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P-ISSN 1411-7924
Vol. 11, No. 1, January, 2025, pp. 14-26 14

Jakarta Waste Management Policy and the Capacity Crisis of Bantargebang TPST: An Environmental Justice Review

Wahyu Pratama Tamba [a,1*], Fitri Yanti[b,2], Dumanita Tamba[b,3]

[a] Social Welfare Doctoral Program, University of Indonesia, Depok, West Java, 16424, Indonesia
[b] Bachelor of Midwifery Program, STIKES Abdi Nusantara Jakarta, Bekasi, West Java, 17412, Indonesia
[c] State Administration Program, Nusa Cendana University, Kupang, East Nusa Tenggara, 85001, Indonesia
[1] wahyu.pratama32@ui.ac.id*; [2] fitriyantisianturi23@gmail.com; [3] dumanita_tamba@staf.undana.ac.id
*corresponding author

ARTICLE INFO

Article history
Received: December 16, 2024
Revised: January 19, 2025
Accepted: January 30, 2025

Keywords:
Environmental Justice
TPST Bantargebang
Waste Management
Jakarta

ABSTRACT

This research aims to analyze the Bantargebang Integrated Waste Disposal Site (TPST) capacity crisis and its environmental and social impacts through an environmental justice framework. This research identifies waste management policies in Jakarta and examines ecological justice in their implementation. This research uses a qualitative approach with a literature study method, supported by various references such as previous research journals and books. The findings show that Bantargebang TPST has reached 86.4% of its maximum capacity. The existence of TPST causes negative impacts on the environment and local communities, including air and water pollution, ecosystem damage, landslides, economic welfare, and social conflicts. Local communities face negative impacts such as unpleasant odors, difficulty accessing clean water, and health risks. In addition, the presence of Bantargebang TPST has led to social tensions between residents and the local government related to the amount of compensation and environmental management. The study recommends increasing community participation in waste management programs and implementing more equitable policies to ensure that all affected communities benefit from TPST Bantargebang's operations. Finally, this study emphasizes the importance of protecting marginalized groups from the negative consequences of waste management within an environmental justice framework.

1. Introduction

Jakarta, as a megapolitan city and once the capital of Indonesia, is experiencing significant population growth, with a total population of 10,672,100 people in 2023 (BPS DKI Jakarta, 2024). This growth has a huge impact on various aspects of city life, one of which is waste management. Every day, the volume of waste generated in Jakarta reaches almost 8,000 tons, most of which is taken to the Bantargebang Integrated Waste Disposal Site (TPST). This phenomenon represents a serious challenge in municipal waste management, which is becoming more complex as the population and economic activities in this metropolitan area increase.

The volume of waste that continues to increase every day is caused by the growth of a denser population. This indicates that human activities produce waste that cannot be avoided daily. With the higher growth rate and population density, the waste generated will also be greater (Yukalang et al., 2017; Chen, 2018; Taufik, 2023; Voukkali et al., 2024; Januari et al., 2024).

The DKI Jakarta Provincial Environment Agency said that the waste produced daily in Jakarta reaches 7,400 tons. The largest waste contributor area of up to 61 percent is the residential area of the Jakarta community, with a distribution of 2,742 Rukun Warga (RW) areas. The remaining 28 percent of waste is generated by the business sector and public facilities contribute 11 percent of waste production (Jakita, 2021). It can be interpreted that most of the waste in DKI Jakarta comes from residential areas, indicating a close relationship between population density and an increase in the volume of waste generated by the community. The increase in population in the region contributes significantly to the amount of waste generated, creating increasingly complex waste management challenges.

Based on the history of waste management, since 1989 waste from Jakarta has been brought and disposed of at the Bantargebang Integrated Waste Management Site (TPST), Bekasi City. The naming of TPST was previously called the Bantargebang Landfill (TPA), which has existed since 1985 and was fully operational in 1989, covering three village areas in Bantargebang District including Cikiwul, Ciketing Udik, and Sumur Batu (A. Ali, 2003). From then until now, waste from Jakarta has consistently been brought to TPST Bantargebang.

