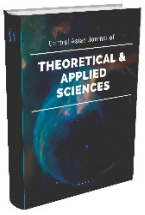

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Waste Reduction and Handling Management in Payakumbuh City

Lisa Anisa, Betha El Sherra, Rico Irvanda, Yusup Maulana, Iswandi, Eri Barlian, Erianjoni
Master Program of Environmental Sciences, Universitas Negeri Padang (UNP) – Indonesia

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Abstract: *One of the priority environmental issues in Payakumbuh City is the management of waste. The generation of waste is high and it is influenced by the increase in population growth. Furthermore, the management of waste management in Payakumbuh is not effective. Payakumbuh City has designed a Regional Strategic Policy (Jakstrada) in the Management of Household Waste and Household-Like Waste. The goal of Jakstrada is to reduce the amount of waste and waste handling in Payakumbuh City in 2018-2025. To achieve the Jakstrada target, good management is needed to reduce waste and handle waste in Payakumbuh City. So, it is hoped that by 2025 the Jakstrada's target that has been set can be achieved by Payakumbuh City. This research method uses secondary data from the Payakumbuh City Environmental Service and literature studies on regional regulations that serve as guidelines for waste management in Payakumbuh City. The estimated generation of household waste and waste similar to household waste in Payakumbuh City in 2020 is 98.14 m³/day with a target of 30% reduction and a target of handling 70% of the generation rate, with the realization of handling 78.62% and a reduction of 16. 23%. Waste management in Payakumbuh City is structured through aspects of waste management institutions, regulations, levies, and financing as well as aspects of community participation.*

KeyWords: *The priority environmental issue, waste generation, waste reduction, waste handling.*

INTRODUCTION

One of the environmental priority issues in Payakumbuh City since the last 5 (five) years is the problem of solid waste. As the second-largest city in West Sumatra Province after Padang City, it is not surprising that this issue appears as an environmental priority issue every year. The population growth of Payakumbuh City from year to year is increasing rapidly, this is of course accompanied by an increase in the generation of waste generated in the city. In addition, the position of Payakumbuh City as a gateway connecting Riau Province and West Sumatra Province has caused Payakumbuh City to become a transit city that receives many visitors. The visit also indirectly contributed to the increase in waste generation in the city.

Waste management in cities in Indonesia generally uses the same method, namely the collection-transport-disposal method, which can be described in 6 (six) stages of waste management starting from storage, collection, transfer, transportation, processing, and finally recovery (Narayana, 2009). Handling of waste like this cannot overcome environmental pollution because it will cause new problems at the Final Processing Site (TPA). As is the case in Payakumbuh City, the Regional TPA of West Sumatra Province in Payakumbuh City is starting to exceed its capacity. This TPA not only accommodates

garbage from Payakumbuh City but also accommodates garbage from nearby districts/cities, such as Bukittinggi City, Limapuluh Kota Regency, and Agam Regency. For this reason, in addition to the need for expansion of the Regional TPA landfill, it is also necessary to increase the fulfillment of waste management facilities and infrastructure followed by good waste management so that all waste generated in the city can be handled optimally.

Garbage is a residue from human activities that are not used, is not liked, and must be disposed of. If not managed properly, waste will certainly cause pollution to the environment. A good and healthy living environment is very important and achievable to create a safe and comfortable place to live for the community. As a guideline, Article 9 of Law No.18/2008 concerning National Waste Management states that Regency/City Governments have the authority to determine the direction of policies and strategies in waste management; implementing waste management; supervise and evaluate the management of the waste management, including the regulated rights and obligations as well as sanctions for the community and stakeholders who carry out waste management. To make it happen, the Central Government and Regional Governments have formulated policies, one of which is the solid waste policy at both the national and regional levels.

This waste management policy is very important because the waste problem can become a big problem if it is not handled properly. An effective and efficient waste management system must consider existing limitations such as costs, technology, education, and community behavior (Arifin, 2019).

