> W Malek et al., "How Have Waste Management Policies Impacted the Flow of Municipal Waste? An Empirical Analysis of 14 European Countries," *Waste Management* 164 (2023): 84–93, <https://doi.org/10.1016/j.wasman.2023.03.040>.



years, the Padang City Government has implemented various preventive and solution-oriented measures to maximize waste management in Padang City.

The Integrated Waste Management Program (PESATU) is the primary initiative for bringing together various policies and strategic steps, focusing on managing and marketing recycled waste products. There was also the installation of floating cubes in the Batang Arau River to filter waste before it pollutes the sea. Batang Arau, a river in Padang City, is severely degraded by garbage. Although many residents utilize river water for various activities, the river's role as an estuary to the sea means that any trash in the river can pollute the marine ecosystem.<sup>23</sup> Another initiative is Recycled Waste in the Mall, along with stickers to encourage the reduction of plastic bag use in supermarkets. Recycled waste products require effective distribution to attract the right consumers, which can be achieved by moving these products in the mall, creating a market opportunity initiated by the Padang Municipal Government. Additionally, stickers have been placed in several supermarkets in Padang City to reduce plastic waste. This movement encourages people to bring their own bags instead of plastic bags.

The Padang Municipal Government, through the Mayor's Flagship Program, initiated Thematic Villages in each sub-district to enhance the local economy of the community, leveraging the region's potential.<sup>24</sup> Of the total, two Thematic

Villages have also become government policy steps in encouraging waste management, namely the Thematic Village of Waste Recycling and Seribu Keripik, and the Thematic Village of Eco Enzymes (Infopublik.id, 2022; Padang.go.id, 2022). The two Thematic Villages create a space that can become a center of education and public awareness for managing household waste while utilizing local creativity to improve the microeconomic sector through waste recycling. Providing incentives and disincentives in waste management is a strategy to encourage community and business sector participation in sustainable waste management efforts. The next step involves waste management efforts based on RDF (*Refuse-Derived Fuel*) technology, which serves as an alternative solution for converting inorganic waste into energy sources. The utilization of this complex technology incurs considerable costs, but these costs are also proportional to the scale of waste processing. Another step is the empowerment of community groups through the Maggot Cultivation Program, which optimizes the processing of organic waste into multi-purpose products, including animal feed, organic fertilizer, and oil. The *One Community Unit, One Waste Bank* program is also a strategic step in managing household waste at the source/upstream. The implementation of the One Community Unit, One Waste Bank program has been limited to only 10% of the total 887 RW in Padang City.

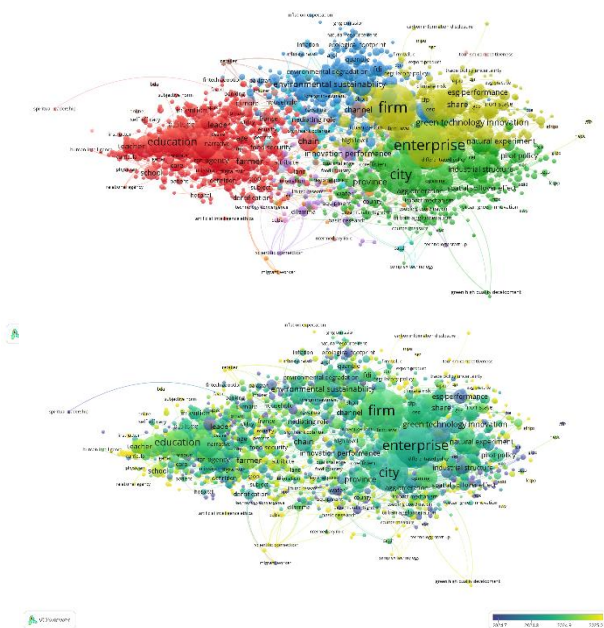
The Padang City Government also provides infrastructure for waste management in Padang City by establishing TPS points throughout the sub-districts, as well as distributing motorized tricycles as an efficient means of waste collection. This step involves providing information services in waste management, including the location of official polling stations and the contact

<sup>23</sup> Triana, Nita, Ade Tuti Turistiati, and Lincoln James Faikar Monk. "Alternative Dispute Resolution in Marine Pollution: Advancing Ecological Justice through The Polluter Pays Principle." *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi* (2024): 89-107.