In the 2019-2022 period, for example, every day the average volume of waste transported to Bantargebang TPST reached above 7,000 tons, where in 2019 it was 7,702.07 tons, in 2020 it was 7,587.49 tons, in 2021 it reached 7,233.82 tons, and in 2022 it was 7,543.42 tons. Meanwhile, data from the National Waste Management Information System (SIPSN) of the Ministry of Environment (MOE) shows that waste accumulation in Jakarta will reach 3.1 million tons in 2022. This is due to the condition of an increase in the volume of waste in Jakarta in the four years, namely 2019-2022 with a total waste volume reaching 11.25 million tons (Kementerian Lingkungan Hidup, 2023).

The dependence of waste disposal from Jakarta to TPST Bantargebang certainly has an impact on the shrinking capacity of the Bantargebang TPST landfill area. Overall, the Bantargebang TPST area reaches 110.3 ha consisting of an effective area of 81.91 ha divided into five zones. The rest, which is 28.39 ha, is utilized for entrance road infrastructure, office roads and waste processing installations with land status owned by the DKI Jakarta Provincial Government. Zone 1 covers 18.3 ha, zone 2 covers 17.7 ha, zone 3 covers 25.41 ha, zone 4 covers 11.0 ha, and zone 5 covers 9.5 ha. Zone 3 has the largest area, while Zone 5 is the opposite. All land areas in the Bantargebang TPST area are owned by the DKI Jakarta Provincial Government (UPST Bantargebang Website, 2024). This is illustrated in the results of Darmawan's research (2020) which explains the problem of shrinking the capacity of TPST Bantargebang, where currently the landfill area has been used in stockpiling waste to reach 86.4% of the total landfill area of the total Bantargebang TPST area of 110.3 hectares. The condition of the heaped waste at TPST Bantargebang reaches up to 40 meters (Khansa et al., 2024).

In addition to the problem of the Bantargebang TPST land crisis, this research also highlights the various impacts caused to the community around the Bantargebang TPST. Sukwika & Noviana, (2020) explains that the condition of more and more waste piles will generally cause the impact of air pollution which is increasingly unhealthy for the community. In addition, the existence of waste landfills, including TPST Bantargebang, will cause various social and environmental impacts, including disease risk and vulnerability, land degradation, global warming, groundwater pollution due to waste leachate water, and high methane emission gas content (Fajarwati et al., 2020; Abubakar et al., 2022; Siddiqua et al., 2022; Jain et al., 2023). Likewise, Yukalang et al., (2016) showed that inadequate municipal waste management can lead to human and ecological health risks, global warming, infrastructure damage, and increased waste disposal and management costs. In addition, Schenck et al. (2019) research revealed various risks faced by communities around landfills that contain many chemicals and rotten objects, namely groundwater and air pollution that cause health risks.

With the various impacts caused and the Bantargebang TPST landfill capacity crisis, it is important to explore the urgent problem of Bantargebang TPST capacity and the impact of the Waste Landfill (TPA), then how the policies implemented by the DKI Jakarta Provincial Government in waste management in Jakarta and environmental justice in the context of the sustainability of Jakarta waste management and Bantargebang TPST. For this reason, this research aims to explain and

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analyze the problem of Bantargebang TPST capacity and the impact of landfills, then identify the waste management policies implemented by the DKI Jakarta Provincial Government and analyze environmental justice in the implementation of Jakarta's waste management policies and the sustainability of Bantargebang TPST. Furthermore, the essential novelty of this research is characterized by the deepening of Jakarta's waste management policies related to multiple aspects, including social, health, environmental, and economic aspects. This is also supported by an explanation of the application of technology in waste management and volume reduction to examine community participation in Jakarta's waste management program which can be a determining factor for policy success.