To determine the direction of waste management policies and strategies in Payakumbuh City, the Payakumbuh City Government has compiled Regional Regulation no. 4/2019 concerning Amendments to Regional Regulation No. 4/2014 concerning Waste Management and Payakumbuh Mayor Regulation No. 89/2018 concerning Regional Policies and Strategies (Jakstrada) in the Management of Household Waste and Waste Similar to Household Waste. The implementation of these policies needs to be supported by community involvement and the implementation of good solid waste management.

Based on the description above, the objectives that are expected to be achieved from the research include: 1) Knowing the condition of waste generation in Payakumbuh City; 2) Knowing the obstacles faced in achieving the target of reducing and handling waste in Payakumbuh City, and 3) Formulate recommendations for the management of waste reduction and handling in Payakumbuh City.

DISCUSSION FINDINGS

Payakumbuh City Overview

Payakumbuh City is located in the Bukit Barisan area under the foot of Mount Sago, at coordinates 0°10' - 0°17' South Latitude and 100°35' - 100°45' East Longitude. The city is crossed by 8 (eight) rivers, namely: Batang Agam River, Batang Lampasi River, Batang Sinamar River, Batang Pulau River, Talang River, Batang Sikali River, Baih River, and Tembok Jua River. The condition of this area has a hilly morphology, with an elevation of ± 514 MASL.

Administratively Payakumbuh City is ± 80.43 km² with a distance of 120 km to Padang City. The city consists of 5 sub-districts and 47 urban villages. The sub-districts in Payakumbuh City are: West Payakumbuh District, East Payakumbuh District, North Payakumbuh District, South Payakumbuh District and Lamposi Tigo Nagori District. The administrative map of Payakumbuh City can be seen in Fig 1 below.

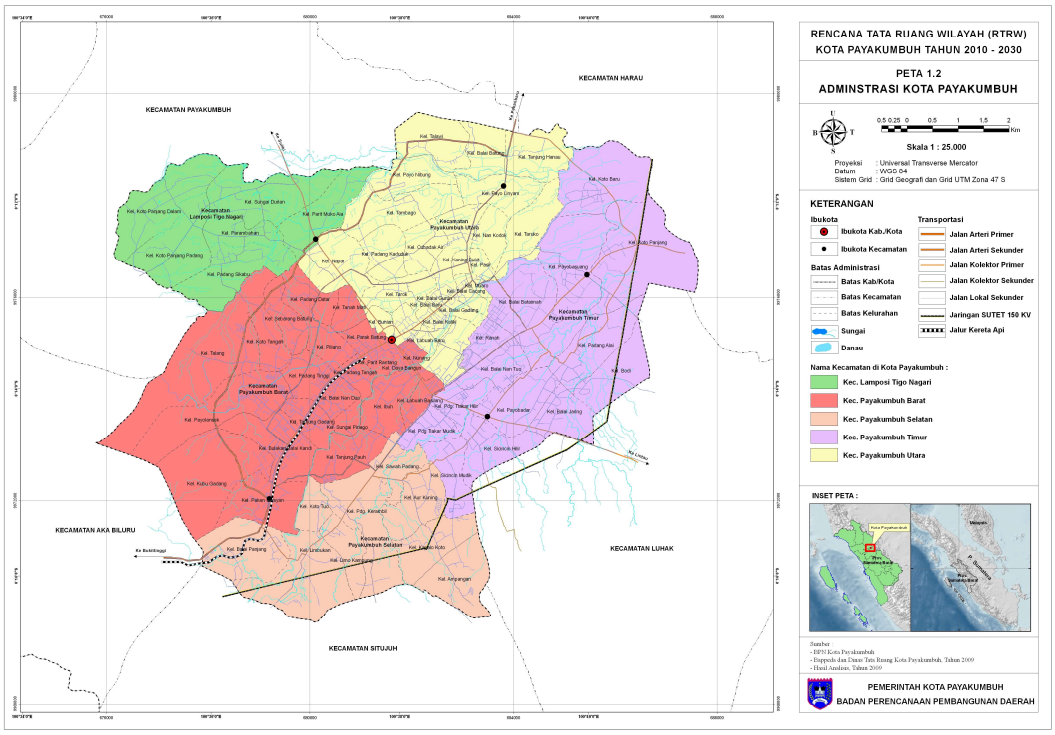

Fig 1. Map of Payakumbuh City administration (RTRW Payakumbuh City 2010-2030)