<sup>24</sup> Abrar, Abrar, Azhariah Khalida, and Haya harem. "Revealing Legal Politics in City Branding: A Study of Padang Panjang City as the Kota Serambi Mekah." *JURIS (Jurnal Ilmiah Syariah)* 23.2 (2024): 309-326.

person in charge of motorized tricycles in each sub-district. The local government not only sets policies and programs but also provides infrastructure that supports the effective implementation of waste management. Recently, the Padang Municipal Government also held the Padang Bagoro Program, demonstrating the government's and community's commitment to addressing waste problems in the surrounding environment. This program has been running for almost two years and is considered quite effective in anticipating waste generation that would otherwise surge to the landfill. Then, a strategic step that has been carried out in recent times is to encourage the involvement of state civil servants (ASN) as waste bank customers to create positive habits in waste management among civil servant, of the many strategic steps that the Padang Municipal Government has taken in waste management, both through the use of technology and community empowerment, not all of these steps in practice have resulted in sustainable positive impacts. There is a need for policy innovation in overcoming complex problems.

Figure 1. Vosviewer Policy Innovation



Source: Vosviewer Visualization, 2025

This image is a bibliometric visualization from VOSviewer, illustrating the relationship between keywords in academic literature based on their frequency of occurrence.<sup>25</sup> Each circle represents a keyword, with its size indicating the frequency of its appearance and its color indicating the average year of its first appearance. Blue-purple colors indicate keywords that appeared earlier (around 2024), while green to yellow colors indicate more recent keywords (2025). Keywords such as \*enterprise\*, \*firm\*, \*education\*, and \*city\* appear dominant and central, indicating that these themes are a significant focus of research. Meanwhile, words such as \*green high-quality development\*, \*digital twin\*, and \*scientific connection\* are colored yellow, reflecting emerging research trends. In contrast, keywords such as \*spiritual leadership\* appear older and are being phased out. This visualization helps map the direction and development of research from past to recent issues that concern scholars today.

There are three key parameters in determining a policy innovation: creative new policy ideas are explored through various means to expand them, policy ideas are valuable and meet public needs, and policy innovation becomes a sustainable policy model.<sup>26</sup> Based on these criteria, researchers have identified three policy innovations carried out by the Padang City Government in its waste management efforts: the *One Community Unit*, *One Waste Bank Program*, *Maggot Cultivation*, and *Padang Bagoro*.

<sup>25</sup> Pisuko Herawati, Sawitri Budi Utami, and Nina Karlina, "Analisis Bibliometrik: Perkembangan Penelitian Dan Publikasi Mengenai Koordinasi Program Menggunakan Vosviewer," *Jurnal Pustaka Budaya* 9, no. 1 (2022): 1–8.

<sup>26</sup> Tendayi Viki, Dan Toma, and Esther Gons, "The Corporate Startup: How Established Companies Can Develop Successful Innovation Ecosystems," 2017.

Waste generation in Padang City plays a significant role in the environmental sector and urban governance. Household and industrial activities, as the largest suppliers of waste, are certainly productive activities in the urban environment. TPA Aia Dingin, as a waste management center, has revealed alarming conditions that threaten the activities of metropolitan communities across various sectors: economic, social, and political. Therefore, there is a need for further analysis of these three programs in encouraging optimal waste management in Padang City.

The local government of Padang City spearheads the design, implementation, and evaluation of waste management policies. Government policies require innovation in planning, implementation, and evaluation. Decentralization provides opportunities for regional leaders to innovate in developing and strengthening regional potential.

Reflecting on governance by governors in American states who have played an essential role in shaping public policy and building government institutions; (1) creating new institutions, (2) filling the void of federal action by innovating in areas that the federal government has not succeeded in doing, (3) managing the federal power of the state, (4) stimulating the national economy, (5) partnering with the federal government in critical areas such as transportation and education.<sup>27</sup> In Indonesia itself, one of the local governments that can be said to be successful in public policy innovation is the Bandung City Government.<sup>28</sup>

Based on the above problems, this study assumes that many waste management programs in Padang City do not adequately consider the local community's culture and awareness, resulting in unsuccessful innovation in waste management policy programs.