2. Research Methods

This research seeks to explore and explain the DKI Jakarta Provincial Government's policy in waste management and the future of TPST Bantargebang in Bekasi City with all the impacts it has caused. This research uses the conceptual framework of environmental justice to analyze environmental justice in the Bantargebang TPST case, this framework emphasizes equality in environmental protection for all individuals, regardless of social, economic, or ethnic backgrounds. It is characterized by several key principles, including: (1) Fair distribution of environmental benefits and burdens, the principle of environment justice emphasizes the fair distribution of environmental benefits and burdens. (2) Community Involvement in Decision-Making, emphasizing the importance of community involvement in decision-making that affects their environment. (3) Protection of Marginalized Groups, paying special attention to the protection of marginalized groups, who are more vulnerable to the negative impacts of environmental damage.

Therefore, this research approach is more appropriate to use a qualitative approach. (Babbie, 2004) explains the qualitative approach as a method that seeks to reveal a deeper meaning to a fact of behavioral experience and obtain qualitative data. Furthermore, the type of research is a literature review by tracing and examining various relevant literature reference sources including previous research journals, reference books, media coverage, government policies, and regulations. Zed, (2004) suggests literature study as a series of activities of library data collection methods, reading, recording, and processing research materials. This type of literature review can identify selected topics by gathering and collecting empirical findings from various sources related to research questions to support evidence-based practice. A literature review can be classified as nonreactive research. Neuman (2014) defines nonreactive research as a research method that is conducted without the knowledge of the community being researched.

The steps in conducting a literature review according to Creswell & Creswell (2018) include: identifying words; searching the Literature by using keywords to search for journals and books in databases; Finding relevant studies; Skimming and selecting articles that have been identified as relevant to the research topic; Creating a literature map of the literature that has been collected; making a summary of the most relevant articles; Compiling a literature review by compiling a summary thematically or based on key concepts by focusing on how a study addresses gaps in the existing literature and outlining proposed methods for further investigation.

To access Scopus-indexed national and international journals, tools such as Google Scholar, Research Gate, and the University of Indonesia digital library were used in the literature research data collection effort. Most of the research article references came from publications within the last ten years. Key phrases including waste management, TPST Bantargebang, the impact of the landfill, and the impact of Bantargebang landfill/ TPST and environmental justice are some of the concepts that are limited in the search for reference sources by using keywords marked with quotation marks. The use of Google Scholar-based scientific article references has become the largest database used by researchers (Baneyx, 2008 in Poerwanti et al., 2024). The entire data set was then analyzed in a comprehensive qualitative manner to give meaning to the data obtained and abstract it into sub-subjects to answer the formulation of the research study problem (Creswell, 2014; Creswell, 2019). The steps in analyzing qualitative data according to Creswell (2014), include: first, organizing data

from various sources, mainly literature reviews, then processing and preparing the data for analysis, after reading the entire data, coding data to determine themes, connecting themes, to interpret themes, and finally describing them.

3. Results and Discussion

3.1 Bantargebang TPST Impact Overview

The capacity crisis at the Bantargebang Integrated Waste Management Site (TPST) is a serious problem that adversely affects the surrounding environment. Currently, the capacity of TPST Bantargebang has reached 86.4% of the total maximum capacity, with waste accumulation reaching around 39 million tons of the total capacity of 49 million tons (Darmawan et al., 2020; Yamin, 2024). With the high volume of incoming waste, which is around 7,500 to 7,800 tons per day, this situation triggers various environmental problems, including air pollution and groundwater pollution.

The discussion of the impact of waste landfills is related to the waste treatment system used at the landfill. For the context of TPST Bantargebang, the waste treatment system uses an open dumping system, which is a waste disposal system without taking any action by simply dumping it in the landfill. Then the sanitary landfill system is by disposing of and piling up waste into one place in the form of a basin, then compaction and covering it with soil (Priatna et al., 2020 & Purwendah, 2019). Implementation of the system if done improperly will hurt the environment, especially groundwater pollution.

The existence of TPST Bantargebang since its operation in 1989 until now has caused various impacts on the environment and the surrounding community. On the environmental aspect, the factual impacts that occur are pollution and pollution of water, soil, and air pollution. Khansa et al., (2024) revealed that people around the Bantargebang TPST area experience or inhale unpleasant odors from the mountains of waste from Bantargebang TPST every day. This condition is even experienced by residents within a radius of 10 km from TPST Bantar Gebang Yamin, (2024). In addition, the community also faces difficulties in obtaining clean water for daily use, especially during the rainy season, there is groundwater pollution in general and specifically groundwater in residents' wells because it is mixed or polluted with residual wastewater or leachate water (Wilandari & Sulistyarso, 2017).