During the Dutch East Indies colonial era, Payakumbuh City was a place for logistics storage and spice warehousing from the West Sumatra region. The spices were then sent to the city of Padang to be traded by the Vereenigde Oostindische Compagnie (VOC) to European nations. On December 17, 1970, the Government of Indonesia set Payakumbuh City to become a Municipal Region led by the first Mayor, namely Drs. Soetan Oesman.

Figure 2. payakumbuh city train station during the Dutch East Indies Period in 1906 (Wikipedia)

Definition of Garbage

Garbage is solid waste consisting of organic and inorganic substances which are considered no longer used and must be managed so as not to harm the surrounding environment. Meanwhile, according to Law No. 8/2008, waste is all types of residual waste in solid form resulting from human activities. With the increasing population growth, the residual waste from human activities will also increase. Therefore, the

increasing volume of waste needs to be handled seriously so that it does not have an impact on the environment. The comparison of population growth with waste generation can be seen in Fig 3 below.

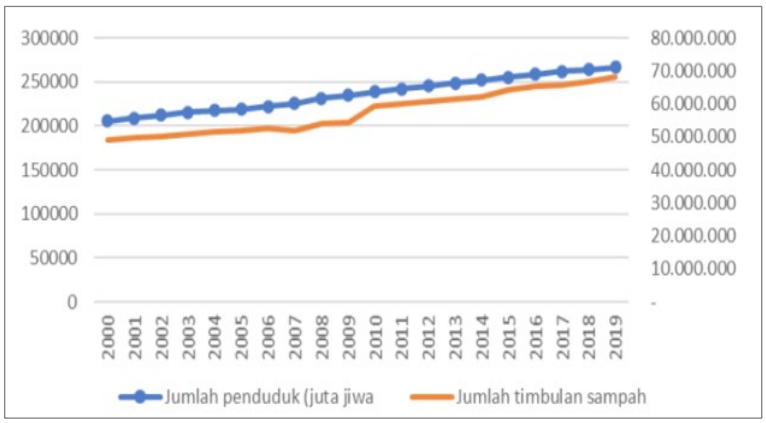

Figure 3. Comparison graph of population growth with waste generation (ADIPURA and BPS Data, 2019) (In Indonesia).

Waste based on its nature is divided into 2 (two) types, namely: organic waste and inorganic waste. Organic waste is the remaining waste that can be decomposed (degradable), such as food waste that easily decomposes. This type of waste can be processed and reused for compost. Meanwhile, inorganic waste is waste that cannot be decomposed (undegradable) and does not decompose easily, such as waste made of plastic, aluminum foil, glass, and made of iron cans.

Fig 4. Types of organic waste and inorganic waste (Haryono, 2019)

Inorganic waste has properties that are difficult to decompose because it cannot be digested by microorganisms or bacteria. The concentration of plastic particles in excessive amounts in a soil ecosystem will kill decomposer animals such as worms and bacteria, because of the ethylene poison produced by plastic waste, so that the soil condition becomes infertile. The percentage of types of waste generated can be seen in Table 1 below.

Table 1. Percentage of types of waste

Garbage Type	Persentase
Organic	60,00 %
Plastic	14,00 %
Paper	9,00 %
Metal	4,30 %
Rubber	5,50 %
Cloth	3,50 %
Glass	1,70 %
Other	2,00 %
Total	100,00 %

Waste reduction

According to the results of research by the Ministry of the Environment nationally regarding the sources of waste generated by human daily activities in urban and rural areas ((Dani, 2018), based on data collection at the National Landfill, it can be categorized as follows:

Table 2. Percentage of generated waste sources

Garbage Source	Persentase
Household	48,00 %
Traditional market	24,00 %
Commercial Area	9,00 %
School	4,00 %
Office	6,00 %
Road	7,50 %
Other	1,50 %
Total	100,00 %

Table 2 above explains that the percentage of waste generated is mostly from household waste, which is 48%, so to reduce the environmental burden due to the accumulation of waste generation, it can be done by conducting socialization so that the community participates in protecting the environment, the methods are as follows: 1) Prevent and minimize the generation of waste due to daily activities (prevention); 2) Reusing the remaining waste for daily needs, for example plastic bags (reuse); and 3) Recycle waste into useful and economical products (recycle).