## Method

This research employed a qualitative case study approach conducted in Padang City, West Sumatra Province. The approach was chosen to allow in-depth exploration of policy innovation in waste management. Data was collected using purposive sampling.<sup>29</sup> Data collection techniques included in-depth interviews, active field observations, and documentation. The data were analyzed through a combination of emic (informant perspective) and etic (researcher perspective) approaches, supported by source triangulation to ensure validity.<sup>30</sup> The analysis process integrated interview data with supporting documents and field photographs to construct a comprehensive and contextual understanding of the phenomenon being studied.

## Results and Discussion

Problems related to waste management in Indonesia are a serious issue to be addressed. According to data submitted by the Ministry of Environment and Forestry (KLHK) in 2022, the total waste generated was 21.1 million tons, of which only 13.9 million tons could be managed effectively, while 7.2 million tons remained unmanaged.

<sup>27</sup> Ethan G. Sribnick, *A Legacy of Innovation: Governors and Public Policy* (University of Pennsylvania Press, 2013).

<sup>28</sup> Hidayah, Khoirul. "Analisis Kritis Pengaturan Sistem Resi Gudang dalam Mendukung Sektor Pertanian di Indonesia." *De Jure: Jurnal Hukum dan Syar'iah* 13.2 (2021): 156-169.

<sup>29</sup> Wahyudin Darmalaksana, *Metode Penelitian Kualitatif Studi Pustaka Dan Studi Lapangan* Wahyudin (UIN Sunan Gunung Djati Bandung, 2020), [http://digilib.uinsgd.ac.id/32855/1/Metode Penelitian Kualitatif.pdf](http://digilib.uinsgd.ac.id/32855/1/Metode_Penelitian_Kualitatif.pdf).

<sup>30</sup> Putu Gede Subhaktiyasa et al., "Penerapan Statistik Deskriptif: Perspektif Kuantitatif Dan Kualitatif," *Emasains : Jurnal Edukasi Matematika Dan Sains* 14, no. 1 (2025): 96-104.



Ten regions are the most significant contributors to waste in Indonesia.

**Table 1.** Provinces that supply the most waste in Indonesia

| No. | Regional       | Total Waste                  |
|-----|----------------|------------------------------|
| 1   | Jawa Tengah    | 5.76 million tons of waste   |
| 2   | East Java      | 4.95 million tons of waste   |
| 3   | West Java      | 4.89 million tons of waste   |
| 4   | DKI Jakarta    | 3.11 million tons of waste   |
| 5   | Banten         | 2.62 million tons of waste   |
| 6   | North Sumatra  | 1.9 million tons of waste    |
| 7   | South Sumatra  | 1.32 million tons of waste   |
| 8   | Bali           | 1.02 million tons of waste   |
| 9   | West Sumatra   | 958.23 million tons of waste |
| 10  | South Sulawesi | 908.85 million tons of waste |

Source: secondary data processed by researchers

From this data, West Sumatra ranks 9th as the largest waste contributor province in Indonesia, while for districts/cities that are the largest waste suppliers, namely the city of Padang, the following are details of the areas that are the largest waste suppliers in West Sumatra:

**Table 2.** The largest waste-producing regencies/cities in West Sumatra

| No. | District/City | Total Waste per day | Total Waste per Year |
|-----|---------------|---------------------|----------------------|
| 1   | Padang City   | 681.21              | 248,641.65           |

|   |                        |                      |                         |
|---|------------------------|----------------------|-------------------------|
|   |                        | tons of waste        |                         |
| 2 | Agam Regency           | 214.83 tons of waste | 78,412.95 tons of waste |
| 3 | West Pasaman Regency   | 172.67 tons of waste | 63,024.55 tons of waste |
| 4 | Lima Puluh Regency     | 154.23 tons of waste | 56,239.95 tons of waste |
| 5 | South Coastal District | 151.33 tons of waste | 55,235.45 tons of waste |

Source: secondary data processed by researchers

As the capital city of West Sumatra Province, Padang City is the highest waste-producing area in West Sumatra. One of the factors contributing to waste generation in Padang City is the growing number of residents. The increase in population, driven by both migration and urbanization, as well as the presence of residents, leads to a rise in community consumption production, ultimately resulting in an increase in city waste in Padang. The following is an overview of the amount of waste in each sub-district in Padang City.