In line with the findings of Khansa et al., the results of Agnesia & Lianto (2022) research also show the impact of waste at TPST Bantargebang which has caused unpleasant odors, polluted groundwater and the potential risk of disease to the community around TPST Bantargebang. Further impacts lead to the social aspects of society, where water pollution will certainly have a direct impact on ecosystem damage and the hygiene or cleanliness of the water used by the community every day (Yamin, 2024). Water consumed in polluted conditions is significantly harmful to humans and susceptible to various diseases. The threat of disease risk and decreased quality of life shows the health impact on the surrounding community due to the poorly managed waste disposal of TPST Bantargebang.

Another impact, given the condition of the high mountain of garbage in Bantargebang TPST, is the threat of landslides. The garbage avalanche incident in 2006 resulted in the death of two people and dozens of scavengers were buried by the garbage avalanche. Then in October 2022 the waste avalanche event had caused the closure of the access road to TPST Bantargebang (Khansa et al., 2024).

Furthermore, the social impact of the existence of the Bantargebang Integrated Waste Disposal Site (TPST) on the surrounding community covers various aspects, including health, economy, welfare, and the potential for social conflict. Sukwika & Noviana, (2020) revealed the vulnerability of social conflict between the communities affected by the Bantargebang TPST and the relevant local governments, including the Provincial Government as the owner of the Bantargebang TPST land and the Bekasi City Government as the party that oversees the Bantargebang administrative area.

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However, of the many impacts, public health is one of the most prominent issues. According to Ayen et al. (2016), air pollution resulting from the waste decomposition process and methane gas emissions increase health risks for the surrounding population, with the emergence of respiratory disorders such as asthma, bronchitis, and chronic obstructive pulmonary disease. In addition, soil and water pollution due to leachate seeping from waste piles also impacts the quality of water resources used by the community.

On the economic and community welfare aspects, the existence of TPST Bantargebang also brings a dilemmatic economic impact, but because it is not managed properly, it hurts the social aspects of the community. On the one hand, TPST provides informal employment opportunities for the surrounding community, especially as scavengers. However, this work is unsafe and tends to be unsustainable. On the other hand, the decline in environmental quality leads to a decrease in the value of surrounding property and land, which has an impact on the welfare of local communities. Communities around waste landfills are the most affected and show a picture of marginalized social groups in waste management policies (Abubakar et al., 2022).

For these various impacts, the environmental aspect requires priority attention from the government to improve the quality of the clean water network, because the groundwater around Bantargebang TPST has been polluted by waste leachate (Wilandari & Sulistyarso, 2017). Furthermore, over the past few years, the DKI Jakarta Provincial Government has implemented a policy of allocating cash compensation for communities affected by the Bantargebang TPST spread across four urban villages, namely Cikiwul, Ciketingudik, Sumurbatu and Bantargebang (Tamba & Laksmono, 2024). However, the local government needs to implement a better compensation program and ensure that the benefits of TPST Bantargebang can be felt fairly by all affected communities. Efforts to raise public awareness about environmental and health impacts are also crucial to creating a better environment around TPST Bantargebang.

3.2 Policy Analysis of Waste Management in Jakarta

National regulations regarding waste management are contained in Law Number 18 of 2008. Five years later, the DKI Jakarta Provincial Government passed a waste management regulation, namely DKI Jakarta Regional Regulation Number 3 of 2013, later revised to DKI Jakarta Regional Regulation Number 4 of 2019. Some of the objectives of waste management as stipulated in Article 3 include, first, realizing a healthy and clean environment from waste. Second, to increase the participation of the community and business actors to actively reduce and/or handle environmentally sound waste. Third, to make waste a resource that has economic value, and fourth, to realize excellent service.