Garbage handling

In particular, the City of Payakumbuh through the Environmental Service has carried out socialization regarding waste management to the community through Regional Regulation Number 4 of 2019 concerning Waste Management. The advocacy and socialization aim to manage and handle household waste from the start, the handling procedures are: 1) Separation, collection, and recycling systems from sources in a segregated manner; 2) Transporting from the source and Temporary Disposal Site (TPS) to the processing site/TPST, or TPA; 3) Processing at the TPST for reuse or the waste is destroyed using an incinerator; and 4) Waste in the TPA must be processed to be safe for the environment.

A good waste management method is handling that starts from the source, the closer to the source, the greater the sense of responsibility for handling and reducing the amount of waste generated from daily activities.

RESEARCH METHODS

This study uses secondary data on the reduction and handling of household waste and similar household waste in Payakumbuh City in 2019-2020 as well as a literature study on regional regulations that serve as guidelines for waste management in Payakumbuh City. The secondary data was obtained from the Payakumbuh City Environmental Service.

RESEARCH RESULTS

Garbage generation in Payakumbuh city

In 2020, Payakumbuh City has a population of ± 140,201 inhabitants. With such a population, the estimated waste generation in Payakumbuh City in 2020 is 98.14 m³/day. The waste generation comes from 5 (five) sub-districts, with the distribution as shown in Fig 5 below.

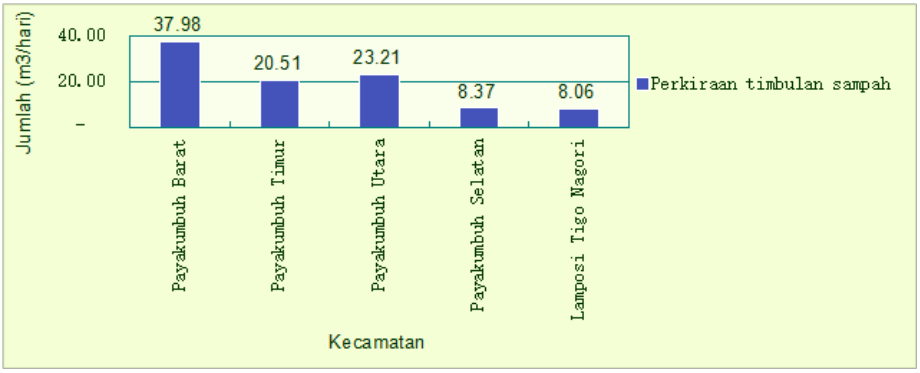

Fig 5. Estimated waste generation in Payakumbuh city in 2020 (In Indonesia) (DIKPLHD Payakumbuh City, 2021)

From the graphic above, it can be concluded that West Payakumbuh District is the largest contributor to waste generation in Payakumbuh City, which is 37.98 m³/day. Followed by North Payakumbuh District of 21.21 m³/day, East Payakumbuh District of 20.51 m³/day, South Payakumbuh District of 8.37 m³/day, and Lamposi Tigo Nagori District of 8.06 m³/day.