**Table 3.** Total Waste Generation in Padang City at the Level of Each Sub-district 2024.

| No  | Kecamatan           | Timbulan Sampah (ton/hari) |         |         |         |         |
|-----|---------------------|----------------------------|---------|---------|---------|---------|
|     |                     | 2019                       | 2020    | 2021    | 2022    | 2023    |
| (1) | (2)                 | (3)                        | (4)     | (5)     | (6)     | (7)     |
| 1   | Padang Selatan      | 43.854                     | 43.885  | 43.625  | 43.273  | 43.63   |
| 2   | Padang Timur        | 56.594                     | 56.186  | 56.275  | 56.433  | 54.88   |
| 3   | Padang Barat        | 31.560                     | 31.097  | 30.790  | 30.436  | 30.24   |
| 4   | Padang Utara        | 40.268                     | 40.152  | 40.422  | 41.126  | 38.84   |
| 5   | Bungus Teluk Kabung | 18.947                     | 19.061  | 19.384  | 19.677  | 20.15   |
| 6   | Lubuk Begalung      | 85.228                     | 85.349  | 86.048  | 86.149  | 89.92   |
| 7   | Lubuk Kilangan      | 39.922                     | 40.061  | 40.230  | 40.417  | 42.43   |
| 8   | Pauh                | 42.524                     | 43.165  | 43.595  | 43.987  | 44.44   |
| 9   | Kuranji             | 100.419                    | 101.718 | 102.645 | 103.686 | 107.20  |
| 10  | Nanggalo            | 41.642                     | 41.504  | 41.835  | 42.016  | 41.47   |
| 11  | Koto Tangah         | 136.363                    | 136.714 | 138.353 | 140.188 | 146.86  |
|     | Kota Padang         | 637.320                    | 638.891 | 643.202 | 647.388 | 660.057 |

Source: Environment Agency (DLH) Padang City

Based on these data, the Padang City Government, together with the community, pays attention and finds solutions in the form of policy innovations for waste management in Padang City. To reduce waste, a legal basis is necessary to ensure that objectives are achieved in a proportionate, effective, and efficient manner. In this case, the local government has issued Regional Regulation Number 21 of 2012 concerning waste management. The regulation states that in waste management efforts in Padang City, the community must be actively involved and have access to facilities provided by the city government to tackle waste problems. The regulation also explains that waste management is the reduction and handling of waste. Therefore, the Padang City Government provides funding and programs for waste management. Andree Algamar, as the current PJ mayor of Padang, said that:

*"To encourage the community to be able to play an active role in sorting and reducing waste consistently, they will be rewarded with a discount on the retribution fee."*

In addition to providing funds, the City Government supervises and guides all stakeholders in tackling waste issues. It also sanctions individuals who fail to comply with waste management rules, such as improperly disposing of garbage. There is also an action plan in waste management, carried out from 2023 to 2030, called Integrated Waste Management (PERSATU). This action was issued in line with the strategic policies outlined in Padang Mayor Regulation Number 44 of 2018, which concerns regional policies and strategies for managing household waste and other similar waste. The integrated waste management action in Padang City aims to reduce waste by 30% and ensure that 70% of waste can be adequately handled by 2025.

Various innovations were issued in waste management efforts in the city of Padang, including the Padang city government forming a program in the form of a circular economy that focuses on the 5Rs, namely reducing and optimizing the use of natural raw materials (Reduce), using materials or products that have been used (Reuse), then making new products from materials and products that have been used before (Recycle), making used materials or products into materials or products that can produce energy (Recovery), and making existing products into products that can be used in the long term (Repair) Plan for Action in an effort to realize the objectives in the integrated waste management action plan, the Padang City Government works with various stakeholders who each have a role in waste management efforts in Padang city, such as the Padang City Environmental Agency (DLH) which is responsible for monitoring soil and air pollution, responsible for the management and control of landfills which will be carried out by the Regional Technical Implementation Unit (UPTD), besides that DLH is also responsible for ensuring that waste has been diverted from temporary disposal sites (TPS) to landfills (TPA).