Referring to article 5 of DKI Jakarta Regional Regulation number 4 of 2019, the duties of local governments in waste management include first, formulating and determining waste management policies and strategies based on national policies. Second, conducting inter-regional cooperation, partnerships, and networks in waste management. Third, determining the location of TPS, TPS 3R, TPST, FPSA, and TPA in the Detailed Spatial Plan (RDTR). Fourth, conduct monitoring and evaluation of TPS, TPS 3R, TPST, FPSA, and TPA. Fifth, conduct monitoring and evaluation of landfills after the landfill is declared closed periodically every 6 (six) months for 20 (twenty) years. Sixth, facilitating and resolving disputes in waste management. Seventh, conducting guidance and supervision of waste management. Eighth, compile and organize a waste management emergency response system by its authority. When compared to Article 5 of the previous DKI Jakarta Regional Regulation number 3 of 2013, there are prominent changes located in the third and fourth points. There is the addition of determining the location of the FPSA in the third point, then in the fourth point, there is the addition of periodic evaluation monitoring items for FPSA, and TPA.

The Integrated Waste Processing Site (TPST), based on the provisions of article 1 point 31 of DKI Jakarta Regional Regulation number 3 of 2013 concerning waste management, is a place for the implementation of waste collection, sorting, reuse, recycling, processing, and final processing activities. So far, waste generated from the Jakarta area has been brought to TPST to be dumped and

managed there. The TPST where Jakarta's waste is dumped and processed is located in the Bantargebang District, Bekasi City, West Java.

Various efforts made by the DKI Jakarta Provincial Government within the framework of waste management policies are aimed at reducing the volume of waste, to reduce the volume of waste brought to TPST Bantargebang. For this purpose, the DKI Jakarta Provincial Government is collaborating with the Osaki City Government, Japan to organize the Jakarta Recycle Center (JRC) program in 2020. However, the implementation of the program has not been massive, until now the JRC program has only been implemented in the Pesanggrahan District, South Jakarta, precisely in two residential areas that have a total of 771 residents. This shows that the program has not significantly targeted and involved the people of Jakarta, so it has not contributed to reducing the volume of waste generation in Jakarta.

Furthermore, based on the waste management masterplan of DKI Jakarta Province in 2012-2042, it is known that there is a plan to build waste processing infrastructure within the city of Jakarta (Intermediate Treatment Facility) whose technology is more environmentally friendly. The planned construction is spread across four areas including Sunter and Marunda North Jakarta, Cakung East Jakarta, and Duri Kosambi West Jakarta.

Next, as an implementation of Presidential Regulation number 35 of 2018 concerning the acceleration of the development of waste processing installations into electrical energy based on environmentally friendly technology, the DKI Jakarta Provincial Government and the Bekasi City Government collaborated in the construction of the Waste Power Plant (PLTSa) infrastructure network in the Bantargebang TPST area. By using PLTSa technology, TPST Bantargebang has the maximum capacity to reduce waste by up to 100 tons every day (Qodriyatun, 2021).

Utilization of waste for energy through Waste Power Plants (PLTSa) can be done by processing and utilizing methane gas in landfills (landfill gas utilization) and biorefineries (Ali et al., 2020). The most power plants that utilize landfill gas are in the United States, with a total of 325 units. On the other hand, biorefinery technology serves to convert waste into various types of fuel, energy, and other chemicals that are widely used in everyday life (Kokossis et al., 2014). One of the products produced through biorefinery technology is refuse-derived fuel (RDF), which is a fuel derived from combustible waste. The manufacturing process involves shredding, sieving, and classification using air (Hutabarat et al, 2018). In principle, RDF is one of the more complex waste management methods compared to incineration and anaerobic digestion technologies (Nizami et al., 2017).