Target and realization of waste reduction and handling in Payakumbuh city

Based on the Payakumbuh City Jakstrada target for 2018 - 2025 as stated in the Payakumbuh Mayor Regulation Number 89 of 2018, the reduction of household waste and waste similar to household waste is 30% of the Payakumbuh City waste generation rate. Meanwhile, the target for handling household waste and similar household waste is 70% of the Payakumbuh City waste generation rate. This figure is the target set for predicting the potential for waste generation in Payakumbuh City from 2018-2025. And the potential for waste generation is of course obtained from the projected population of Payakumbuh City in 2018-2025 times the waste generation index. While the realization of handling and reducing waste in 2019-2020 is 78.62% and a reduction of 16.23%, thus it can be concluded that the Payakumbuh City Jakstrada target has not been achieved in 2020. Furthermore, it is necessary to develop a strategy so that the Payakumbuh City Jakstrada target can be achieved.

Efforts to reduce household waste and waste similar to household waste in Payakumbuh City are carried out through: limiting waste generation, reusing and recycling household waste, and similar household waste. The application of this waste reduction effort was previously known as 3R (Reduce, Reuse and Recycle). Efforts to handle household waste and similar household waste in Payakumbuh City are carried out through sorting, collecting, transporting, processing, and final processing. Waste sorting efforts have been carried out on several households that have received socialization and direct guidance from the

Payakumbuh City Environmental Service and also Zero Waste Ambassadors. The community was introduced to the types of waste and how to sort it. In addition, the community was also assisted in the form of a composter, biodigester, and 3R garbage bins to be able to manage the waste they produce.

In Payakumbuh City, 6 units of the waste bank have been developed, namely: Peduli Garbage Bank, Sejahtera Garbage Bank, Labinar Garbage Bank, Liberty Waste Bank, Damai Parent Waste Bank, and Kito Basamo Garbage Bank. The amount of waste managed in each of these waste banks can be seen in Fig 6 below.

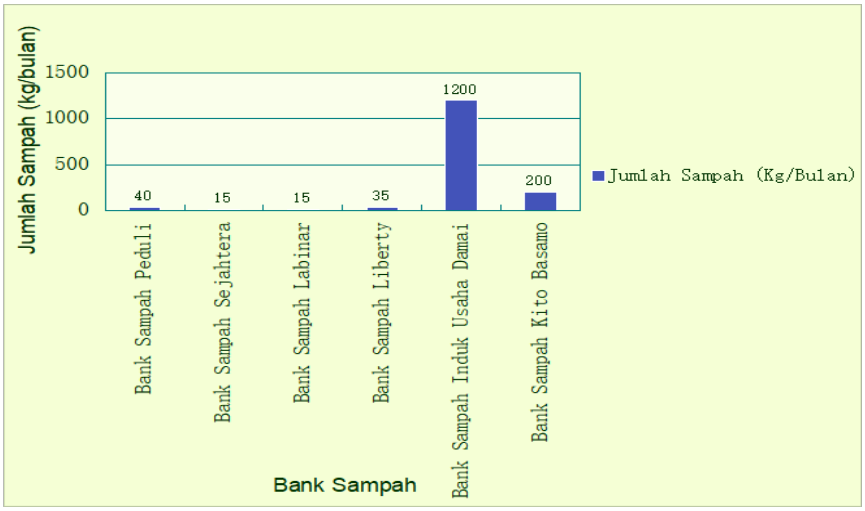

Fig 6. Comparison of the amount of waste managed by the waste bank in Payakumbuh city in 2020 (In Indonesia) (DIKPLHD Payakumbuh City, 2021)

Obstacles faced in reducing waste and handling waste in Payakumbuh City

The realization of the reduction and handling of household waste and waste similar to household waste in Payakumbuh City encountered obstacles in achieving targets according to the Payakumbuh City Central Jakarta Regional Office. The obstacles faced in realizing the Jakstrada target generally stem from the high amount of waste generated due to several things, including:

1. The generation of waste in Payakumbuh City does not only come from residents of Payakumbuh City but also comes from residents of the surrounding area. This causes a very significant difference in calculations between the existing waste generation and the previous prediction of total waste generation in Payakumbuh City according to Jakstrada.
2. Payakumbuh is a city that is very fast in culinary development, especially at night. Street food vendors will be seen lined up along the main road as the evening approaches. This is of course also a contributor to the increase in total waste generation originating from night food.
3. The strategic position of Payakumbuh City as a liaison between Riau Province and Padang City, makes this city a stopover city. The visit led to an increase in a total waste generation along the main road.
4. The development of tourist destinations in Payakumbuh City is also a contributor to the increase in total waste generation in Payakumbuh City, such as Panorama Ampangan, Ngalau Indah, and new tourist destinations along the Batang Agam River.
5. The generation of waste from market waste, which is mostly organic waste.