To maximize waste management, the local government collaborates with various agencies of the Pamong Praja Police Unit (Satpol PP), which are responsible for enforcing local regulations and other waste management regulations. There is also the involvement of the Public Works and Public Housing Agency (PUPR), which is responsible for providing funds and budgets, as well as procuring the necessary infrastructure and technology for waste management. Several other institutions, including the Office of Cooperatives and MSMEs, the Office of Tourism, the Office of Agriculture, and the Office of Industry and Procurement, are responsible for educating

or marketing products that can be made from recycled materials.

In addition, the government also involves non-governmental organizations (NGOs) that focus on environmental issues, such as Wahana Lingkungan Hidup (Walhi), which campaigns and educates the public on how to manage waste properly. In addition to Walhi, the government also involves waste activists in Padang City, such as the Waste Bank Association and Eco Enzym Nusantara, among others. It also involves academics who play a role in designing policy innovations related to urban waste management.<sup>31</sup> To maximize the effectiveness of this integrated waste management action plan, the government also requires contributions from the private sector, specifically in designing various waste management products.

The government also involves community institutions in waste management at the sub-district, village, neighborhood, and community levels. According to Mulgan and Albury in Muluk, successful innovation consists of the creation and implementation of new processes, products, services, and service methods that lead to genuine improvements in terms of efficiency, effectiveness, or the quality of results.<sup>32</sup> Therefore, in Padang City, the waste management model is included in the product and service-based model. Below is a more detailed explanation of the policy innovation model in waste management implemented by the Padang City Government, with a focus on products and services.

## 1. Electronic-based Management and Compliance Evaluation System (SIKAT-PEL) Environmental Monitoring Information

Based on Regional Regulation Number 21 of 2012 concerning waste management and Padang Mayor Regulation Number 109 of 2009 concerning guidelines for implementing Regional Regulation Number 21 of 2012, both regulations mention the incentives provided by the government to the community that plays a role in overseeing waste management. These incentives will later be given to individuals who report proven violations committed by the community in waste management, such as improperly disposing of garbage. The Padang City Environmental Agency initiated the Sikat Pel application-based service as a tool for conducting environmental monitoring, which is carried out online or electronically.

Electronic-based innovations designed by DLH have entered the implementation and evaluation stages of the feasibility testing process.<sup>33</sup> The use of this application aims to facilitate the government's Environmental Service in managing and inputting data, as well as monitoring and supervising waste management development in Padang City.

This application also enables the community's ability to assist in monitoring and reporting waste management violations in the city of Padang. In using this application, it is equipped with several files or forms that must be filled in by the reporter who will report or find violations or find people who throw garbage out of place, which contains; the identity of the reporter, the address of the reporter, the identity of the reported party (if any), documentary

<sup>31</sup> Bin Salman, Abdul Matin, and Eko Asmanto. "Islamic Environmental Stewardship: A Sociological Approach to Hadith and Legal Frameworks for Ecological Responsibility." *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi* (2024): 361-378.

<sup>32</sup> Muluk, "Knowledge Management: Kunci Sukses Inovasi Pemerintahan Daerah."

<sup>33</sup> Sabrina T. Howell, "Government Intervention in Innovation," *Annual Review of Financial Economics* 16, no. 1 (2024): 367-90, <https://doi.org/10.1146/annurev-financial-082123-105722>.

evidence of the violation in the form of video.