In addition to seeking the construction of refused derived fuel (RDF) facilities and Waste Power Plants (PLTSa) for processing waste into alternative fuels, the DKI Jakarta Provincial Government continues to build Reuse, Reduce, and Recycle Waste Processing Sites. TPS 3R is equipped with waste processing machines with a processing capacity of 25 to 50 tons of waste/day and can also produce refused-derived fuel (RDF) / Solid Jumputan Fuel (BBJP). The DKI Jakarta Provincial Government emphasizes that TPS3R is a global city innovation currently owned by the DKI Jakarta Provincial Government to create an environment that is clean, comfortable, and sustainable so that it can reduce the volume of waste brought to the final disposal site (TPST Bantargebang) (Jakita, 2024). Therefore, the local government's efforts to promote TPS 3R (reduce, reuse, recycle) in waste management policy are so important amidst the crisis of landfill land availability capacity in urban areas (Haqq & Hidayah, 2022). This is also the case in Jakarta, TPS 3R efforts are a consequence of the limited land conditions in Jakarta so it determines the location of landfills outside the Jakarta area, namely in Bantargebang, Bekasi City, West Java.

In 2023, the DKI Jakarta Provincial Government targeted the construction of 44 TPS 3R stations spread across 44 sub-districts. However, in 2023 it only built seven TPS 3Rs and planned to build four TPS 3Rs in 2024, then the rest will be built in stages (Jakita, 2024). The DKI Jakarta Provincial Government has built TPS 3R in the West Pejaten area, South Jakarta, Ciracas East Jakarta, Rawasari Central Jakarta, DKI Jakarta.

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In addition to the Regional Regulation, Jakarta's waste management is also regulated in DKI Jakarta Governor Regulation (Pergub) number 108 of 2019 concerning Regional Policies and Strategies for the Special Capital Region of Jakarta Province in the Management of Household Waste and Waste Similar to Household Waste. The Pergub targets waste reduction from its source of up to 30 percent and a waste processing target of up to 70 percent, which is adjusted to the National Policy and Strategy for Household Waste Management and Waste Similar to Household Waste (Jakstranas), where the achievement target is expected to be realized by 2025.

Amid all the efforts of the local government in reducing waste, community participation is no less important. The DKI Jakarta Provincial Government issued DKI Jakarta Governor Regulation number 77 of 2020 concerning Waste Management in the Rukun Warga Scope. This Pergub encourages people in Jakarta settlements starting from the RW level to participate in waste management independently, especially waste reduction from its source. Communities at the RW level are encouraged to form working group teams that are tasked and responsible for managing waste in their neighborhoods. The Pergub also encourages socialization and education of the community in efforts to sort and reduce household waste. However, encouraging people to sort waste from the source is not an easy matter for the ranks of the DKI Jakarta Provincial Government. Therefore, community education efforts are needed to reduce, sort, and process waste independently (Jakita, 2024). In addition, it also regulates sanctions against people who do not comply with the provisions in question, this is intended to improve and strengthen the discipline of the people of Jakarta.

The implementation of the waste bank program at the RW level is one of the governor regulation's mandates. Indeed, the role and existence of waste banks are needed to socialize waste management and reduction efforts from the source, namely residential areas and households. Until now, the waste bank program has been implemented in almost every RW in Jakarta, which is believed to reduce waste shipments. With the implementation of the waste bank program, the community is allowed to exchange waste including plastic bottles, cardboard, paper, and others that are worth rupiah and benefit the community (Jakita, 2024).

Referring to the findings revealed by Afdhal (2024), the existence of waste banks has a significant positive impact in three main aspects, namely, social, economic, and environmental aspects. From the social aspect, waste banks play a role in changing people's behavior towards waste management, increasing awareness of the importance of disposing of waste in its place, and providing education on how to manage waste properly. In the economic aspect, the positive impact can be seen from the increased income of the community involved in waste bank activities. From an environmental perspective, waste banks contribute to reducing the amount of waste that goes to waste processing sites (TPS) and reducing the accumulation of waste in public areas, thus creating a cleaner environment. In implementing the waste management policy through the waste bank program, several obstacles were found, including low public understanding of the policy, inadequate socialization and supporting facilities, low public awareness of waste management, and challenges in monitoring and changing policies (Wahyudin et al., 2024). Therefore, it is important to overcome these barriers so that the positive impact of waste banks can be maximized, so that they can contribute more to community welfare and environmental preservation. More effective education and socialization efforts as well as the provision of adequate facilities will go a long way in encouraging community participation and the success of the waste bank program in Jakarta.