Recommendations for waste reduction management and waste management in Payakumbuh City

Waste management aims to reduce and manage existing waste. Waste management can be seen from 4 (four) aspects, namely: waste management institutions, regulatory regulations, user fees, and management costs, and community participation.

1. Waste Management Institutions: The Payakumbuh City Government has an Environmental Service that is authorized and responsible for waste management, which is supported by several relevant agencies such as Bappeda, Education Office, Health Office, Industry Service, Cooperatives and SMEs Service, Food Security Service, Transportation Service, District, and Urban Village. It is necessary to increase cooperation between OPD / related institutions and cooperation with provincial and central governments in reducing household waste and waste similar to household waste as well as encouraging executive and legislative commitment to prioritize budget allocations in the waste management sector.

2. Regulatory Regulation: To strengthen waste reduction and handling, the Payakumbuh City Government can issue Mayor Regulations related to waste reduction, such as Mayor Regulations on Reducing the Use of Plastic Waste and Mayor Regulations on Organic Waste Processing and Utilization.

3. Retribution and Financing for Waste Management: The funding for waste management in Payakumbuh City comes from the APBN, Provincial APBD, and APBD. Funds originating from the APBN and the Provincial APBD are generally used for the procurement of waste management facilities and infrastructures, such as procurement of dump trucks, arm-roll trucks, and motorized tricycles. Meanwhile, funds from the APBD are used for waste management operations, such as spending on fuel, maintenance, and spare parts for operational vehicles as well as payment for cleaning services and the procurement of equipment needed in waste management, such as brooms, hoes, sickles, and others. other. For this reason, a commitment from the executive and legislature is urgently needed to prioritize budget allocations in the waste management sector.

As a source of funding for waste management, the Payakumbuh City Government has collected retribution for waste services originating from household consumers, shops, hotels, and restaurants. To increase revenue to assist the government in handling waste, the Payakumbuh City Government can review the levy rates by taking into account the cost of providing services, community capacity, aspects of justice, and the effectiveness of control over services, referring to the Regulation of the Minister of Home Affairs Number 7 of 2021 concerning Procedures. Calculation of Retribution in the Context of Implementing Waste Handling.

4. Community Participation: Community participation in waste management in Payakumbuh City can be seen through the development of Waste Banks and TPST in urban villages, but the practice of selecting waste in households is still very lacking, this causes the volume of waste managed by the government is still quite large, as well as discipline. the community in obeying the hours of waste disposal is also lacking so that the government needs to carry out comprehensive socialization to the community regarding the procedures for sorting waste and the importance of obedience to the hours of waste disposal. The existence of the Waste Bank and TPST must continue to be supported by its empowerment and it is hoped that it can become a center for sorting, utilizing, and processing organic waste and inorganic waste.

The Environment Agency should continue to provide education to the public to use the biodigester and composter that has been distributed as one of the government's programs in reducing household waste so that the compost produced can be used as fertilizer for the community.

CONCLUSIONS

The estimated waste generation in Payakumbuh City in 2020 is 98.14 m3/day with a target of reducing household waste and similar household waste by 30% and the target for handling household waste and

similar household waste is 70% of generation numbers. Based on data for 2019-2020 the target for Handling and Reducing Jakstrada Payakumbuh City waste in 2018-2025 has not been achieved, with waste handling of 78.62% and a reduction of 16.23%, but there is still a lot of time until 2025, for that we need strategies and waste management so that the Payakumbuh City Jaktrada achieve the expected target. Waste management in Payakumbuh City can be arranged through 4 (four) aspects, namely waste management institutions, regulatory regulations, fees, and management costs, and community participation.

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