**Figure 2. PeL Brush Form**

Source: secondary data researchers

## 2. ASN Peduli Sampah (APES)

ASN Peduli Sampah, or APES, is one of the innovations involving ASN in Padang City. In this program, ASN is required to be actively engaged in waste management by becoming a member of one of the Waste Banks in Padang City; this activity is evidenced by the presence of a Waste Bank customer card in the ASN's neighborhood. This program aims to raise awareness among the community, empowering them to drive waste management initiatives in Padang and position ASN as a key influencer in this innovation. The presence of this ASN waste care innovation is based on the Padang City Secretariat's Instruction Number 600.4/1073/DLH-PDG/2023, which was issued on September 26, 2023. Achievements in ASN's involvement in this innovation are evaluated on a monthly basis.

**Figure 3. Letter of instruction from the regional secretary to ASN to become a member of the waste bank**



Source: DLH document of Padang City.

As part of Padang City's trash reduction initiatives, the Regional Secretary's Letter of Instruction exhorts civil servants (ASN) to join local waste banks. This policy encourages government workers to sort and dispose of recyclable rubbish and raises their understanding of environmental issues. The goal of ASN involvement is to enhance community-based waste management and serve as a positive example for the general population. The program demonstrates the government's commitment to promoting environmentally friendly behaviors and fostering a culture of shared responsibility.

## 3. Padang Mamilah

This Padang Mamilah innovation was presented in December 2023. This Padang mamilah program collaborates with various institutions, including DLH, the Health Office, and the Education Office of Padang City. This program aims to increase community and stakeholder understanding of and participation in waste management. This program seeks to ensure that all residents of Padang City can sort waste effectively, with every item entering the TPS being categorized into organic and inorganic waste before transportation.

The Padang mamilah program is carried out by the Environmental Service, Health Service, and Education Service through education in public places, such as health centers (puskesmas), schools, and small community spaces, including women's gatherings, arisan, posyandu, and PKK meetings.<sup>34</sup> In addition to conducting offline activities, this program is also carried out online, where socialization is facilitated through various channels, including radio, social media, and podcasts.

<sup>34</sup> Malik, Ihyani, Suud Sarim Karimullah, and Huseyin Okur. "Gender Analysis in the Islamic Law-Based Ecofeminism Movement for Ecosystem Protection." *El-Mashlahah* 15.1 (2025): 101-124.



The Padang mamilah program aims to enhance community involvement in waste management in Padang city. This initiative begins by sorting household waste, which is then processed into various tools, including composters, solar biodigesters, biopori, eco-enzymes, and maggot systems. Besides aiming to reduce waste at its source, this program can also generate economic benefits for the community by managing both organic and inorganic waste. In line with the design of the Padang memilah program, the Padang City Government is also trying to optimize the Waste Bank by targeting each RW to have 1 Waste Bank. Currently, there are 182 waste banks established in each RW in Padang City, totaling 909 RWs in the city.

#### **4. Padang Bagoro Reborn**

Padang Bagoro became one of the flagship programs of the Padang City government during Hendry Septa's leadership. This program aims to address waste problems by engaging the community as the primary target for overcoming waste issues in Padang City. The Padang Bagoro program was first introduced in 2022 to encourage and raise public awareness about working together to clean up their respective neighborhoods. Padang Bagoro can be considered a derivative of the ASN Peduli Sampah (APES) innovation. After successfully running the APES program, the Padang City Government developed an innovation that can be accessed or implemented by all levels of society, known as the Padang Bagoro program.

At the beginning of the Padang Bagoro program's formation, it did not run as expected. Therefore, in the following year, 2023, a new program was re-established under the name "Padang Bagoro Reborn," utilizing the same concept as before. Still, there were minor changes or updates in this program. The targets in this Padang Bagoro Reborn program are:

- a. Revolutionizing people's perspectives on individual responsibility in keeping the environment clean.
- b. The implementation of gotong royong is carried out regularly every month with a predetermined schedule.
- c. Make the family the leading actor and keep in touch with fellow residents/neighbors and revive the spirit of gotong royong.
- d. Involving children or young people who are agents of change by instilling the values of clean culture and cooperation from an early age.

Padang Bagoro reborn is carried out once a month and its implementation starts from 07.00-09.00 WIB, in this activity it is not only focused on the problem of creating a clean and litter-free environment, but also can build collective awareness amid the community that environmental cleanliness is a shared responsibility, through this program it also builds network with fellow residents, moments at the time of gotong royong like this are expected to be a place to strengthen neighborly relations.