3.3 Environmental Justice in Waste Management Policy

The environmental justice movement began to emerge in the early 1980s in the United States, triggered by inequities in the unequal distribution of environmental burdens based on class, gender, and ethnicity (Avila, 2018). As a conceptual framework, environmental justice emphasizes equality in environmental protection for all individuals, regardless of social, economic, or ethnic

backgrounds. This conceptual view is in line with Collin's (2008) opinion (Wibisana, 2017), which emphasizes that environmental justice is related to the fair distribution of environmental rights and benefits among race, class, and income. Thus, environmental justice serves not only as a moral principle but also as a foundation for creating inclusive and sustainable policies, which ensure that all communities have equal access to natural resources and protection from the negative impacts of pollution and environmental damage.

The concept of environmental justice emerged as a response to the injustice experienced by marginalized groups of people, who are often victims of pollution and exploitation of natural resources, without getting equal benefits from a healthy environment. Historically, the emergence of this concept also occurred in North Carolina, United States in 1982. At that time, there was a social movement protesting the existence of waste disposal facilities, where the community jointly fought for justice and their rights over the negative impacts of the construction of waste disposal facilities in areas where black people lived (Afinas, 2023). Furthermore, environmental justice is also referred to as "eco-justice," which focuses on achieving environmental equity. It encourages people to have contributing involvement in the policies that shape their communities and fair treatment in decision-making processes to ensure environmental protection (Rogers & Jonker, 2024).

The environmental justice movement focuses on the equitable distribution of environmental benefits and burdens, as well as ensuring that communities have a voice in decision-making that affects their environment. This includes efforts to address issues such as hazardous waste and land grabs, which often have a greater impact on low-income, minority, and marginalized communities (Purwendah, 2019; Afinas, 2023).

It is also emphasized that the principles of environmental justice include the fair distribution of environmental benefits and burdens. This includes efforts to address issues such as hazardous waste and land grabbing, which often have a greater impact on low-income, minority, and marginalized communities. Environmental justice also focuses on community involvement in decisions that affect their environment, ensuring that communities have a voice in the decision-making process (Aminah, N. Z. & Muliawati, 2021).

In the context of the existence of TPST Bantargebang, to what extent does the distribution of benefits and impacts of TPST Bantargebang show fair or unfair conditions? To assess this, it is important to look at two sides, namely the benefits and negative impacts caused. In terms of Benefits: First, the most striking thing is that the DKI Jakarta Provincial Government provides cash compensation to affected communities in four villages around Bantargebang TPST, this is a mandate from Article 10 Letter e of Regional Regulation Number 4 of 2019 concerning Waste Management. Second, the existence of TPST Bantargebang has provided informal employment opportunities for some of the surrounding communities, especially as scavengers. However, the existence of these scavengers is not formally managed by the local government, either DKI Jakarta or Bekasi City.

On the other hand, the negative impacts caused by TPST Bantargebang include: first, environmental pollution, that TPST Bantargebang causes air and groundwater pollution which has an impact on the health and quality of life of the surrounding community. Second, the community around Bantargebang TPST is exposed to the risk of respiratory diseases and diseases due to water pollution. Third, it is undeniable that environmental pollution and the negative stigma of TPST Bantargebang have caused a decline in the value of surrounding property and land. Fourth, the high pile of waste at TPST Bantargebang will threaten public safety due to the potential for landslides. Therefore, the distribution of benefits and impacts of TPST Bantargebang tends to be unfair. Although there are economic benefits and compensation, the negative impacts felt by the community, especially related to health and the environment, are much greater.

The Social Classes of people who receive more negative impacts from the existence of TPST Bantargebang are low-income people and people who work in the informal sector, such as scavengers. They receive more negative impacts from TPST Bantargebang. This is due to several reasons, including: First, the dependence of waste pickers on the existence of TPST as a source of

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livelihood, so they are directly exposed to occupational health and safety risks. Second, limited access to health services, low-income communities generally have limited access to health services, making them more vulnerable to health impacts from environmental pollution. Third, groundwater pollution forces local communities to buy clean water, which will certainly add to their economic burden.

Environmental justice in the waste management policy at TPST Bantargebang reflects the challenges faced by the surrounding community regarding the social and environmental impacts of the existence of the TPST. Although TPST Bantargebang has attempted to implement a more environmentally friendly and sustainable management system, many residents still feel negative impacts, such as air pollution and health problems due to poorly managed waste. People's perceptions are often torn between hopes for an improved waste management system and the conditions they face factually, including the decline in people's quality of life due to pollution (Zaman, 2024).

The characteristics of the community around Bantargebang TPST as affected residents can be seen from the provision of compensation funds so far. The distribution of compensation is an order from Regional Regulation Number 4 of 2019 concerning Waste Management, stipulated in Article 10 Letter e, that compensation is given to people who are negatively affected by waste landfills. Compensation has been given to people in four villages, including Cikiwul, Ciketingudik, Sumurbatu, and Bantargebang. However, the amount of compensation funds is determined bottom-up by the local government, in this case, the DKI Jakarta Provincial Government and the Bekasi City Government, because the source of funds comes from the DKI Jakarta Provincial APBD. In practice, people in three urban villages including Cikiwul, Ciketingudik, and Sumurbatu received compensation of Rp. 400,000, while people in Bantargebang received Rp. 150,000. This is a critical note of this research, relating to the equality between the sacrifices of the local community and the compensation they have received so far.

Participation in the context of waste management is also emphasized in this study, community participation in waste management programs, such as the establishment of waste banks and waste management groups at the Rukun Warga (RW) level, is key to overcoming these challenges. These initiatives not only aim to raise awareness of the importance of waste segregation and recycling but also to empower communities to be more active in the waste management process in their neighborhoods. By involving the community directly, it is hoped to create a more effective and sustainable management system and improve the quality of life of residents around Bantargebang TPST.

4. Conclusion

The urgency of environmental justice in waste management policy at TPST Bantargebang is to ensure that all communities, especially the marginalized, get equal protection against the negative impacts of pollution and exploitation of natural resources. Despite efforts to implement a more environmentally friendly management system, challenges still exist, such as air pollution and health problems experienced by residents. Therefore, active community participation in waste management programs, and the government's commitment to creating inclusive and sustainable policies, is key to achieving an effective waste management system and improving the quality of life of communities around Bantargebang TPST.

To create a more effective and sustainable waste management system, it is important to directly involve the community in the decision-making process related to waste management. This can be done through the establishment of a transparent and inclusive management structure, as well as the implementation of extensive education programs to raise public awareness of the importance of waste segregation and recycling. In the context of waste management in Jakarta, local communities are educated about waste management within the 3R framework of reduce, reuse and recycle. The goal is to realize waste reduction from the source, namely households and settlements in Jakarta.

Furthermore, in the context of communities affected by the Bantargebang TPST, it is also important to involve local communities in the decision-making process related to planning and formulating compensation policies for the negative impacts of the Bantargebang landfill.

The government and local governments must commit to implementing policies based on the principles of environmental justice. This can be achieved by implementing consistent and strict regulations, increasing investment in waste management technology, and promoting or mainstreaming the practice of recycling and processing organic waste into compost. In addition, close coordination between the government, the community, and the private sector is required to achieve the goal of sustainable waste management. Local governments can develop partnerships with the private sector in waste management, such as technology investment, service provision, and development of community empowerment programs. Thus, the goals of the local government in handling and managing waste problems in Jakarta can be well realized, while creating a cleaner, healthier, and more sustainable environment for future generations, both in Jakarta and the affected areas of Bantargebang TPST.

5. Acknowledgments

The authors would like to thank the management of the University of Indonesia Library for supporting the availability and providing access to various reputable international journal references that support the preparation and development of this manuscript, and also to the Reviewers and Editors of Renai Journal who have provided notes on manuscript improvements and publication opportunities.

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