#### **5. Waste Bank MAPS Point**

This program is aligned with the Padang city government's commitment to reducing waste and implementing a circular economy in waste management by expanding the availability of existing waste banks. This program aims to make it easier for people to collect, sort, and sell waste. The program's functionality will be demonstrated through Google Maps using the keyword 'Waste bank in Padang City'. It has been operational since 2021. This program can be accessed by individuals who wish to locate waste bank points through the following link: <https://bit.ly/BankSampahKotaPadang>.

Another program related to managing waste bank point maps is Titik Coma or Titik Container. This innovation provides the public with information on the location of waste containers.



## 6. Nabuang Sarok

The Nabuang Sarok program was initiated by PT Semen Padang, which recognized the community's effort to sort waste and then hand it over to the company. Seeing this, PT Semen Padang took the initiative to motivate the wider community to participate in waste management by offering awards or rewards to individuals who had collected and sorted the waste. This phenomenon eventually led PT Semen Padang to collaborate with DLH Padang City on establishing waste banks in Padang City. Innovation, which applies the circular economy principle to manage domestic waste, offers sustainable benefits for all stakeholders, encompassing environmental, social, and financial advantages. This program has been carried out since 2010 by PT Semen Padang. In 2023, PT Semen Padang finally collaborated with DLH Padang City and Waste Banks in Padang City. With the existence of this program, the 'Nabuang Sarok' agent will screen people who want to exchange their waste, and people can also contact the Nabuang Sarok agent through the website available through the Instagram account page nabuangsarok.sp.

As for the program issued by the Padang City Government with the private sector, namely with PT Semen Padang, apart from the nabuang sarok above, the government and PT Semen Padang are designing a refuse derived fuel (RDF), which in this program will convert waste into a coal substitute energy that can be used, and can solve problems from upstream to downstream in Padang City Environment Agency.

In addition to the six innovations previously described, the Padang City Government has issued several innovations in collaboration with related institutions or stakeholders. One such innovation is the Eco-Edu landfill tours, which are conducted in cold water. This initiative transforms the landfill into a community environmental learning site. In

the city of Padang, blue cubes or floating cubes are located at several points along the river. This innovation aims to prevent waste from flowing far into the sea. There is also an innovation in the form of an appeal to the community through the mosque to reduce and overcome hygiene problems in the neighborhood.

**Figure 4.** Innovation Shape Blue cube or Floating cube



Source: secondary data

Policy innovations that have been designed by the Padang City Government together with various layers of stakeholders have received multiple awards in waste management in Padang City, including the Nirwasita Tantra organized by the Ministry of Environment and Forestry (KLHK) to the Padang City government, this award is a form of award given based on the success of Padang City which can present innovations in managing and protecting the environment of Padang city well.

Padang City received an award, in addition to the Nirwasita Tantra award, as the mayor of the Marine Waste Management Movement from the Ministry of Maritime Affairs and Fisheries (KKP) of the Republic of Indonesia. This award was received directly by the Acting (PJ) Mayor of Padang, Andree Algamar, at the peak of the National Movement (Gernas). This award is a testament to the seriousness of the Padang city government, working alongside fishermen who consistently keep

the sea and beaches clean of plastic waste. (Antoro, 2024) The next award that Padang City successfully obtained was the adipura award organized by the Ministry of Environment and Forestry (LHK), in this award the classification carried out was based on the regional strategic policy (Jakstrada) designed by the local government by ensuring the installation of a waste management system based on a tested system and accurate data that has been verified through the National Waste Management Information System (SIPSN), landfill operations, and green open space.

## Conclusion

The policy innovation model in waste management in Padang City uses a product and service model. Several programs in waste management have been carried out in Padang City, namely: the existence of an Electronic-Based Environmental Management and Monitoring Compliance Evaluation Information System (SIKAT-PEL) application, the ASN Peduli Sampah (APES) program, Padang Mamilah, Padang Bagoro Reborn, the Waste Bank MAPS Point application, and the Nabuang Sarok program.

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